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PDF version of the User Guide (11.12.2017)

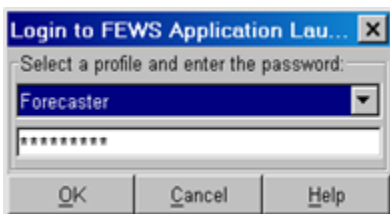
01 Launching Delft FEWS

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02 FEWS Explorer

Launching Delft FEWS

Depending on the local installation Delft-Fews can be started using the Application Launcher or by using an executable program located in the Delft-Fews binary directory (usually a link/shortcut will have been set up). On Linux systems Delft-Fews is started using a shell script. When using the Application Launcher a user must select a profile and enter the required password at startup.



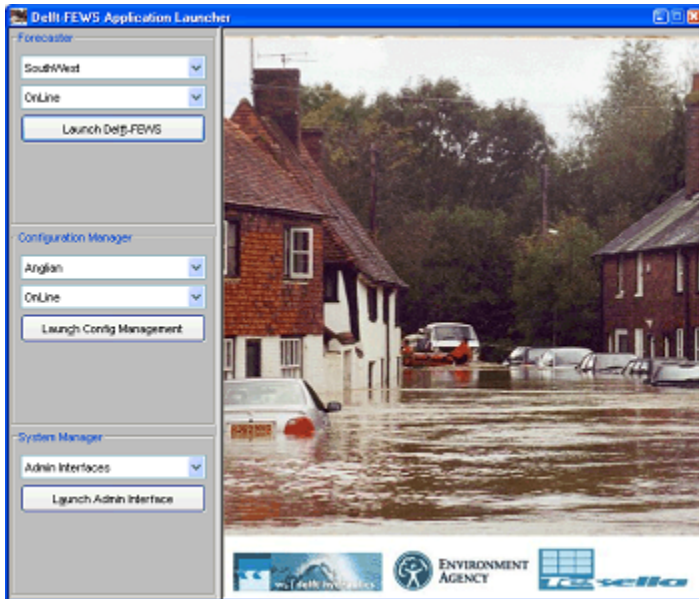
There are four profiles with each of them its own password:

- Viewer
- Forecaster
- Configuration Manager

- System Manager

The Viewer profile is the most restricted profile, a user with this profile can only launch the FEWS Webserver. The System Manager Profile, on the other hand, has all the rights to launch Stand Alone and Operator Clients, launch the Configuration Manager and use the Admin Interface. Depending on the configuration of FEWS all or some profiles may be present.

A screen dump of the FEWS Application Launcher for the National Flood Forecasting System for England & Wales is presented as an example below.



02 FEWS Explorer

01 Launching Delft FEWS

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03 Dropdown Menu

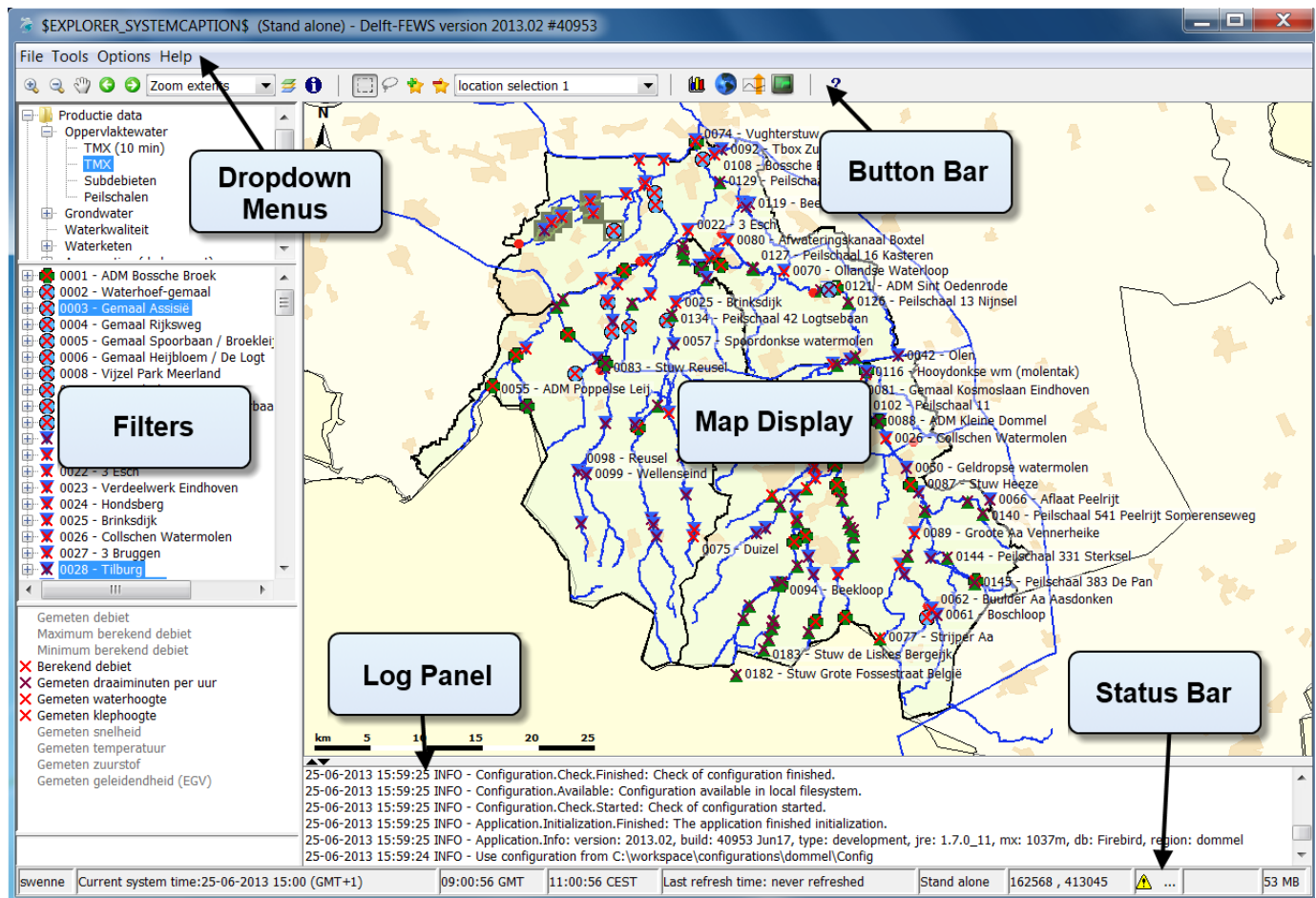
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 - Map Display
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 - Visibility of locations and parameters
 - Selection of location types
 - Locations list box
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 - Forecast list box
 - Location related icons
 - Location type
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 - Search in list boxes
 - Log Viewer
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 - Operator name (always displayed)
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- Mouse coordinates
- System status icon (always displayed)
- Notification (default disabled)
- Database Viewer
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FEWS Explorer

Overview

FEWS Explorer is the principal window of Delft FEWS. The main elements of FEWS Explorer are highlighted in the figure below. All windows can be re sized manually by dragging the mouse, or they can be undocked from the main screen, see 23 Interactive Forecasting Displays#23InteractiveForecastingDisplays-Dockablewindows



Map display

The map display serves a double purpose. The first is to give an overview of the available locations given a combination of filters applied and to allow the user to select or deselect locations by clicking the location icon. The second is to provide a geographical background to the locations involved in the flood forecast.

Filters

The list boxes- also called filters- are required to identify the data to be displayed in a graph or table, or the icons on the map. There are four list boxes, from top to bottom:

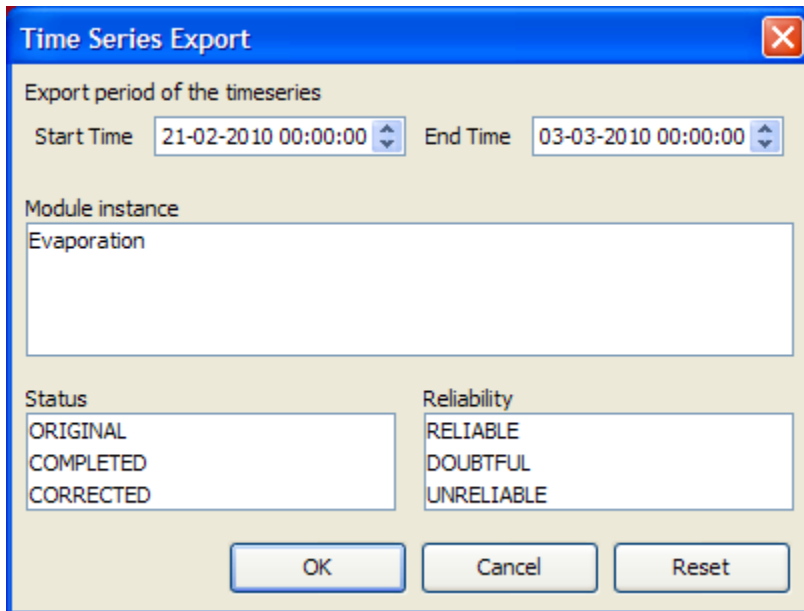
- Time series groups
- Locations
- Data types (parameters)
- Forecasts

Drop down menus

The drop down menu bar provides access to all displays configured for your configuration of FEWS.

File - Export timeseries

This menu option opens the Export timeseries dialog.



This dialog can be used to filter the selected timeseries by view period, module instance, reliability and status. After the filter options are selected, the timeseries which match the given criteria are saved to a file.

When the user selects in the Export timeseries dialog the reliability "unreliable", then only export formats that write quality flags are available, i.e. PI xml files, CSV files with quality flags and Dutch CSV files with quality flags.

If "unreliable" is not selected in the export timeseries dialog, then all export formats are available. This is required, because if unreliable values would be exported without quality flags, then it would not be possible in the exported file to see which values are unreliable. In the case of csv format with quality flags, the complete text of the quality flags (including STATE and DETECTION flags, if they exist) are added to the timeseries.

All export formats available in the Export timeseries dialog are:

- PI xml
- GIN xml
- csv, Dutch csv
- csv with quality flags
- Dutch csv with quality flags
- iBever csv
- Hymos transfer DB 4.50 mdb
- Hymos transfer DB 4.03 mdb
- Menyanthes csv
- UM Aquo 2009 xml

Since 2015.01 from the Reliability list, MISSING can be selected. Missing values will only be exported if MISSING has been selected.

Button bar

The Tool bar provides quick access to frequently used tools. Tools are plug-ins to FEWS Explorer. See [FEWSExplorer-StatusBar](#) for more information.

Log Panel

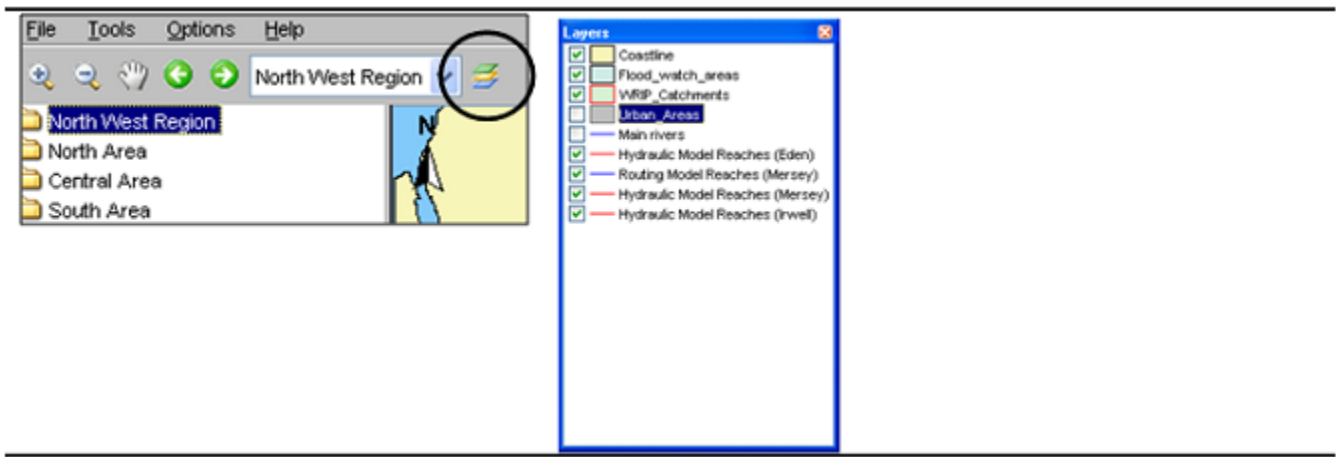
The Log Viewer relays high level messages generated by active system components. Additionally, detailed messages are available in the Log Browser.

Status Bar

The Status Bar provides information about the status of the forecasting system.

Map Display

Locations are displayed on top of the background map. The selected main filter determines which locations will be displayed. The background map may be configured to consist of stacked layering of various maps. For each map details about line types and fill colours may be set as well. Map layers can be disabled via the Layers button on the Button Bar..



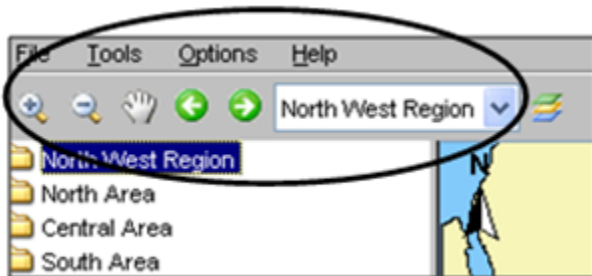
Tooltip

Information that is displayed when the user is moving the mouse cursor over a shape. To see this information turn on the 'I' button, in the button bar.

Map navigation

Map navigation options are set in the zoom toolbar item. After clicking the "button you can manually zoom in to a user defined map area. With the '-' button you can zoom out. Panning is possible after having clicked the *hand* button. From version 2008-01 the zoom in, zoom out and pan have been combined. After selecting the " button, drawing a box from top left to bottom right zooms in, while bottom right to top left zooms out. Holding down the right mouse button allows you to pan. The buttons for zoom out and pan remain for users with only one mouse button.

Returning and moving forward between previously selected zoom extents can be done after clicking the *arrow* buttons. The drop-down allows you to select pre-defined zoom ranges.



Please note that in case you want to leave the zoom or pan mode, you have to click the buttons again.

Zooming with scroll wheel

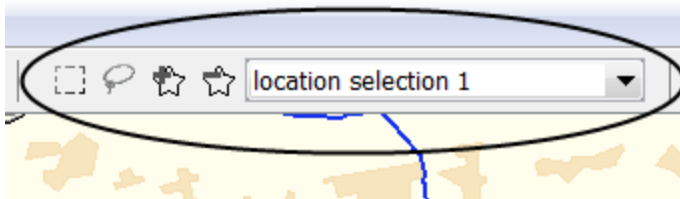
Alternatively, zooming can be done with help of the scroll wheel on the mouse (when available). Zooming in and out is done by respectively turning the scroll wheel away and towards for the user. The position of the cursor determines the centre point of the zoom action.






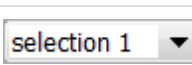
Selecting locations and parameters

Locations in the Map Display can be selected by clicking on their icon. When selecting a location in this fashion, the locations selected in the Filters (to the left of the map display) will be adjusted to correspond with the map display. Conversely, if a location is selected in the Filters, the selection in the Map View will be adjusted as well. Multiple locations can be selected by holding down the [CTRL] key while selecting.

Parameters can be selected in the filter box below the locations filters. It's also possible to select multiple parameters by holding down the [CTRL] key while selecting.

In the Button Bar, there is a section further aiding location and parameter selection.



	Rectangle selection: When selected allows you to press left mouse button and drag to create a rectangular box over the Map Display. When released it will select all locations contained in the rectangle.
	Lasso selection: When selected allows you to create a freehand selection in the Map Display. Press and hold the left mouse button and drag around the locations you want selected. Release to make the selection.
	Select with map item selection: When selected allows you to select polygons on the Map Display. When hovering over a polygon, the polygon will be highlighted. If clicked, the locations related to the polygon will be selected.
	Add location parameter selection: Stores the current Map Display location and parameter selection. A Pop-up will allow you to enter a name for this selection. After entering the name and pressing OK, the selection can be found in the dropdown box to the right.
	Removes location parameter selection: Removes the current item in the location and parameter selection dropdown box to the right of this icon. If there is no current item, or it is empty, nothing will happen.
	Location parameter selection dropdown: When selecting an item from this dropdown, the locations and parameters contained in that item will be selected in the Map Display and the Filters. Selections can be added or removed with the Add / Remove location selection buttons.

The stored selections endure a restart of FEWS and will only be deleted by manually removing them or when overwritten.

Show map layer information

An icon on the toolbar can be pressed to activate the presentation of information for map layers as a tooltip. If a map layer has been configured such that it shows information from the dbf file, a user can show this information by clicking the information button.

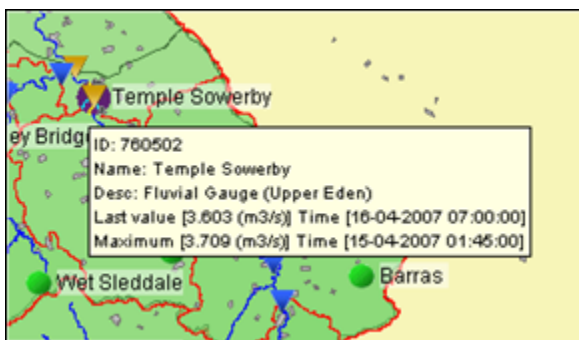
Note

In case the zoom mode has been activated, the desired location will not be selected, but the map will be panned instead. The zoom or pan mode must first be deactivated by clicking the magnifying glass again.

When moving the cursor to a location, a tool tip will be displayed with the following information:

- Location ID
- Location name
- Site description
- Information about time series...
- Last available value and date & time of last value
- Maximum value (in view period) and date & time of maximum

An example is given below;



The tooltip shown above is the default tooltip. Within Delft-Fews it is possible that the tooltip has been configured differently to e.g. display a picture of the location. Consult the documentation of your local system or the Delft-Fews [configuration guide \(locations\)](#) for more information.

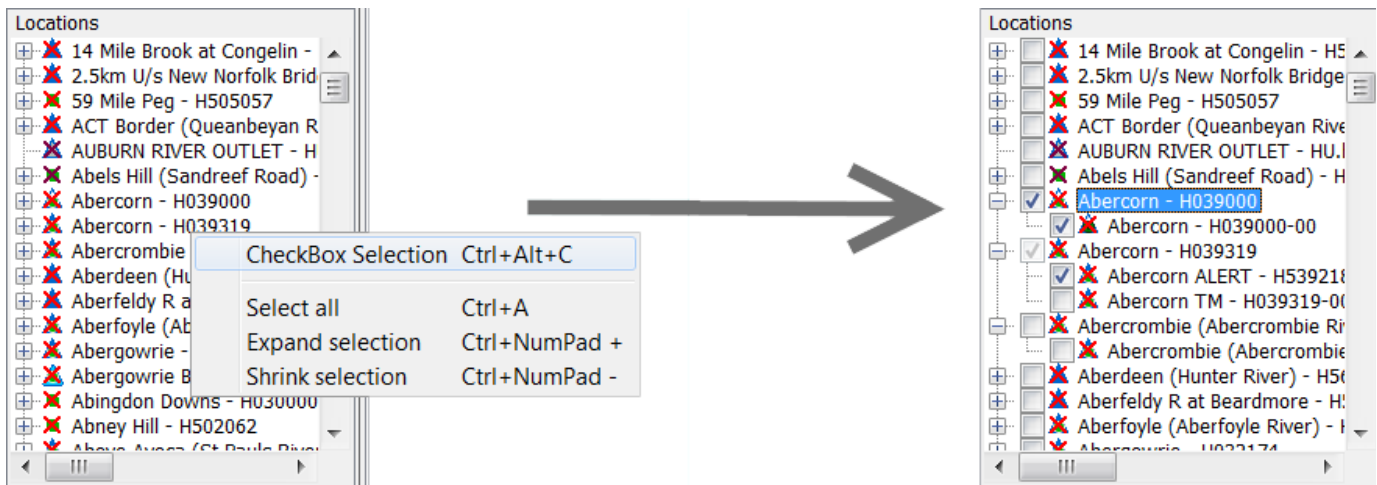
Filters

The filters are the 4 list boxes at the left hand side of the FEWS Explorer. The filters are used to select the data to be displayed in a graph or table. Your selection can be filtered by making one of more choices in the list boxes.

Using Check box selection

Locations, parameters and qualifiers have the ability to be selected with check boxes. To do so, right click on the windows for which you want the check box selection and select "Show check box selection".

With check box selection, selecting the label does not select the item. You will have to check the checkbox to select the item. A greyed out selected checkbox means that one, but not all locations associated with the local branch (the parent and its children) are selected. Like in the normal selection mode, it is possible in check box mode to select only the children without the parent.



Visibility of locations and parameters

The context menu of the listboxes includes the option Show only selected [CTRL ALT O]. This option restricts the visibility of locations and parameters in the listbox to the elements that are selected at the moment this option is chosen. In case of locations, the visibility in the map is also restricted. The visibility of all elements can be restored using the option Show All [CTRL ALT A]. It should be noted that these options require the listbox tree to be rebuilt; in check box selection mode, this leads to collapsing all children, except for the element with focus (dashed box).

Selection of location types

Time series sets can be selected in the upper filter. Time series sets are configured groups of locations with similar data types. The locations with the selected time series set(s) will be displayed on the map display and listed in the *locations* filter, the second list box. The data types associated with the locations are displayed in the *data types* filter, the third list box.

To select a list of multiple locations, hold down the [SHIFT] key between the first and second selection. Hold down the [CTRL] key to select multiple location types individually.

Using the right mouse button or a shortcut key, some context menu options become available:

- Select All [CTRL A] : Select all locations.
- Expand selection: [CTRL Numpad +] : A popup is shown where the selected locations can be expanded using a wildcard search. The wildcard characters are "*", matching zero or more characters, and "?", matching exactly one character. All matching locations will be selected.
For example, "Maas km 1?.00" will match "Maas km 10.00", "Maas km 11.00", etc., but not "Maas km 101.00".
As another example, "Maas km 1*" will match "Maas km 10.00", "Maas km 11.00", etc., but also "Maas km 100.00", "Maas km 101.00", etc.
- Shrink selection: [CTRL Numpad -] : A popup is shown where the selected locations can be shrunk using a wildcard search (using * and ?). All matching locations will be deselected.

Locations list box

The locations associated with the selected main filter(s) are shown in the locations filter. Selected location will be highlighted on the map by means of a blue square. Locations can also be selected in the map display.

Location related icons are displayed on the map as well as in front of the location names.

Different icons are used to display locations and give information about the availability of data and about the hydrological status of the locations. More information about location related icons is given below in a separate section.

Data types list box

The data types associated with the selected main filter(s) are shown in the data types list box.

Selecting one or multiple data types causes the location list box to be updated regarding the potential availability of data, as shown by the icon displayed to the left of the location.

When depending on the selections made no data is available for a particular location or parameter its name is greyed out.

To select a list of multiple data types, hold down the [SHIFT] key between the first and second selection. Hold down the [CTRL] key to select multiple data types individually.

Using the right mouse button or a shortcut key, some context menu options become available:

- Sort by name: Sort all data types by name.
- Select All [CTRL A] : Select all data types.
- Expand selection: [CTRL Numpad +] : A popup is shown where the selected data types can be expanded using a wildcard search (using * and ?). All matching data types will be selected.
- Shrink selection: [CTRL Numpad -] : A popup is shown where the selected data types can be shrunk using a wildcard search (using * and ?). All matching data types will be deselected.

Forecast list box

The forecast list box displays forecasts that have been selected for viewing with help of the Forecast Manager. By highlighting one or more forecasts in this filter you can display them in graphs and tables.

Please note that- although not visible in the forecast list- the *current forecast* is always selected by the system. Icons related to the current forecast will be displayed on the map. The current forecast will also always be shown in the time series display. Selection of the current forecast is described in the section about the *Forecast Manager*.

The selection of forecasts in the Forecast list box can be removed by clicking the right mouse button with the cursor placed in the forecast list box. A pop-up menu appears with 'Remove all'. Pressing this menu item will remove the list of forecasts from the list box. Please note that this will just remove the selection but will not remove the actual forecasts from the database.

Location related icons








Locations related icons can refer to the following types of information:

- Location type icons
- Data availability icons (validation information)
- Hydrological status icons (threshold information)

Location type


For different types of locations different icons can be configured to allow for easier identification. Please note that only a single location type icon can be defined per location. In case for example various data types are available at a certain location that relate to different icons, the choice has to be made which icon will be displayed.

In Delft FEWS the following location icons have been chosen but in principle any icon could be chosen to represent a location type in FEWS.

	gauged fluvial site
	ungauged fluvial site
	meteorological site
	radar data site
	coastal site
	catchment centre point
	default site

Data availability and validation

Data availability icons show what kind of data is available for the timeSeries selected in a filter.

	no data stored in database (also when looking outside of the view period)
---	---

	only missing values available in view period
	only missing values available in view period for some time series (configurable since 2011_02; see someSeriesCompletelyMissingIconVisible in the Explorer file)
	some missing values available in view period
	soft validation limit exceeded
	hard validation limit exceeded
	data edited or interpolated

Although the icon descriptions are always true, there are some common assumptions that are not always correct. Following are some examples and an elaboration with details why it's not true.

- "If a timeSeries contains only missing values (also when looking outside of the view period), it will have a purple cross". This often results from the missing values not being stored in the database but are deduced (i.e, for an equidistant time steps). However, missing values that are the result of a manual adjustment are stored in the database.

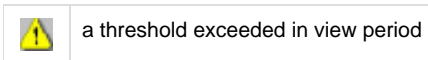
- "If a timeSeries has a red cross, there are some values available, just not in this view period". The only reason a red cross is not a purple cross is because data are stored in the database (for the timeSeries). But besides values there are also other data stored for a timeSeries, like expired forecasts or the example shown above. These two "data" examples are not an exhaustive list and are not meant to be, but they show that this assumption is not correct.

- "A red cross means that one will see no data in the timeSeries display (or the other way around)". The selected filter determines the view period that is used to determine which data availability icon should be shown. This view period configured for a filter does not have to be the same as the view period for the timeSeries displayed in the timeSeries Dialog. If the relative view periods are the same, then the assumption can be used.

If both a data availability icon and validation icon are valid - both will be shown concurrently. By default only the red crosses are shown; add the tag to the Filters file to display the additional validation icons.

Hydrological and meteorological status

In case the high flow thresholds or rainfall thresholds are exceeded somewhere in the configured view period, the following icon is displayed.








The threshold status icons are only displayed for the *current forecast* or selected forecast and observed data.

Together with the threshold icons information is displayed on the map to inform the forecaster on:

- the timing of the threshold crossing (historic or forecast period),
- the severity of the threshold crossing.

There are 5 extra icons pre-configured for 5 threshold levels that are merged with the original threshold icon. These extra icons are:

	Level 1 threshold crossing in historic and forecast period
	Level 2 threshold crossing in historic and forecast period
	Level 3 threshold crossing in historic and forecast period
	Level 4 threshold crossing in historic and forecast period
	Level 5 threshold crossing in historic and forecast period

For a level 3 threshold crossing in the historic period the combined threshold icon for a location will look as follows:



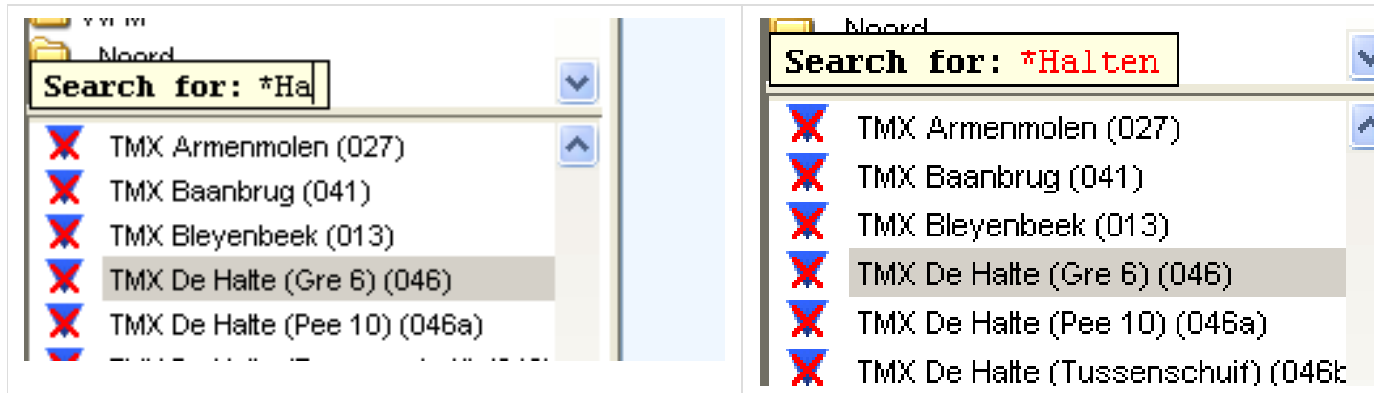
Since 2017.01 a button is available to turn of the threshold icons, it can be recognized by its icon:



. While this button is activated, the threshold icons are shown on the map (as normal). When the button is deactivated, the threshold icons will be deactivated, thus allowing the location type and data availability and validation icons to become visible.

Search in list boxes

It is possible to search elements in the list boxes. Select the appropriate list box and start typing the search criteria, see examples below. The cursor jumps to the next element *starting* with the letters you typed; in determining a match a closing asterisk "*" is implied. You may also use the asterisk "*" explicitly in the search criteria, for example if you do not want to start with the first character of the elements in the list box. When the search criteria turns red, the search criteria can not be found.



By using the up and down arrow keys you can jump to the next element in the list boxes that match the search criteria.

Log Viewer

The Log Viewer provides information about the status of tasks run by the system. The messages that are displayed by the Log Viewer- called *System Messages*- are meant for both end users and system managers. Typical system logs are the successful start and finish of a module run.

The following type of system messages are identified:

Log level	Description
Fatal	Severe errors that cause premature termination
Error	Other runtime errors or unexpected conditions
Warn	Events that are undesirable or unexpected, but not necessarily wrong
Info	Runtime events (startup/shutdown) that allows tracking of the progress of the system

Per message, the Log Viewer provides the following information:

- Log level (see table above)
- Time of creation
- Event code
- Log message

Further sorting and assessment of the messages can be done with help of the system Monitor (see also *System Monitor*).

A System Manager can configure the system to also provide *Debug Messages*. These are used to log application internal events for system development and management. Typical debug events are the creation of a database connection or exceptions that occurred due to programming or configuration errors.

All messages listed in the Log Viewer can be removed from the display (not from the Local Data store) clicking the right mouse button with the cursor placed in the Log Viewer panel. Now two selections can be made:

- *Clear Messages* will remove all messages from the panel
- *Save As* will allow you to save the messages in the Log Panel to file

Status Bar

The Status Bar provides information about the status of the forecasting system. The information that is displayed can be defined by the user via the Options menu (see also *Options*). Some information is always visible.

The following information can be displayed:

Operator name (always displayed)

The name of the operator that has logged in is displayed.

Current system time

The current system time is the time in which the system 'lives'. The current system time moves forward in the so-called "Cardinal Time Step". In the live system the current system time will generally be the same as the current time. For analysis purposes, the system time can be set back in the standalone system to simulate a particular situation in the past.

When the system time is set back, only information- e.g. observed data and external forecasts- will be available to the system with a time stamp before the set system time. In case an hindcast for a particular flood is made with the *system time set back* to for example 13:00 on 21 January 2004, only data, that where imported into the database before this time will be used by the system. The system behaves as if the current time was 13:00 on 21 January 2004. When part of the required import data streams were missing at that moment but have been received later, they are *not* used in the analysis.

In case however, the same analysis is done *without setting back the system* , all data until the current time will be available for the analysis. This means that in this case also the above mentioned missing import data will be used in the analysis.

FEWS time

This is the time that is configured in FEWS to display information.

Local time

The actual computer time. This is the time the user configures in the regional settings of windows.

Time of last refresh (only relevant for OC)

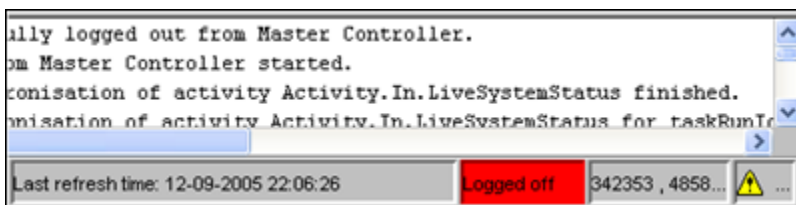
The time of last refresh indicates the last time the local data store has been synchronised with the Central Database. Not relevant for Stand alone FEWS configurations.

System status

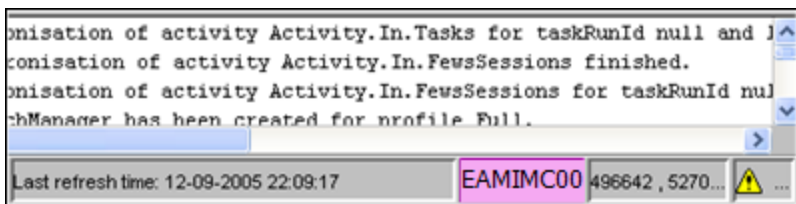
The system status indicates in what mode the system is currently operating: online, or stand-alone.

In the live system the following colour information indicates the state on synchronisation:

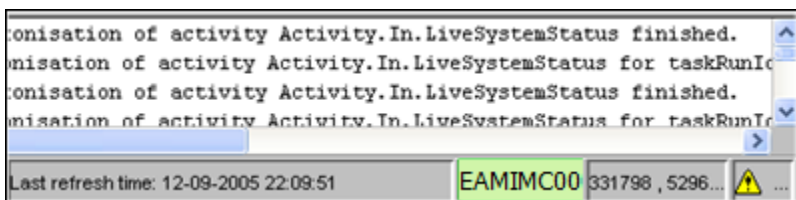
- In case the colour is red, the OC is logged off:



- In case the colour is soft purple, the OC is synchronising with the MC displayed in system status box:



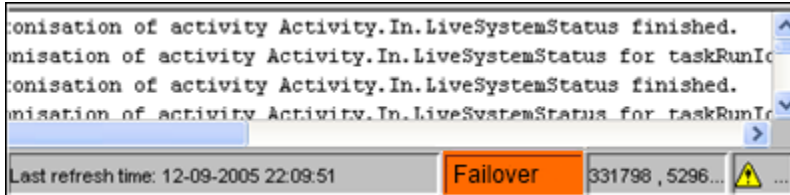
- In case the colour is soft green, the OC is logged on and fully synchronised with the MC displayed in system status box:



- In case the colour is tomato, the OC is running the Rolling Barrel (system maintenance) in order to remove expired data from the local datastore.



- In case the colour is orange, the MC which the OC is logged into is in failover mode, either manually or because the FSS's are down.






Mouse coordinates

Mouse coordinates displayed in the configured coordinate system

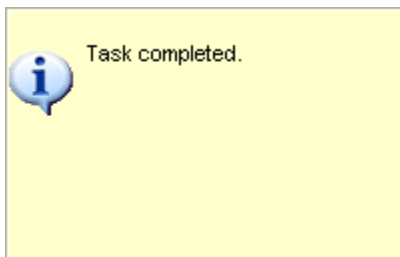
System status icon (always displayed)

The System status icon- in the lower right corner of the display- indicates whether the system operates normally or that severe errors are encountered. The icon has the following display modes:

Icon	Color	Description
	Green	System is running normally but warnings have been encountered.
	Yellow	System encountered severe errors in the past 48 hours. This means that at least one system message has been generated with log level ERROR. After all messages with this log level have been acknowledged by the user via the System Monitor (see also <i>System Monitor</i>), the icon becomes green again.
	Red	System encountered fatal errors in the past 48 hours. This means that at least one system message has been generated with log level FATAL. After all messages with this log level have been acknowledged by the user via the System Monitor (see also <i>System Monitor</i>), the icon becomes green again.

Notification (default disabled)

Since 2007.02, the Explorer can be configured to provide a popup type notification to show completion of manually dispatched tasks. The popup appears in the lower left screen corner, reporting the name of the job dispatched as well as its success or failure.



Database Viewer

Introduction

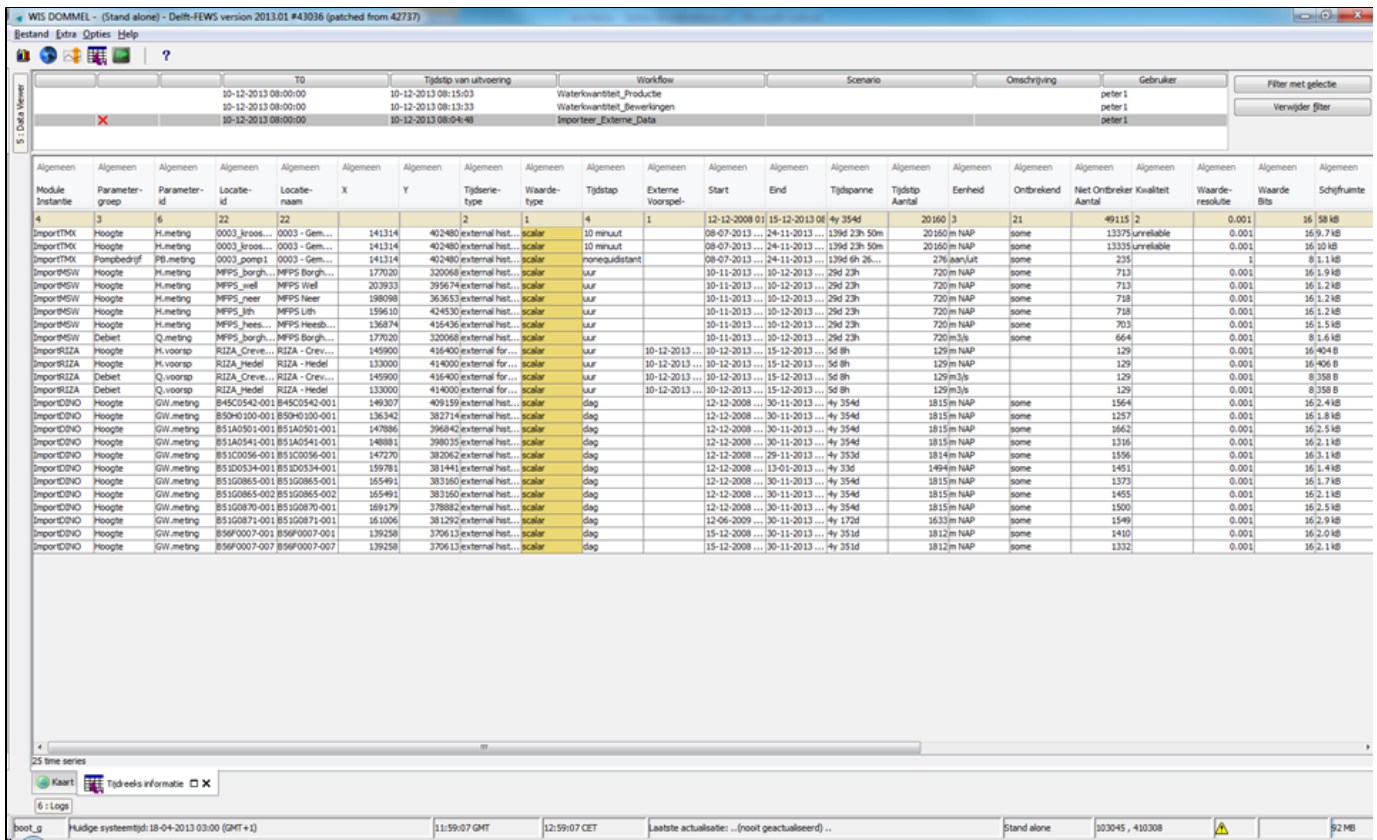


figure 1: the GUI of the Database Viewer

The database viewer is a *configuration support* tool for inspecting the contents of the FEWS database (localdatastore). It provides an overview in tabular form of statistics and other metadata (columns) of the timeseries (rows) in the database. To aid the inspection of data, the user can add or remove columns, and select and filter rows. From the Database Viewer it is also possible to access the content (=values) of selected timeseries by opening the timeseries dialog. The database viewer is available in two different modes:

- Workflow based database viewer - for each available workflow, all timeseries written to the database in that workflow can be inspected. From the Explorer, the Database Viewer can be accessed using <F12> + J.
- Timeseries lister - for the selection made in the Data Viewer or Forecasts (Explorer Tabs) all available timeseries in the database are listed and can be inspected. To enable this mode, some configuration is required.

Configuration (mode: timeseries lister)

To enable the timeseries lister, it must be added as explorertask in Explorer.xml:

```
<explorerTask name="Timeseries Lister">
  <iconFile>tableInfo.jpg</iconFile>

  <taskClass>nl.wldelft.fews.gui.plugin.timeseriestableviewer.TimeSeriesTableViewer</taskClass>
  <toolbarTask>true</toolbarTask>
  <menubarTask>true</menubarTask>
  <allowMultipleInstances>false</allowMultipleInstances>
  <accelerator>ctrl T</accelerator>
</explorerTask>
```

Usage

The database viewer enables the user to inspect the database. The database records are visualised as individual rows, which can be selected. When selected it can be browsed through (all columns) or its values can be inspected through a graph (scalar series) or the spatial display (grid data).

In the top window, workflows are available. When selected, the lower part of the screen shows the records which have been written to the database in this selected workflow. In this lower part, individual rows can be selected as well.

All meta information and statistics are calculated on-the-fly and are not stored. Within selections or filters (e.g. on start/end time) the content of the (visible) columns are updated immediately.

There are many columns which can be viewed: general columns about module instance, location, parameter, disk space and all kind of relevant meta information about the selected record(s).

Besides the 'general' metadata, the basic statistics of that row can be inspected. These basic statistics are sum, average, maximum, minimum, etc.

The remaining columns describe the quality of the data. If the user e.g. wants to know how many values are 'unreliable' and how many 'periods' of unreliable data are available, this information can be retrieved. The same is true for all kinds of combinations of doubtful, completed and corrected data. This same functionality (number of records, periods) is available for primary and secondary validation results. This means that the user can inspect number of records and periods of e.g. hard maximums and flag comparison or series comparison.

When many records (rows) are available the user can filter the results. Double-clicking a cell will automatically filter for that value. If you want to filter on e.g. a location, select the location (name or Id) column and press F8 or double-click it. The background color of the cell will turn blue (meaning there's a filter on it).

This filter mechanism is applicable on all available columns, including the Start and End Time. When the users changes the start and/or end time, the visible columns will be updated accordingly.

Two types of filters - with or without data hierarchy

Note well that there are two modes for using the Database Viewer. When using the filters on the top of the screen of the database viewer, the timeseries can be viewed as they are available in the database. However, when using the other filters from for instance FEWS-Explorer (left below), the database viewer shows the timeseries as they are in the data hierarchy. In the first case this means that external data with a scenario can be made visible, and in the latter case, the external timeseries are viewed as they were imported, i.e. without the scenario applied. For more info read about the FEWS data hierarchy.

Context Menu Options

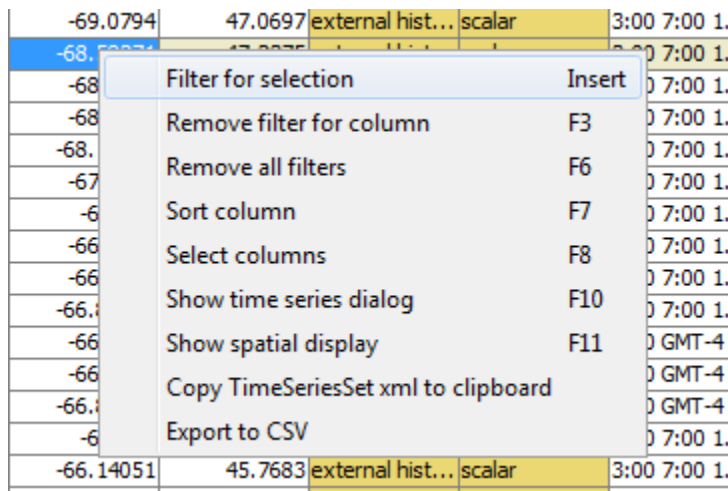


figure 2: context menu of the Database Viewer

The Graphical User Interface contains a number of context menu options for selection/filtering and inspection of data. Right-click the mouse on one of the cells to access the context menu.

Menu option	Shortcut	Functionality	Alternative	Remark	Visible effect
Filter for selection	<insert>	Uses the cell content as a filter	Doubleclicking the cell	You can set different filters in different columns	Cell background turns blue
Remove filter for column	<F3>	Show all timeseries (again) for this column	Doubleclicking the blue cell		Cell background turns white
Remove all filters	<F6>	Show all timeseries (again)	Doubleclicking the blue cell		Cell background turns white
Sort column	<F7>	Sort the content of the column	Clicking the header		

Select columns	<F8>	Opens a dialog for selecting the columns (Met Data Elements/groups)			
Show Timeseries Dialog	<F10>	Opens the TimeSeriesDialog and shows the content of the selected (scalar) timeserie(s)			
Show Spatial Display	<F11>	Opens the Spatial Display and shows the content of the selected (gridded) timeserie(s)			
Copy TimeseriesSet.xml to clipboard		Copies the TimeSeriesSet in XML format			Shows the XML in popup
Export to CSV		Export selected timeserie(s) to a CSV file			File dialog opens for saving the CSV file
Show interval statistics		Allows the user to view statistics such as %available, %unreliable, %doubtful, Min, Max, Mean and also if values have exceeded a threshold			

Special Filter option: Start time / End time

Two columns have special features: The Start and End time columns can be used to increase or limit the view period. If you adjust these all statistical columns or columns showing information about quality flags and (secondary) validation will be adjusted automatically.

Doubleclicking in these time columns will provide the user with the following, see figure below.

The screenshot shows the WIS DOMMEL application window. At the top, there's a menu bar and a toolbar. Below that is a header section with various filters and a 'Filter met selectie' button. The main area is a large data table with columns for 'Algemeen', 'Parameter-groep', 'Parameter-id', 'Locatie-id', 'Locatie-naam', 'X', 'Y', 'Tijdserie-type', 'Waarde-type', 'Tijdstap', 'Start', 'End', 'Tijdsparre', 'Tijdstap Aantal', 'Eenheid', 'Ontbrekend', 'Opgeslagen Ontbrekend', 'Niet Ontbreker Aantal', 'Kwaliteit', 'Bewerkt', 'Waarde-resolutie', and 'Waarde Bits'. A date selection dialog box is open over the 'Start' and 'End' columns, showing a calendar for September 2013. A blue text box with white text is overlaid on the dialog, stating: 'Adjust Start and/or End dates to be used as additional filter. Visible columns will be updated accordingly'.

figure 3: Special filter in the Start/End time columns

Meta Data Elements / Select Columns (F8)

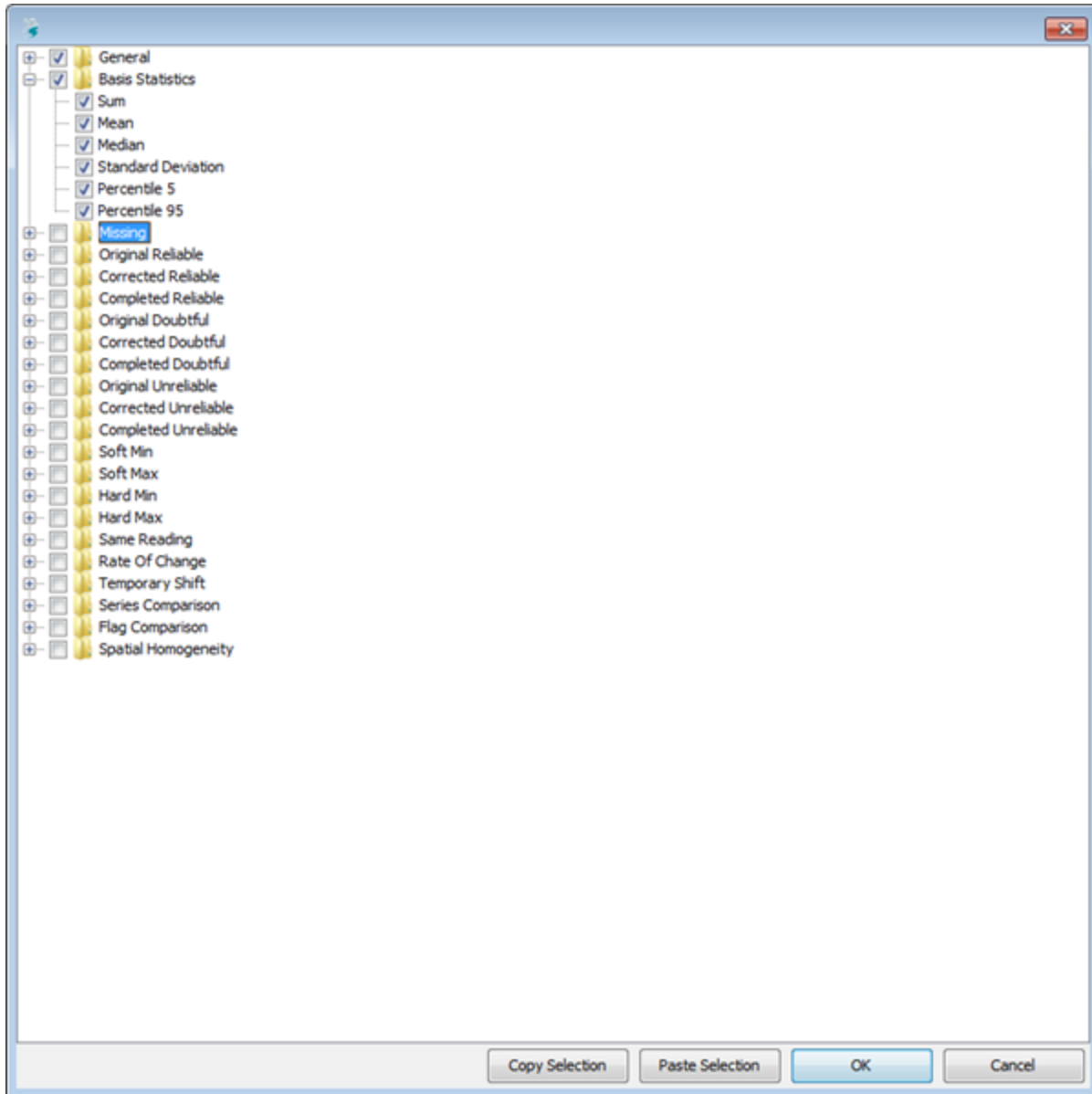


figure 4: Selecting different columns (elements) in the Database Viewer

The meta data elements are grouped as follows.

- General (e.g. moduleinstanceId, location, parameter, timestep, blobsize etc.)
- Basis Statistics (Sum, Mean, Median, Standard Deviation, Percentile-5, Percentile-95)

The below mentioned groups give an overview of number of values and periods based on quality flags, primary and secondary validation.

- Missing
- Original Reliable
- Corrected Reliable
- Completed Reliable
- Original Doubtful
- Corrected Doubtful
- Completed Doubtful
- Original Unreliable
- Corrected Unreliable
- Completed Unreliable
- Soft Min
- Soft Max
- Hard Min
- Hard Max
- Same Reading
- Rate of Change

- Temporary shift
- Series Comparison
- Flag Comparison
- Spatial Homogeneity

The list of available columns can be adjusted by (un)selecting the individual elements. Only the selected ones will be visible in Database Viewer after confirming by clicking <OK>.

Selections can be copied to the clipboard (<Copy Selection> button) and adjusted in a text editor (figure 5). These lists can be shared amongst users (e.g. e-mail). From a text editor you can adjust the list by removing rows, select the remaining rows and then copy it the clipboard (<CTRL+C>) again. After that use the <Paste Selection> button to update your selected columns (figure 6). See below:

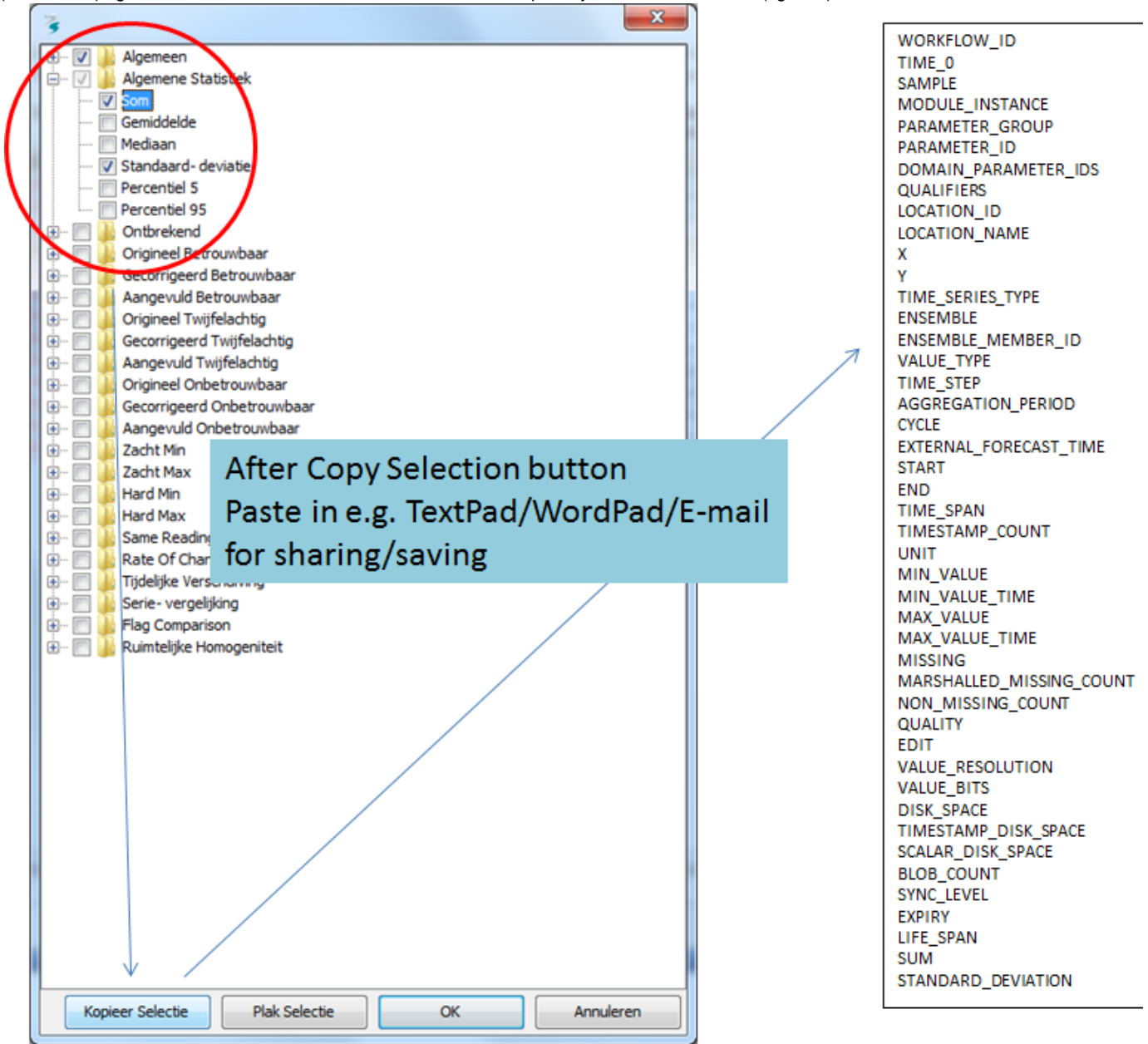


figure 5: Copying the selection of columns to clipboard

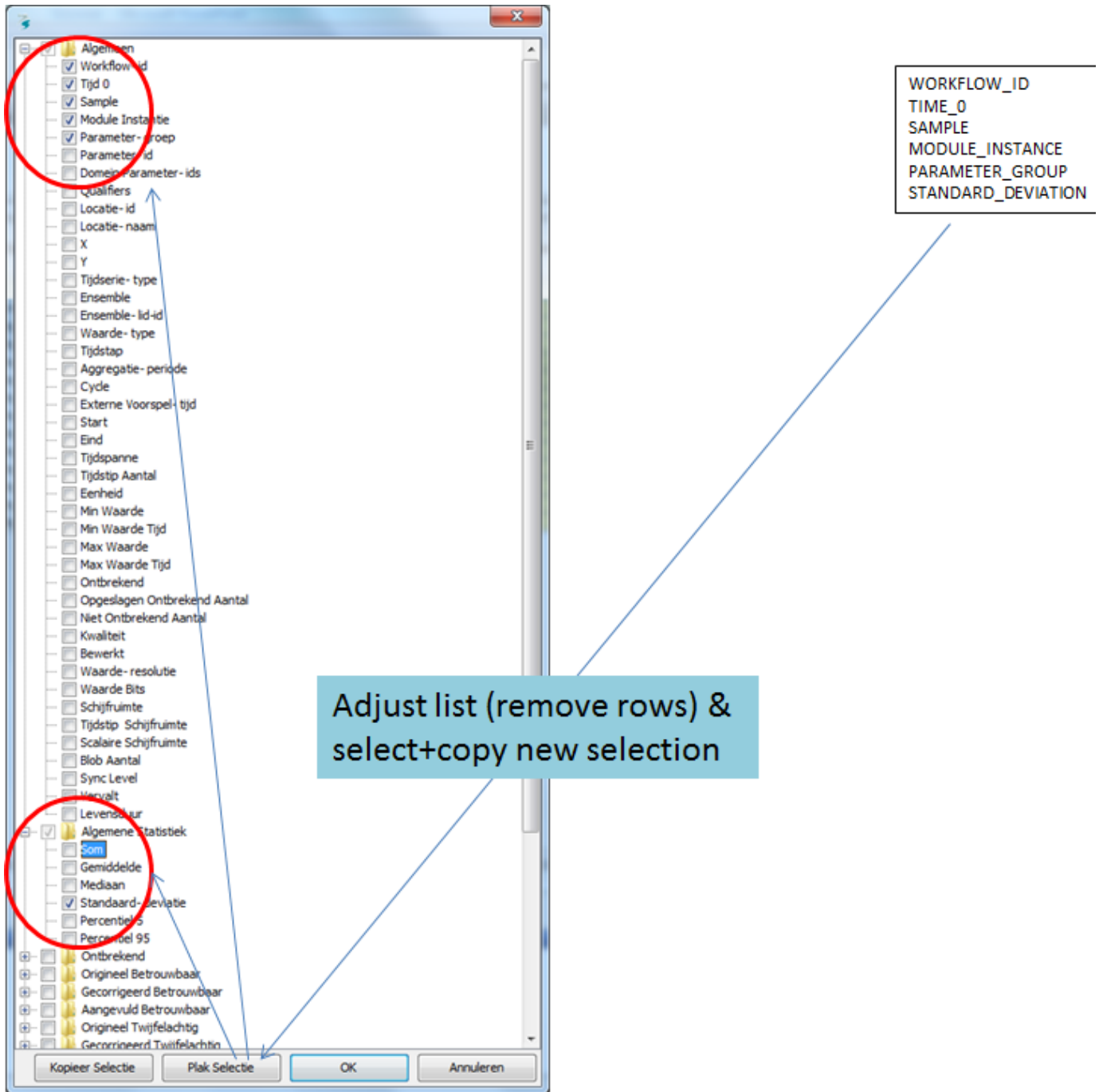


figure 6: Pasting the selection of columns from the clipboard

Delete module instance from Database Viewer

From build 2016.02 it is possible to remove module instances from Local Data Store via Database Viewer. This function only exists in FEWS stand alone mode. The procedure is as follows:

1. In Database Viewer, select one workflow, press F12, a menu will pop out (figure 7).

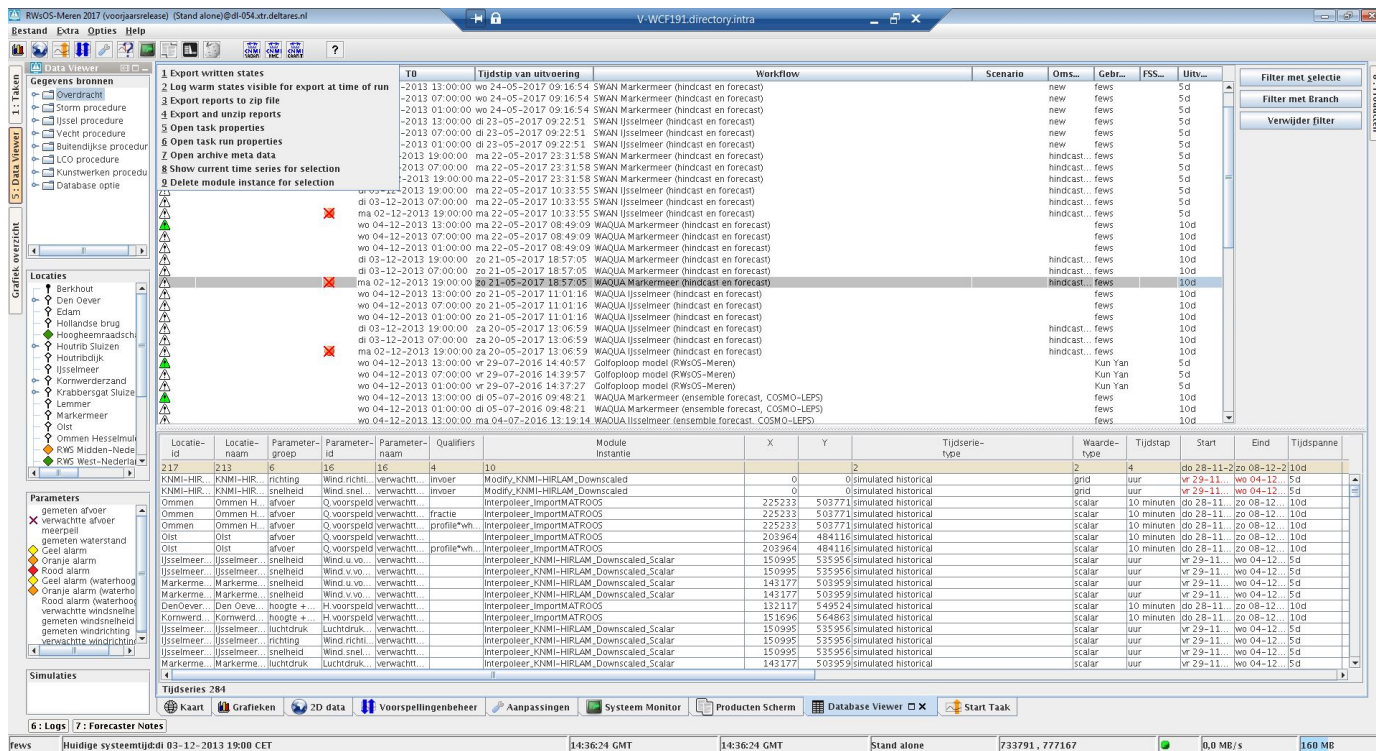


figure 7: F12 menu in Database Viewer

2. Select '9 Delete module instance for selection', the module instances in this workflow will be displayed for selection. One can select the module instances that should be removed from the database.

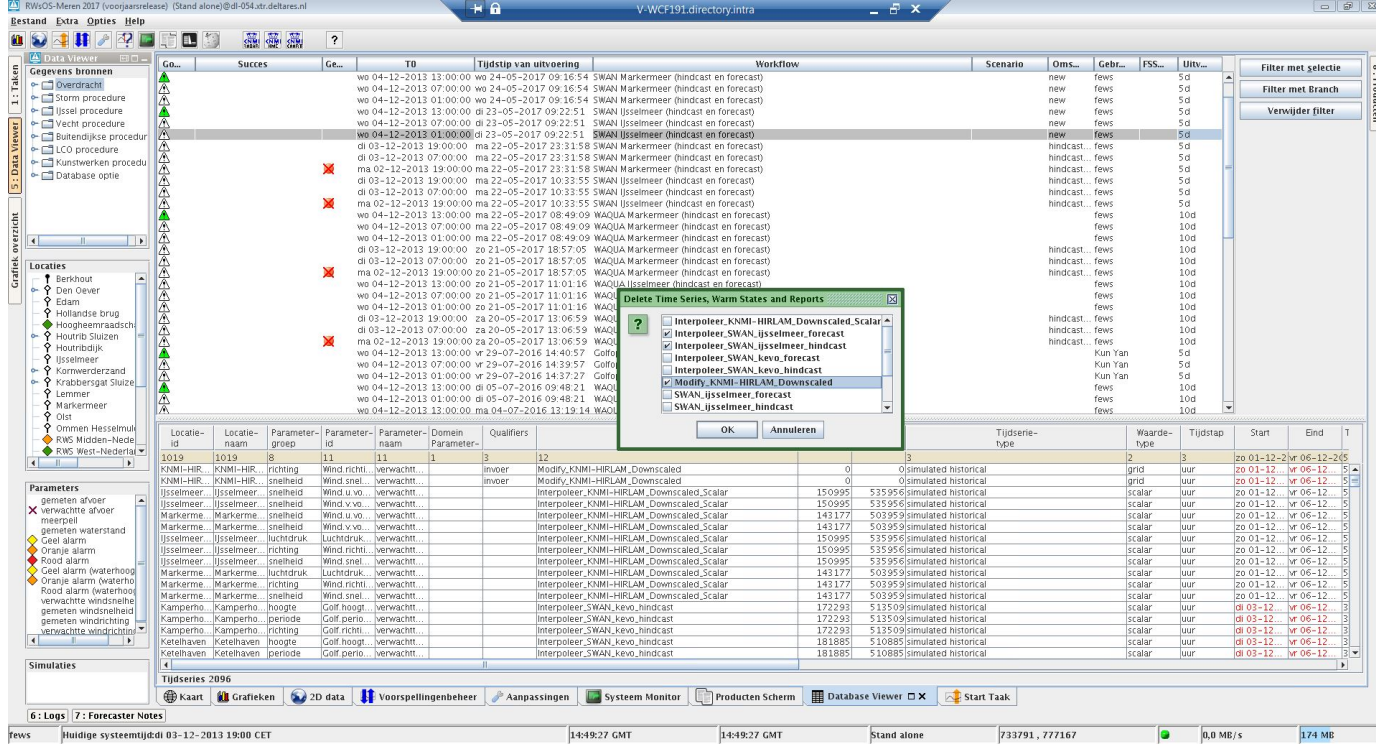


figure 8: select module instances to be removed from database

3. Press 'OK', the selected module instances will be removed. If all module instances in one workflow are all removed, the workflow will become empty, but the workflow still appears in the Database Viewer.

To completely remove this workflow from the list, go to FEWS F12 menu (in log panel, press F12), select 'P database', select 'validate, repair, and compact datastore indices and cache files', then restart FEWS, the workflow will be completely removed. To completely remove the data from the localDataStore (i.e. reduce file size), press F12, select 'P database,' and select 'repair and defrag localdatastore'.

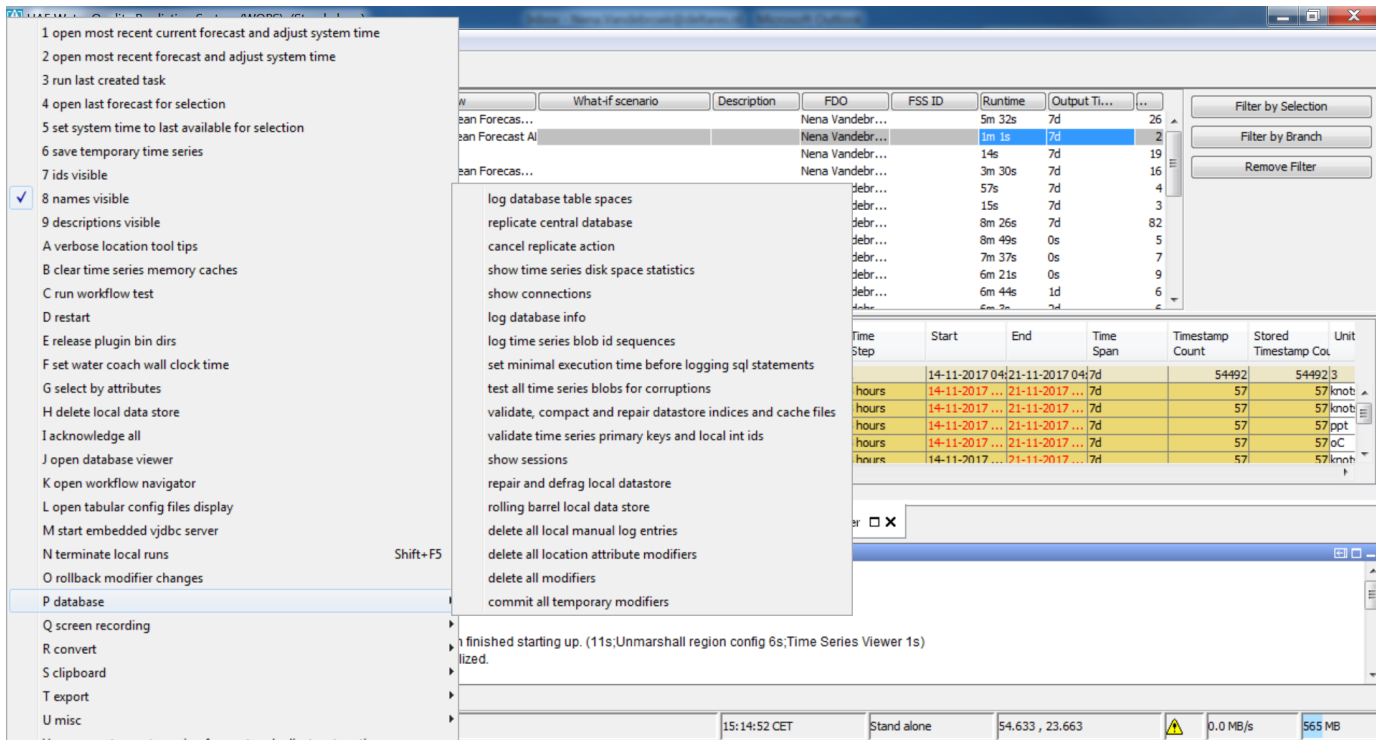


figure 9: Remove workflow and data using F12 - P - database menu

The F12 menu

Contents

- Contents
- F12 menu options
 - Database sub-menu options
 - Screen recording sub-menu options
 - Convert sub-menu options
 - Clipboard sub-menu options
 - Export sub-menu options
 - Misc sub-menu options

F12 menu options

In the FEWS Explorer and the TimeSeries Display, a number of options are available under the <F12>. They are meant to be used during debugging or testing and useful functionality might end up in the GUI in a later version. Below are the options available in 2016.01, most of the options are self-explanatory but some additional descriptions of the functionality are included here.

F12 - Choice		What does it do?
1	open most recent current forecast and adjust system time	
2	open most recent forecast and adjust system time	
3	run last created task	Repeat last task run

4	open last forecast for selection	Opens forecast for selection in the data viewer
5	set system time to last available for selection	
6	save temporary time series	
7	ids visible	Shows ids next to location name (filters)
8	names visible	Shows names in location filter
9	descriptions visible	Shows description
A	verbose location tool tips	Extra info in tooltips
B	clear time series memory caches	
C	run workflow test	Allows selection of test workflow xml file
D	restart	
E	release plugin bin dirs	
F	set water coach wall clock time	Opens Water Coach wall clock time dialog
G	select by attributes	Opens the optional attributes panel in the data viewer
H	delete local data store	
I	acknowledge all	Acknowledges all flagged messages in the system monitor
J	open database viewer	Optional display for visualising database records
K	open workflow navigator	Optional display for visualising workflow tree
L	open tabular config files display	Optional display for visualising metadata (use with filters)
M	start embedded vjdbc server	Connect to Delft-FEWS via JDBC
N	terminate local runs	
O	rollback modifier changes	
P	database	database menu (see below)
Q	screen recording	screen recording menu (see below)
R	convert	convert menu (see below)
S	clipboard	clipboard menu (see below)
T	export	export menu (see below)
U	misc	misc menu (see below)
V	open most recent running forecast and adjust system time	
W	restart and disable UserSettings	

NB. If option `<timeSeriesStatus>remotely updated snapshot</timeSeriesStatus>` is enabled in the explorer.xml an additional F12 option appears 'time series status'. This option allows the user to 'load database snapshot' or 'update database snapshot'. These snapshot files are used where the calculation of the status icon is complex or has a long relative view period, thus improving the refresh performance of these icons.

Database sub-menu options

log database table spaces	Logs to table spaces to the Logs dialog and log.txt
replicate central database	
cancel replicate action	
show time series disk space statistics	

show connections	Shows current connections to the central database (live system)
log database info	
log time series blob id sequences	
set minimal execution time before logging sql statements	
test all time series blobs for corruptions	
compact datastore index files	
validate index files	
repair and defrag local datastore	Option available in stand alone and synchronising OCs
rolling barrel local data store	Option available in stand alone and synchronising OCs
delete all local manual log entries	Option available in stand alone and synchronising OCs

Screen recording sub-menu options

start/resume recording	Starts recording (full screen)
pause recording	
stop recording	

Convert sub-menu options

*.FI and *.BIN to xml	Used for converting binary files created by Delft-FEWS into text based files
netcdf file curvilinear grid cell center coordinates to csv file	
netcdf file unstructured grid node coordinates to csv file	
netcdf file unstructured grid flowlink coordinates to csv file	
netcdf file unstructured grid cell contours to shape file	
netcdf file quadtree grid flowlink coordinates to csv file	
netcdf file quadtree grid cell contours to shape file	
netcdf file 3Di stations to csv file	
pack dbf files (remove white space)	
convert ascii grid file(s) (*.asc) to coverage tile archive (*.cta)	This creates an efficient 'pyramid of maps' for improved performance displaying large static grids in the explorer and grid displays
convert sll to shp	Converts Delft-FEWS specific .sll files into shp files
convert dbf/dbz to csv	

Clipboard sub-menu options

copy current map scale	
------------------------	--

copy current map extent	Useful feature for generating extents which can be used in the explorer.xml
copy selected time series sets	Used in conjunction with a selection in the data viewer
copy selected time series sets as display group	Used in conjunction with a selection in the data viewer
paste selected time series sets as filter	Used in conjunction with a selection in the data viewer
copy grib geometry from file	
encrypt password	Used to encrypt password for DDA root config file

Export sub-menu options

Options	Explanation	Details
default config	Exports current config to disk	
default config as zip	Exports current config to disk in a zip file	
default dbf/dbz as csv files	Exports current dbf/dbz files as comma separated value (csv) files	
location sets as csv files	Exports location sets as comma separated value (csv) files	
parameters as csv files	Exports parameters as comma separated value (csv) files	
qualifiers as csv file	Exports qualifiers as comma separated value (csv) files	
export all modifiers	Exports all modifiers	
current warm states	Exports all current warm states	
all warm states	Exports all warm states	A complete set of Warm States which can be used as Cold States can be exported. In the Explorer using F12+T, current warm states are exported for the current module runs. T0/system time is ignored. It exports for current module runs and for the current branches. This can give problems when the historical module instance id of the state is also used in another workflow that does not produce states. Code has been changed so it will search in the whole branch till the system time. A folder structure to the exported warm states for both export 'current' warm states and export 'all' warm states. The most recent state in the current branch per module instance is exported. This is the same method as used in the export state activity
irregular grids to esri shape files	Exports all irregular grids to ESRI shp file format	
rating curves	Exports all rating curves	
save current visible map as png file	Exports current visible map extent as png file	

Misc sub-menu options

last value visible on map	Appends the last value from the selected timeseries to the name on the map
---------------------------	--

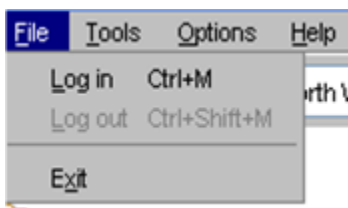
03 Dropdown Menu

- Dropdown Menu
 - File
 - Log in
 - Log out
 - Reload Configuration
 - Exit
 - Tools
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 - Data Display
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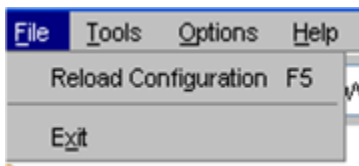
Dropdown Menu

File

The File Menu in the Operator Client of Delft FEWS offers you the possibility to log into and out of the Master Controller:



In the Standalone system the File Menu only allows you to reload you configuration:



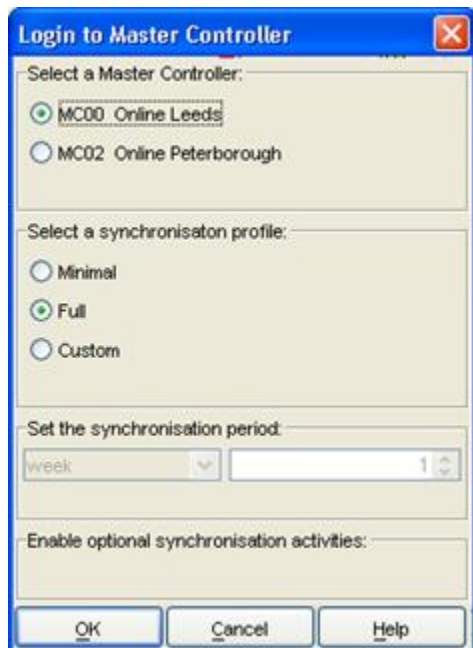
Log in

With Log in, an on-line session can be started. When logging in, the system may require some time for synchronising new data from the Central Database.

A range of synchronisation profiles can be selected:

- *Minimal*
This profile synchronises a minimum amount of data required for a forecaster to perform the required tasks. As a default, data is

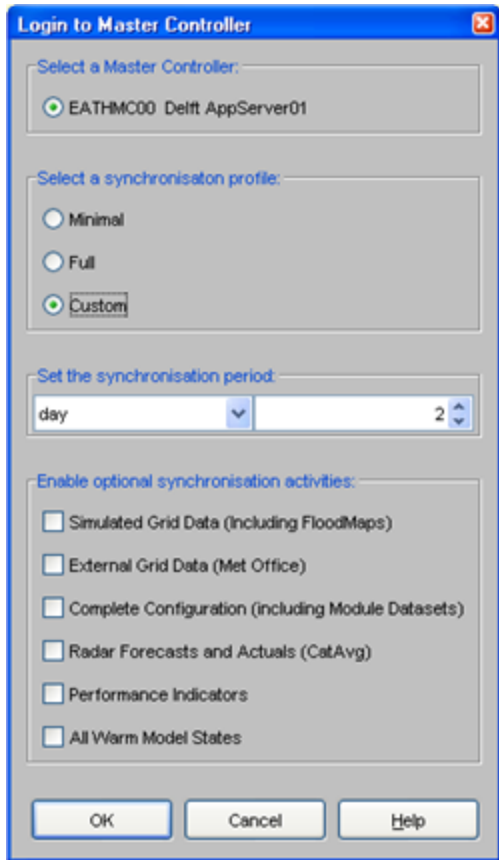
synchronised over the past 2 days and no radar and grid data is transferred to the OC. This profile should be used, when logging in over a dial-in connection.



- *Full*
This profile synchronises a larger amount of data required for a forecaster to perform the required tasks and have sufficient background data available. As a default, data is synchronised over the past 7 days.
- *Custom*
With this profile a user can determine over which period data should be downloaded.

In addition, a user can select to download:

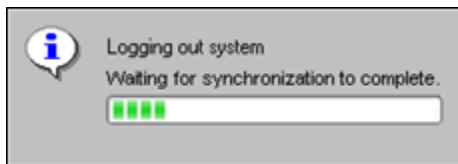
- Simulated Grid Data (e.g. flood maps)
- External Grid data (e.g. radar grids, surge forecast grids)
- Complete configurations (all versions of the configuration files in the database including the module datasets)
- Radar forecasts and actuals (catchment average time series)
- Performance indicators
- Warm states



The period over which data should be downloaded can be defined by the user.

Log out

With Log out, an on-line session can be closed without closing the FEWS menu. Work can be continued in an off-line mode. When logging out the following window appears:



Before logging out, the system will complete a ongoing synchronisation action. Depending on the action this may take from seconds to several minutes.

Reload Configuration

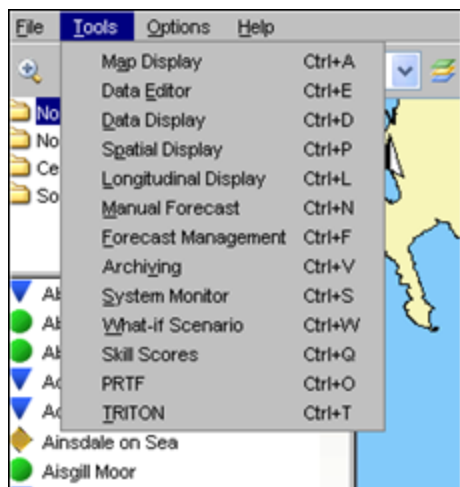
In the Standalone system you can reload your configuration from the file system without having to close your client. This may be practical when you have changed some configuration files and want to check the result of the changes.

Exit

With Exit a forecasting session can be closed.

Tools

Plug-ins to FEWS Explorer are activated primarily through the Tools menu. The following plug-ins may be configured (an example of some is shown in the picture below):



Map Display

The current map view will be opened in a new window when selecting this option.

Data Editor

By selecting Data Editor, time series can be displayed and edited in the form of tables. (see also *Data Display and Editor*).

Data Display

By selecting Data Display, time series can be displayed in graphs (see also *Data Display and Editor*).

Spatial Display

By selecting Spatial Display, meteorological forecast grids or hydrological flood maps and catchment average data can be displayed on a map (see also *Spatial Display*).

Longitudinal Display

The Longitudinal Display is for example used to display data for the axis of the river or along the coast (see also *Longitudinal Display*).

Manual Forecast

Via the Manual Forecast Display, the user can define forecasts that should be run in manual mode (see also *Manual Forecasts*).

Forecast Management

Via the Forecast Management Display, the user can download forecasts from the Central Database and make forecast active for viewing. The current forecast can be set and archived forecasts can be retrieved. (see also *Forecast Management*).

Archiving

Archiving allows you to archive and retrieve forecast runs with all associated data to/from an repository. Also threshold crossing events, time series and configuration can be archived. You can only retrieve to a standalone system.

System Monitor

The System Monitor allows the user to view selections of system messages and acknowledge severe and fatal errors (see also *System Monitor*).

What-if Scenario

Via the What-if Scenario Display, the user can define what-if scenarios, which can be run via the Manual Forecast Display. (see also *What-if Scenarios*).

Skill Scores

The Skill Scores display provides an overview of all threshold crossings in the observed and forecast time series. By matching observed and forecast thresholds crossings, the skill scores, which are shown at the bottom of the display, are obtained.

LookUp Table

The LookUp Table display allows for working with lookup tables interactively and run what-if scenarios on them (see also *Lookup Table Display*).

Correlation

The Correlation display allows for working with interactive regression functions and make alternative (off-line) forecasts

Calibration

The Calibration display allows a user to automatically optimize the model calibration parameters.

Threshold display

The Threshold displays allows for extended reviewing of all thresholds.

Other displays

Also displays specifically focussed on a particular forecast procedure or method- like PRTF, TRITON, K-Flows and Trends in NFFS for England and Wales- can be accessed from this menu.

Part of the functionality offered by the Tools menu is usually also (partly-) available via the *Button Bar*.



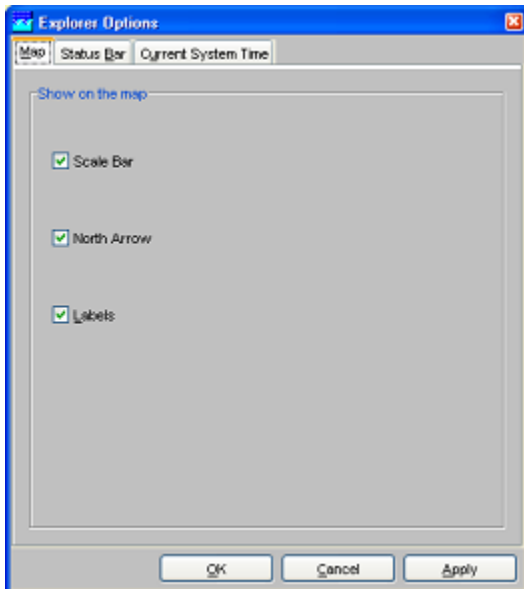
Options

Through the Options Menu a number of settings can be defined.

Map

The *Map Tab* allows the user to activate or de-activate the:

- scale bar
- north arrow
- labels



Status Bar

The *Status Bar Tab* allows the user to activate the display on the Status Bar of:

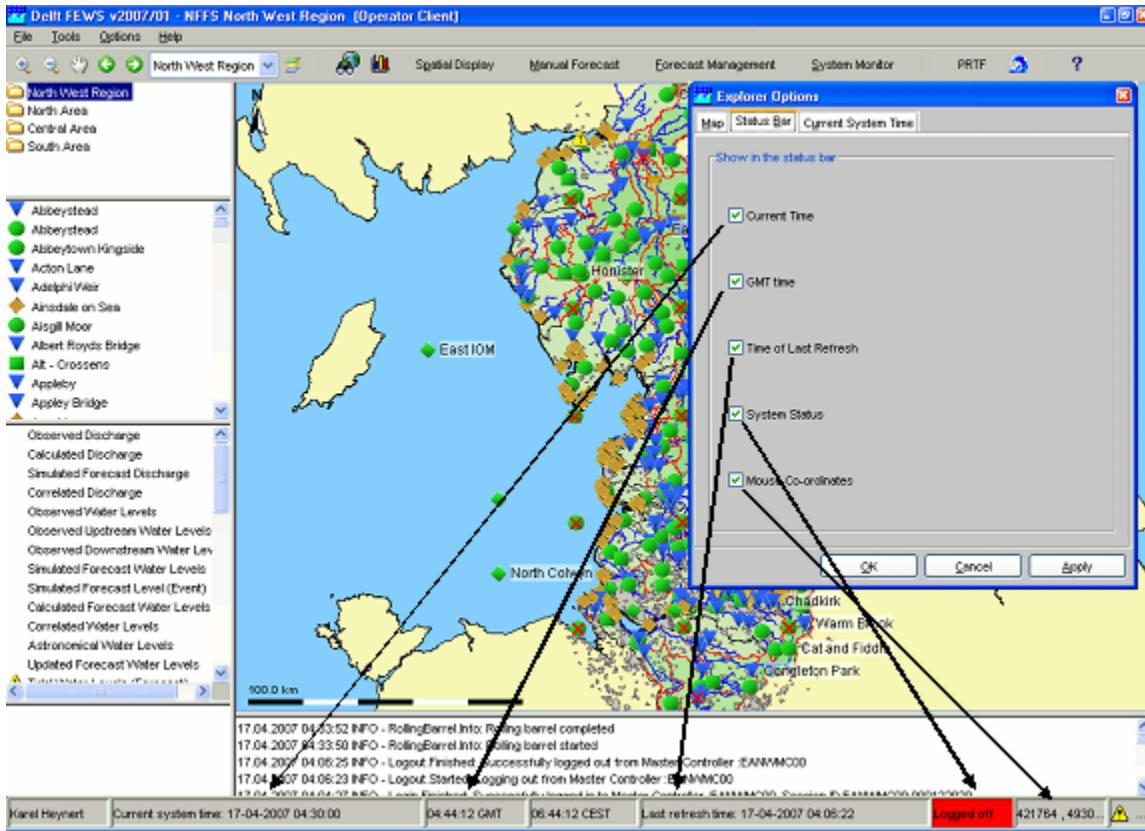
- GMT time
- Current time
- Time of last refresh__
- System status__

- Mouse co-ordinates__

The *time of last refresh* indicates the last time the local data store has been synchronised with the Central Database.

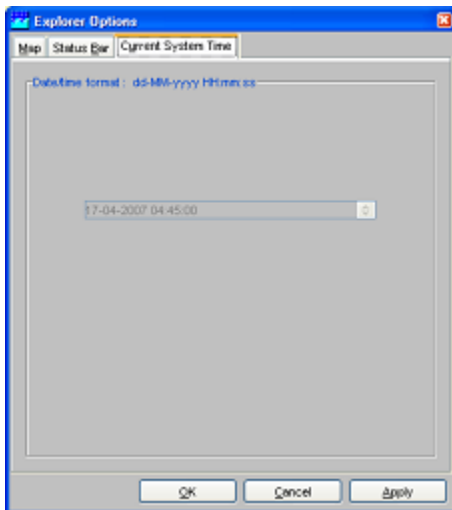
The *system status* indicates in what mode the system is currently operating: online, offline and stand-alone.

Mouse co-ordinates displays the mouse pointer co-ordinates in a configurable format (e.g. OSGB 1936 format for NFFS).



Current System Time

The *Current System Time Tab* allows the user to set the current system time. This is the time, that should be simulated by the system. Under normal operational conditions, the current system time coincides with the actual time. For hindcasting, the current system time can be set at a user defined time.



The current system time can only be changed in a *Stand-alone* system. In an Operator Client this item is disabled.

Help

The Help Menu provides:

- About
- Contents



Contents

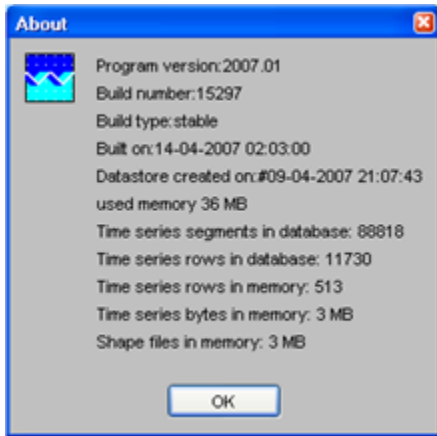
Contents give access to the context sensitive Help information. The On-line HELP provides:

- Logical grouping of topics (*Contents* Tab)
- An Index (*Index* Tab)
- A search option (*Search* Tab)

Buttons are available at the top of the window to increase the size of the display window by closing the overview panel (*Hide*), navigate back and forward through the HTML pages opened before (*Back* and *Forward*) and print the information (*Print*).

About

Via About background information regarding the Delft FEWS version can be displayed. The software version and build information is displayed. In addition, technical data is presented regarding the actual allocation of memory to the Delft FEWS application.



04 Data Display and Data Editor

03 Dropdown Menu

Delft-FEWS User Guide

05 Spatial Display

- Data Display and Data Editor
 - Table
 - Shortcuts
 - Graph
 - Descriptive statistics
 - Validation Rules (hidable panel)
 - Rotate Splitter
 - Rotate Legend
 - Toggle Graph
 - Scale to show unreliable Data
 - Show no Thresholds
 - Scale to show relevant Thresholds
 - Scale to show all Thresholds
 - Show data labels
 - Statistical Functions
 - Search and Select Forecast
 - Historical Events
 - Display time
 - Datum Toggle
- Navigating in Graphs
 - Save As
 - Print

- Zoom in / out
- Allow Vertical / Horizontal Axis Zoom
- Auto Range
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- Longitudinal profile
- Category plot
 - Configuration
 - Restrictions
- Editing Data
- Changing display properties
- Interactively modifying display colours
- The F12 debug menu (Timeseries Display)
- Statistical functions
- Filtering data

Data Display and Data Editor

The Data Display and Data Editor offer graphical displays for presenting and editing of data. Both have nearly the same functionality but only the Data Editor allows you to edit data. In addition, the data editor can only be opened once while multiple instances of the data display can be opened.

This display offers the following features:

- Display of time series in:
 - graphs (scalar/longitudinal profiles)
 - tables (scalar/longitudinal profiles)
- Tabular data editor
- Display of actual data with:
 - Historical events
 - Threshold levels

Data is displayed in a table and a graph simultaneously. The splitter between the table and the graph can be moved to modify the display. Select the data series, that should be displayed with help of the List Boxes and/or the Map Display (see also *Filters*).

Decimals for the reference values (ticks) in the chart autorange between 0 and 6, always using the lowest amount necessary to differentiate between ticks.

When the display is started through the FEWS Tools menu item *Data Editor* , data can be edited and the edited data can be stored in the FEWS data base. When the display is started through the FEWS Tools menu item *Data Display* or through the FEWS toolbar, the data can only be viewed.

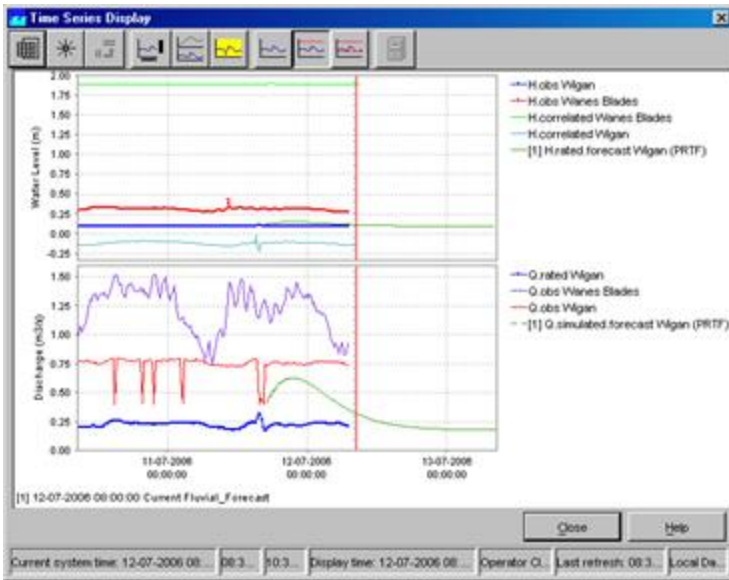
1.1 Data Display

Press the [**Data Display**] button



on the toolbar to present graphs displaying the data. The splitter is normally positioned on the left of the display.

When data series of different data types have been selected, the data will be presented in different subplots with the data series of a single data type merged into one subplot.



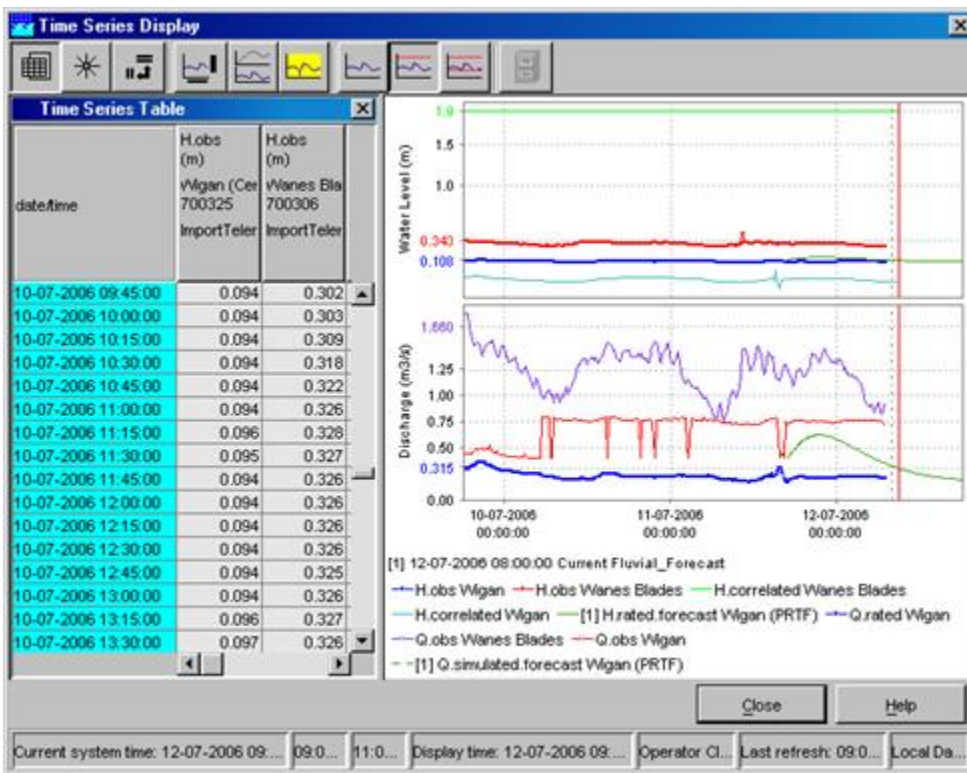
The data in the graph is *updated automatically* in case new data becomes available. Below the graph the workflows are listed that generated the forecast time series in the graph. Their numbers are used in the graph legend and table headers too.

The following buttons are used in the Time Series Display:















Table

By clicking this button the time series in the graph is also displayed in tabular format. Please note that in case you like to edit data, you have to select the Data Editor from the Tools menu (see section 4.3).



Selecting the small arrow at the right of the icon shows the next menu:

 Validation	Ctrl+Shift+J
 Users	Ctrl+Shift+K
✓  Comments	Ctrl+Shift+L
✓  Units	
✓  Location Names	Ctrl+Alt+Shift+N
✓  Location Ids	Ctrl+Alt+Shift+L
✓  Modules	Ctrl+Shift+M
✓  Column Statistics	Ctrl+Alt+Y
✓  Threshold Crossing	Ctrl+Alt+T
✓  Normal	Ctrl+Alt+N
Days	Ctrl+Alt+D
Weeks	Ctrl+Alt+W
Months	Ctrl+Alt+M
Years	Ctrl+Alt+Y
✓  Show empty RVP series	Alt+Shift+L
✓  Show empty complete series	Alt+Shift+C
Time order reversed	Alt+Shift+R

function	description
Validation	shows a separate column with the validation flags
Users	shows a separate column with the user names of edited values
Comments	shows a separate column with the comments
Units	shows in the header the unit of the parameter
Location Names	shows in the header the location name
Location Ids	shows in the header the location ID
Module	shows in the header the moduleInstanceid
Column statistics	shows between the header and the table statistics of the values in the current relativeViewPeriod, like mean, sum, min, max
Threshold crossing	shows in the cells (on the left side) a small bar with a color according to the threshold definition, that indicates a threshold crossing
Normal	shows the values in a normal table, so all times have a row
Days	shows the values in an aggregated way, so that each day gets its own column. Usefull to series with for example an hourly time step.
Weeks	shows the values in an aggregated way, so that each week gets its own column. Usefull to series with for example a daily time step.
Months	shows the values in an aggregated way, so that each month gets its own column. Usefull to series with for example daily time step.
Years	shows the values in an aggregated way, so that each year gets its own column. Usefull to series with for example monthly time step.
Show empty RVP series	shows/hides the series which are empty in the current viewperiod. Usefull while using shortcuts or thumbnails.

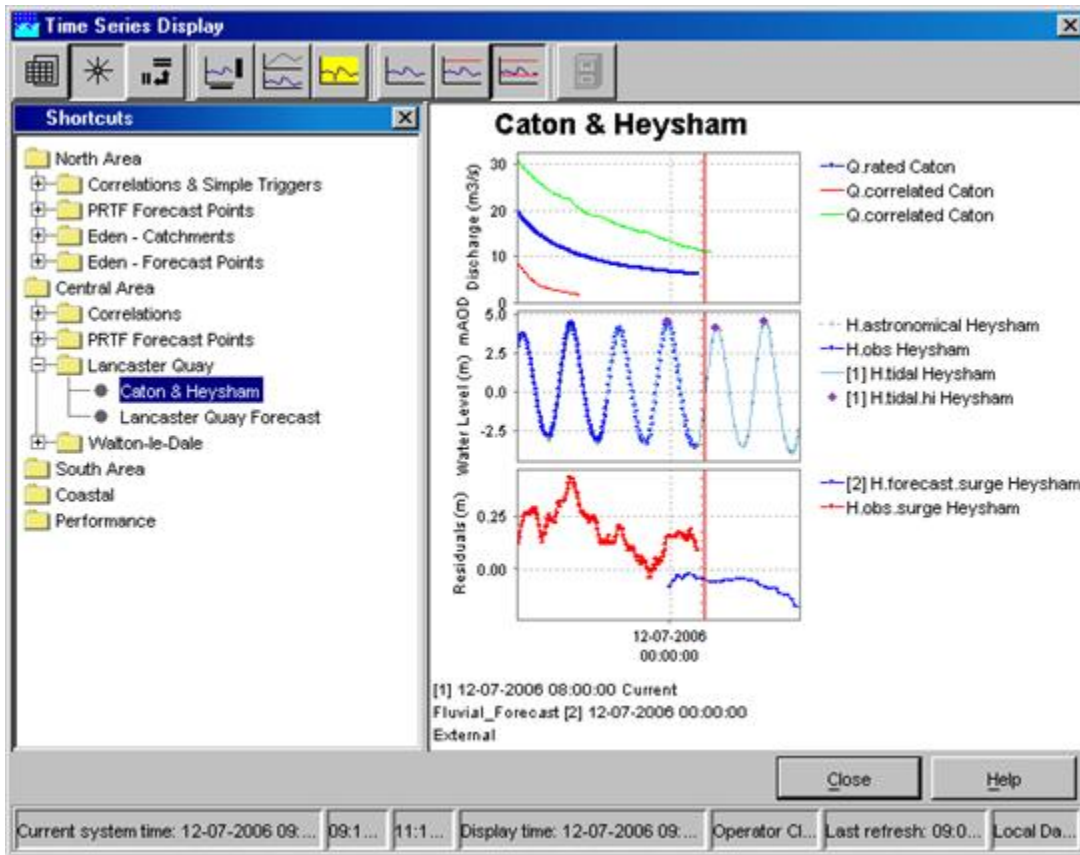
Show empty complete series	shows/hides the series which are completely empty. Usefull while using shortcuts or thumbnails.
Time order reversed	Shows the times in reversed order, so from new to old



Shortcuts

Display templates are available for rapid assessment of data. The templates can be activated by clicking the above mentioned button. The left side of the display shows the available shortcuts in a pre-configured grouping.















The data shown via the Shortcuts belong to the forecasts selected in the Forecasts panel of the FEWS Explorer. Please note that the current forecast is always displayed in the graphs.



Graph

This button can be used to hide or show the graph. If the table was not yet selected, it will show up.

Selecting the small arrow at the right of the icon shows the next menu:

	Toggle graph	Ctrl+G
	Scale to show unreliable data	Ctrl+U
<input checked="" type="checkbox"/> 	Show data labels	Ctrl+D
	Toggle Filter and Shortcuts	Ctrl+Shift+G
	hide unreliaables	Ctrl+Shift+H
<input checked="" type="checkbox"/> 	Show legend at vertical axis	Ctrl+J
	Show legend at horizontal axis	Ctrl+K
	Hide legend	Ctrl+O
<input checked="" type="checkbox"/> 	No thresholds	Ctrl+1
	Scale to show relevant thresholds	Ctrl+2
	Scale to show all thresholds	Ctrl+3
	Validation	Ctrl+Alt+V
	Users	Ctrl+Alt+U
	Comments	Ctrl+Alt+C



Descriptive statistics

This button will add a table to the display with descriptive statistical information. The statistics only appear if a column in the table is selected. Use the right mouse button to copy this table to the clipboard for pasting in Excel.

Statistical Functionality available (if configured):

- Mean
- Min (with date)
- Max (with date)
- Sum
- Standard deviation
- Percentiles (exceedance and non-exceedance)

Time series information:

- Location id
- Location name
- Parameter id
- Parameter name
- Module instance
- Start time
- End time

Data quality information:

- Number of values
- Number of completed values
- Number of corrected values
- Number of doubtful values
- Number of missing values
- Number of reliable values
- Number of unreliable values

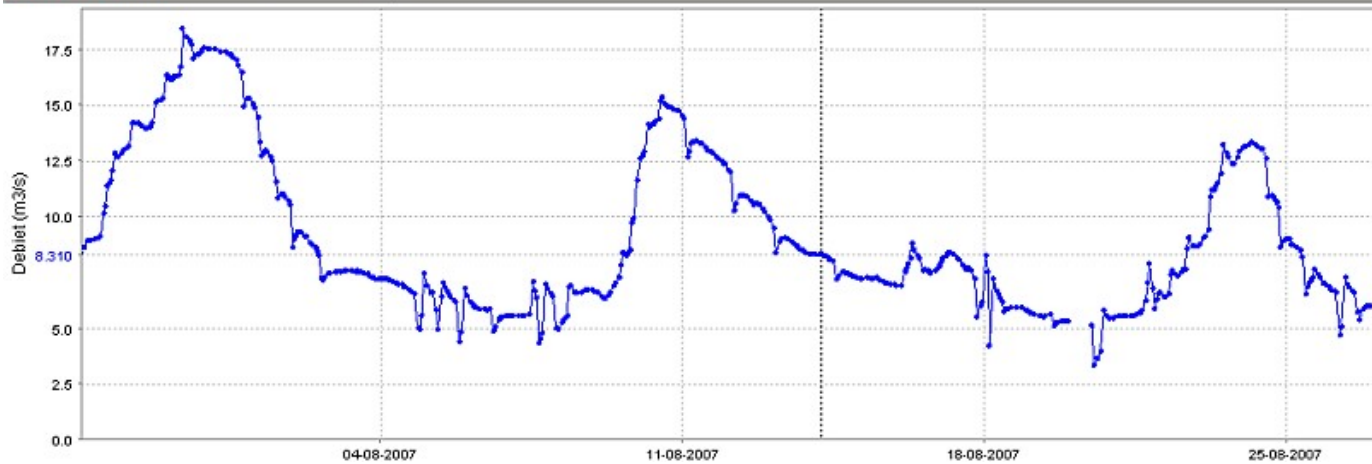
Time series info	
Location id	Please select a column header in the time series table to display descriptive information.
Location name	
Parameter id	
Parameter name	
Module instance	
Start time	
End time	

dateTime	Berekend debiet (m3/s) 0021 - Sint Mic 0021 Debietformule
14-08-2007 00:00:00	8.330
14-08-2007 01:00:00	8.295
14-08-2007 02:00:00	8.295
14-08-2007 03:00:00	8.295
14-08-2007 04:00:00	8.295
14-08-2007 05:00:00	8.310
14-08-2007 06:00:00	8.310
14-08-2007 07:00:00	8.234
14-08-2007 08:00:00	8.212
14-08-2007 09:00:00	8.192
14-08-2007 10:00:00	8.100
14-08-2007 11:00:00	8.100
14-08-2007 12:00:00	8.040
14-08-2007 13:00:00	7.332
14-08-2007 14:00:00	7.186
14-08-2007 15:00:00	7.361
14-08-2007 16:00:00	7.419
14-08-2007 17:00:00	7.498
14-08-2007 18:00:00	7.498
14-08-2007 19:00:00	7.439
14-08-2007 20:00:00	7.469
14-08-2007 21:00:00	7.409
14-08-2007 22:00:00	7.379
14-08-2007 23:00:00	7.322
15-08-2007 00:00:00	7.293
15-08-2007 01:00:00	7.263

-Descriptive statistics	
Mean	9.059
Min	3.332 20-08-2007 13:00:00
Max	18.43 30-07-2007 10:00:00
Sum	6,405.064
Standard deviation	3.48
Percentile (exceedence) 5%	16.421
Percentile (exceedence) 25%	11.361
Percentile (exceedence) 50%	7.608
Percentile (exceedence) 75%	6.57
Percentile (exceedence) 95%	5.318
Percentile (non exceedence) 10%	5.557
Percentile (non exceedence) 20%	6.188
Percentile (non exceedence) 50%	7.608
Percentile (non exceedence) 80%	12.742
Percentile (non exceedence) 90%	14.448

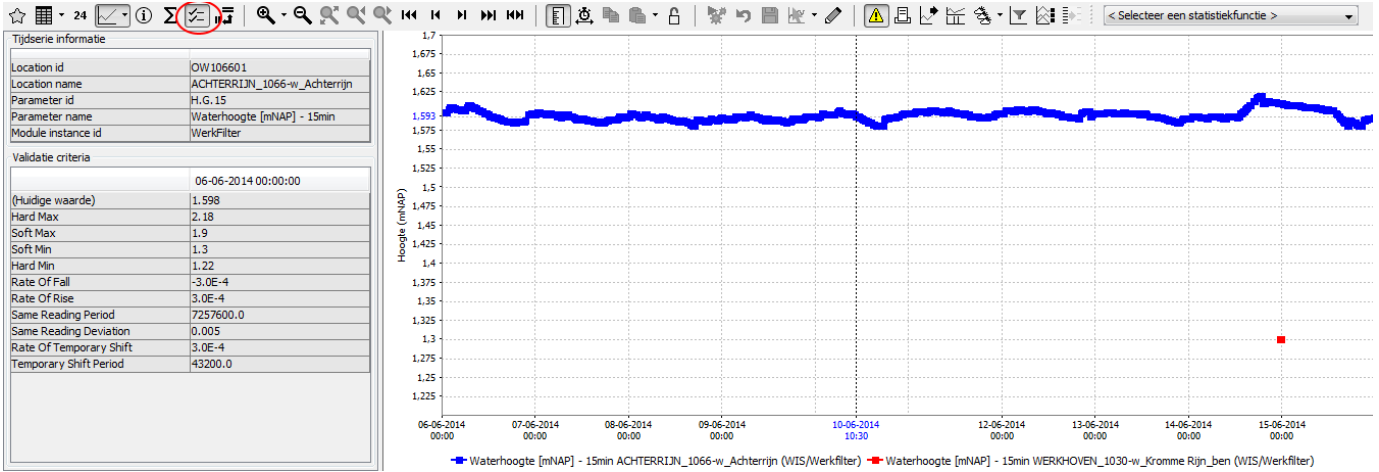
Time series info	
Location id	0021
Location name	0021 - Sint Michielsgestel
Parameter id	Q.afgeleid
Parameter name	Berekend debiet (Q.afgeleid)
Module instance	Debiet_Berekenen_TMX
Start time	28-07-2007 01:00:00
End time	27-08-2007 02:00:00

Data quality	
Nr. of values	722
Nr. of completed	15
Nr. of corrected	0
Nr. of reliables	707
Nr. of doubtfuls	0



Validation Rules (hidable panel)

Since 2016.02 button is added to show (or hide) a panel that show the validation criteria for the selected time series on the selected time step



Opening this panel will automatically hide descriptive statistics panel when open



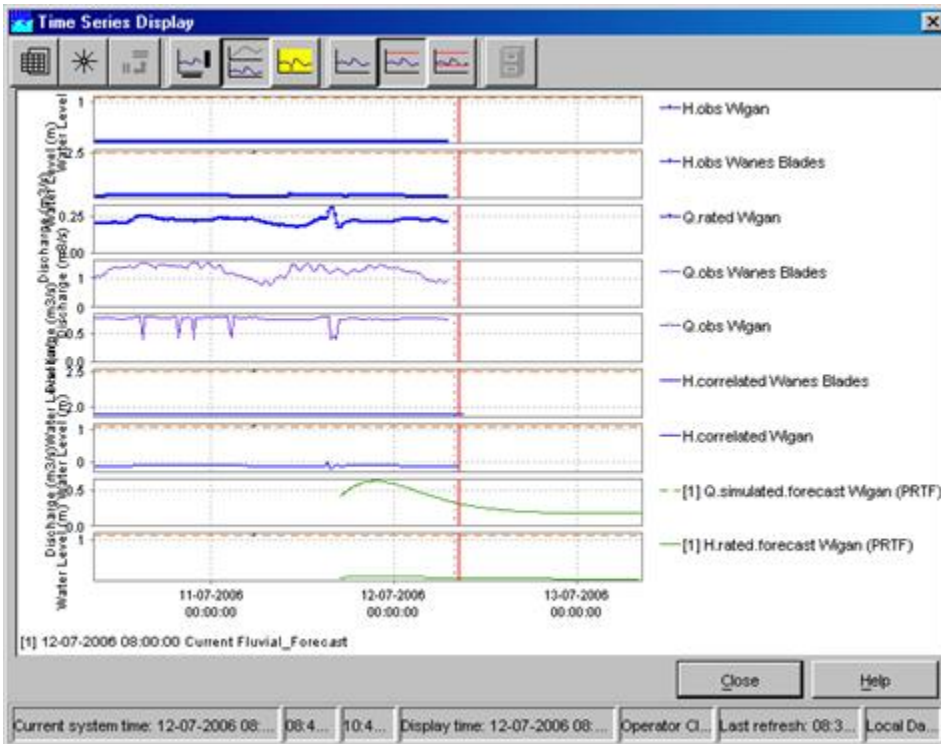
Rotate Splitter

With this button the splitter between table and graph can be placed in a horizontal position. Clicking the same button again returns the splitter to its default vertical position.



Rotate Legend

This button can be used to place the graph legend underneath the graph. Clicking the same button again returns the legend to its default position at the right hand side of the graph.



Toggle Graph

When multiple data series are selected for a single data type (parameter), the graphs will be placed in one subplot of the graph. This sometimes complicates the analysis of time series with different data ranges. By clicking the above mentioned button you can change the layout of the chart:

- Merged into a single graph
- Stacked in different subplots



Scale to show unreliable Data

This button can be used to focus on time intervals with unreliable data within the selected time series. Data is marked as unreliable, if values exceed hard limits.



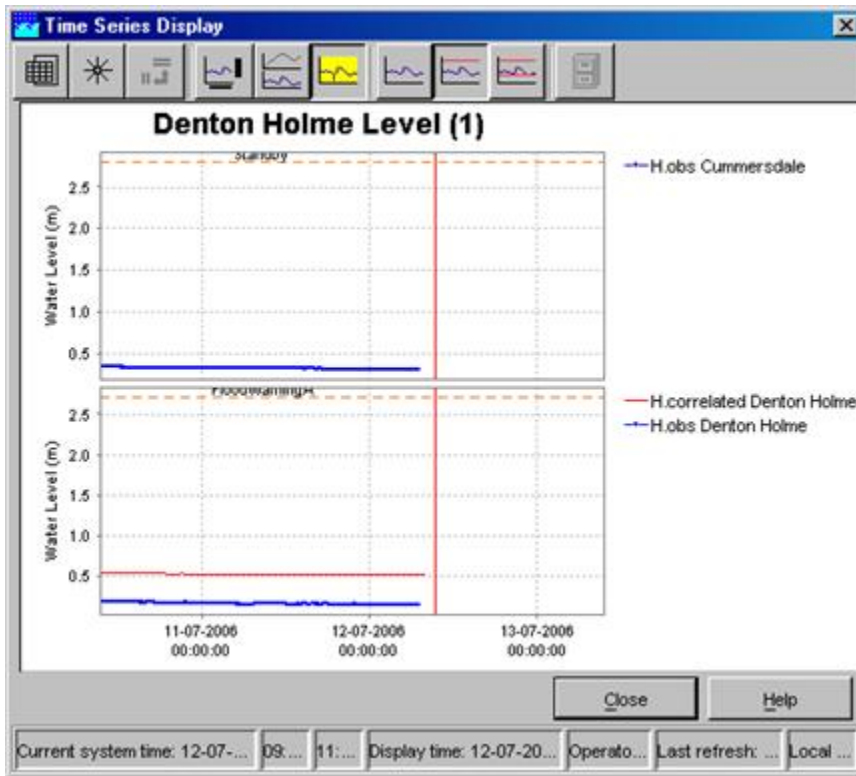
Show no Thresholds

By clicking this button all pre-configured thresholds which can also be shown in the graphs with the selected time series disappear.



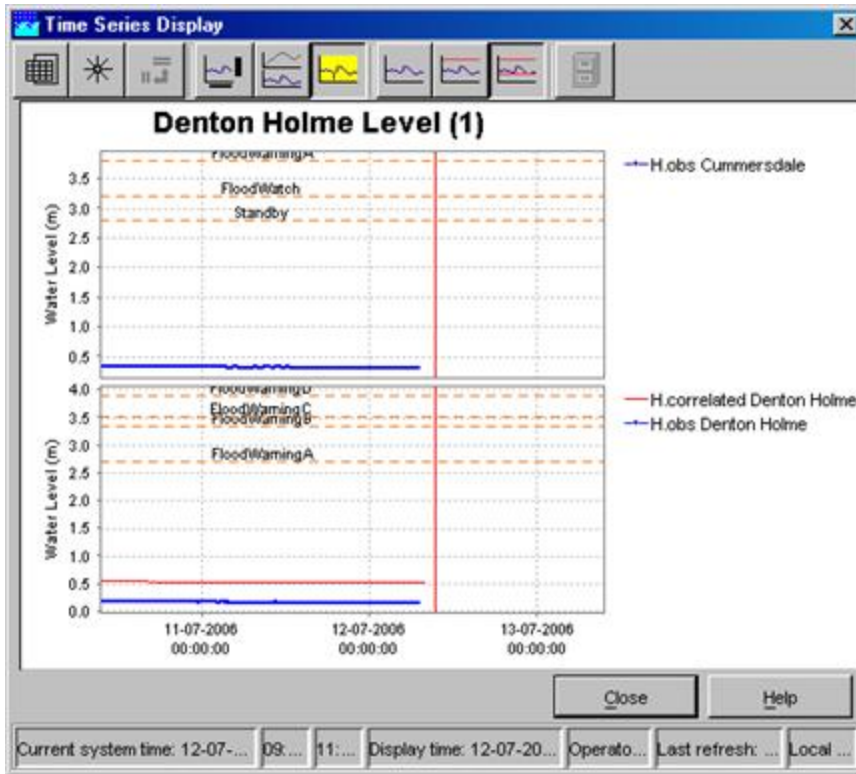
Scale to show relevant Thresholds

With this option the graph is scaled in such a way, that relevant thresholds (the closest threshold values) are displayed together with the selected time series in the graph.



Scale to show all Thresholds

This button can be used to show *all* pre-configured thresholds of a certain parameter at the selected location(s). This means that all thresholds levels (e.g. Standby, Flood Watch, Flood Warning and Severe Flood Warning) are displayed in the graph.



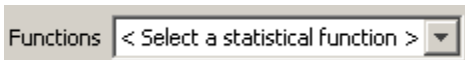
Show data labels

Clicking the 'Show data labels' will you to display quality flags for the data you are presenting. The information is shown at the bottom of the screen.

The following colour codes have been used:

- the upper line indicates the origin of the data
 - original data: no line is displayed
 - automatically corrected data (original data flagged as unreliable and automatically interpolated): blue line
 - automatically completed data (original data is missing and interpolated by system): magenta line
 - manual corrected data (original data edited by a user): dark blue line
 - manual completed data (filled up by a user): dark magenta line
-
- the middle line indicates the quality of the data
 - reliable data: no line is displayed
 - doubtful data: light yellow
 - unreliable data: dark yellow
-
- the lower line indicates where comments have been added to the data
 - no comment: no line is displayed
 - comment available: dark red

The lines are displayed under the data points. The colours correspond with the colouring used in the tables.



Statistical Functions

If switched on in the *configuration*. This functionality works independently from the descriptive statistics table.

The available statistical functions can be selected from the drop-down box in the button bar. The selected function will act on the timeseries that are currently selected by in the timeseries dialogue. The result of the statistical analysis will be shown in the timeseries dialogue window. Follow [this link](#) for a description of all available statistical functions.



Search and Select Forecast

Displays in FEWS by default only show current approved forecasts. Previous forecasts can be shown if you approve them in the Forecast Management Display, or by using this “search and select forecasts” option.

Search and select forecasts

search period start time: 09-25-2014, 12:00 end time: 10-20-2014, 12:00

nr of recent forecasts: 5

include historical run

persist selection

search

<input type="checkbox"/> workflow	time	description	dispatch time
<input checked="" type="checkbox"/> CJStrike_Forecast Current	10-20-2014, 12:00	Preprocess MAP/MAT	01-12-2015, 16:26
<input type="checkbox"/> CJStrike_Forecast Current	10-20-2014, 12:00		01-12-2015, 15:50
<input type="checkbox"/> Bruneau_Forecast Current	10-20-2014, 12:00		01-12-2015, 15:49
<input type="checkbox"/> Bruneau_Forecast	10-20-2014, 12:00		01-12-2015, 15:47
<input type="checkbox"/> Bruneau_Forecast	10-20-2014, 12:00		01-12-2015, 15:46
<input checked="" type="checkbox"/> BRON_Forecast Current	10-20-2014, 12:00	Bruneau at Rowland (BRON)	01-12-2015, 17:17
<input checked="" type="checkbox"/> BRON_Forecast	10-20-2014, 12:00	Bruneau at Rowland (BRON)	01-12-2015, 17:10
<input checked="" type="checkbox"/> BRON_Forecast	10-20-2014, 12:00	Bruneau at Rowland (BRON)	01-12-2015, 17:09
<input type="checkbox"/> BRON_Forecast	10-20-2014, 12:00	Bruneau at Rowland (BRON)	01-12-2015, 15:53
<input type="checkbox"/> BRON_Forecast	10-20-2014, 12:00	Bruneau at Rowland (BRON)	01-12-2015, 15:52

OK Close Apply



Historical Events

With this button historical events can be activated (provided that they are pre-configured). They will be displayed in the same graph to enable a comparison with the actual timeseries. Further explanation is given below.

Display time

To change the view period in the graph, the field *Display time* in the Status Bar below the graph should be double clicked. The display time can now be changed with help of the menu. Press [OK] to accept the changed view period. The next time the chart is opened the original configured display time will be used again.

19:43 Display time: 20-11-1992 14:00 Stand e

RM - Validation Limit - Hard / Soft Limit

Display Time Relative View Period

Relative Start Time: -24 Hours

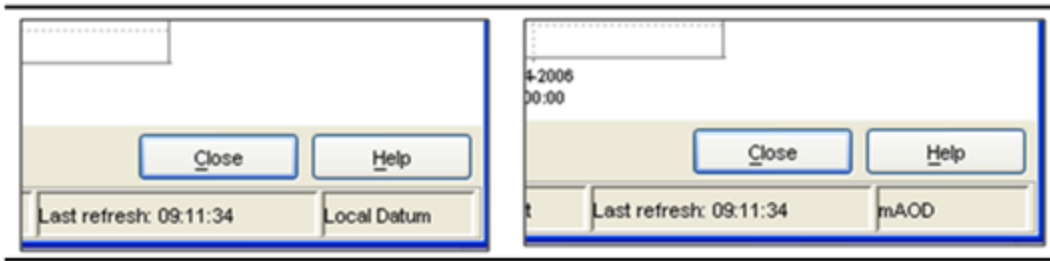
Display Time: 14-04-2006 09:00:00 Reset

Relative End Time: 24 Hours

OK Cancel Apply

Datum Toggle

The Datum Toggle at the lower right hand corner of the display allows levels to be displayed with reference to *Local Datum* or *mAOD*.

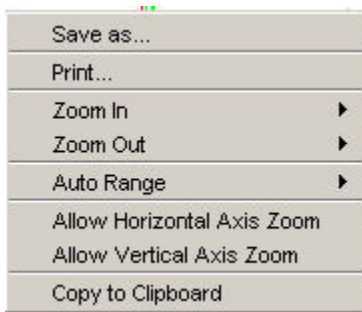


Navigating in Graphs

Zooming in and out can be done with help of the scroll wheel of the mouse. Scrolling away from the user results in zooming in while scrolling towards the user results in zooming out.

Zooming is also possible by selecting a zoom range. Drag the mouse holding down the right button to form a rectangular area to zoom in to.

When clicking the right mouse button, the dropdown menu presented below appears. The menu gives you some additional options.



Save As

You can save the graph to file with this option.

Print

This option allows you to print the graph.

Zoom in / out

You can select to zoom in and out along one or both axis with this option.

Allow Vertical / Horizontal Axis Zoom

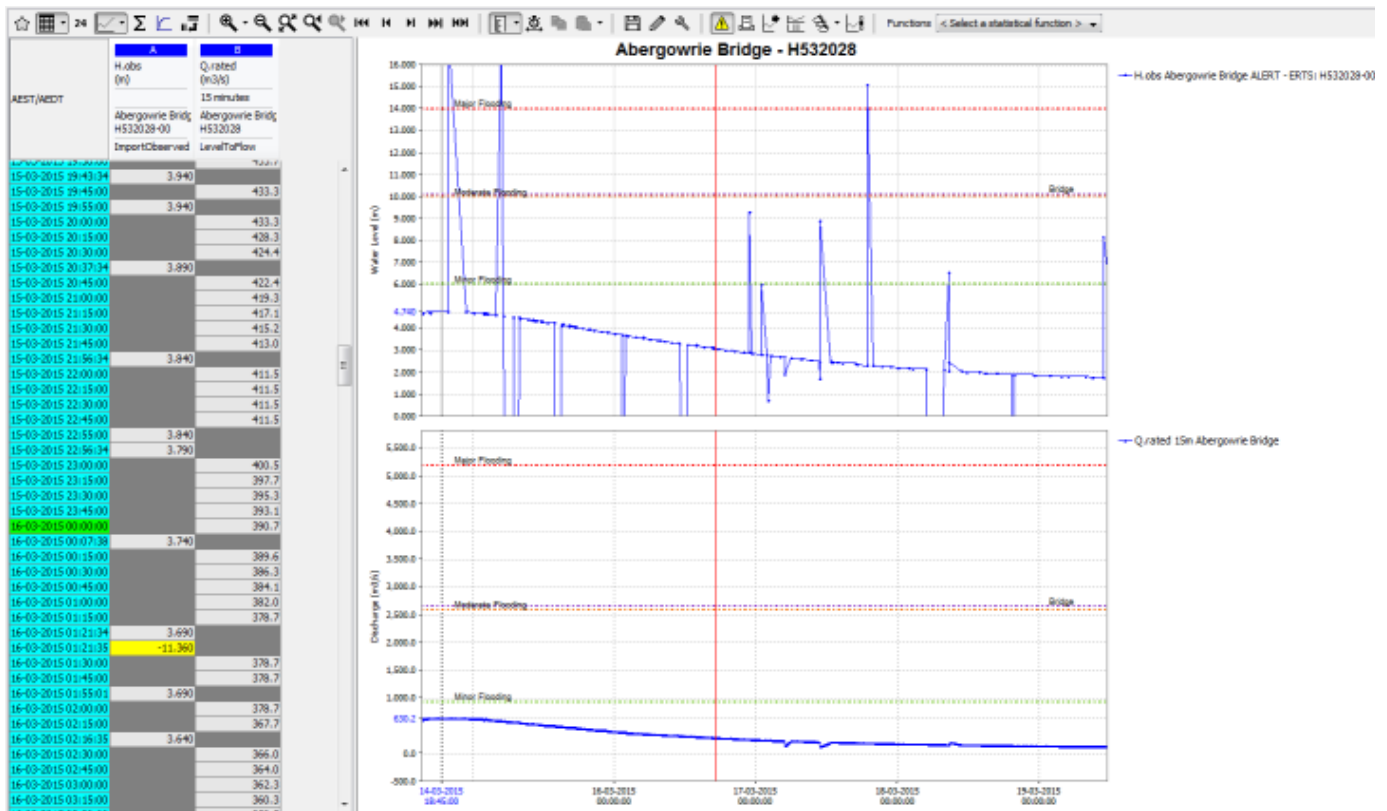
You can select to allow for zooming in and out along one of the axis with this option.

Auto Range

This feature allows you the set automatic scaling along one or both axis.

Data Editor

The Graph and Editor display has a table and an edit mode.



The most left column shows the date and time of the data. The period displayed spans the overall period defined in the filters for all time series.

The colours in the headings of the columns correspond with the line colour in the graph.

In the date/time column different colours are used to provide a logical meaning to certain important moments:

- Light blue: historical data, either observed or hindcast (data before T-0~)
- Dark blue: forecast data (data after T-0~)

For the data columns the background colour is used to indicate the quality of the data, identified by the data flags set of the Validation utility. Further, an indication of the editability of the data is given by the the background colour. The meaning of the background colours in the data fields is:

- White: reliable, editable
- Light yellow: doubtful
- Bright yellow: unreliable
- Gray: not editable

The font colour in the data fields indicates the data origin. Following colours are used:

- Black: original data
- Blue: corrected (original data flagged "Unreliable" and interpolated)
- Magenta: completed (original data missing and interpolated)

The edit mode can be enabled from the toolbar with the



Enable Edit mode button. Data (only those with a white background) can be edited by double clicking a field in the column. Editing may be done in the table directly. The result of an edit action is directly displayed in the corresponding graph. Manually corrected data will be saved to the database by disabling the Edit mode again from the toolbar. A pop-up will ask to save the edited data to the database. With **[OK]** the data is saved, **[NO]** the data is not saved and with **[Cancel]** changes will be undone.

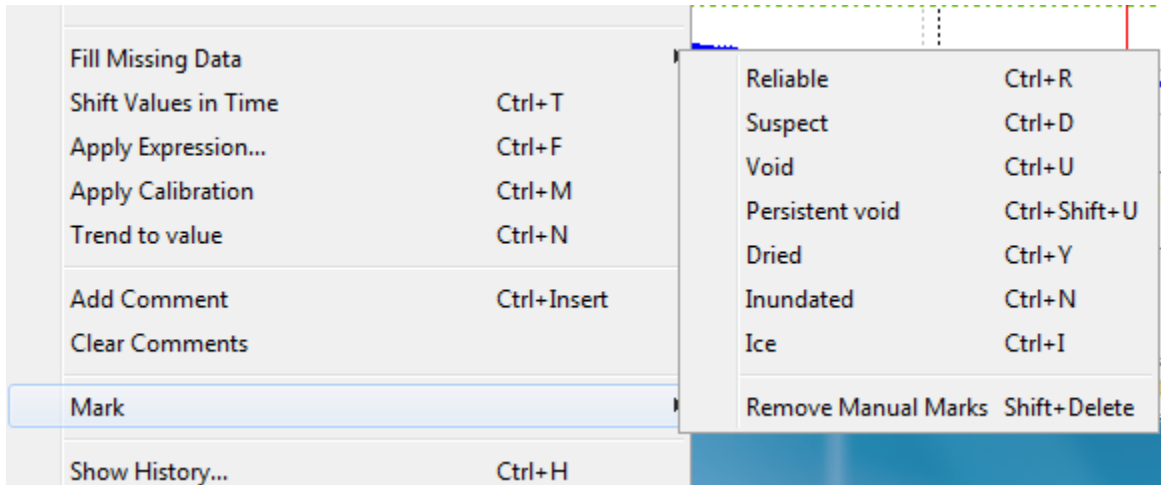
Through manual editing of data, the source of the data changes from original to corrected. The font colour used for edited data is blue to indicate that it is completed data. The background colour remains white, as the data has not yet been validated. If however, after pressing **[Apply]** validation indicates that the value exceeds certain validation limits, the background colour will be set accordingly.

Editing data labels

Data labels can also be edited from the Table when the



Enable Edit mode is active. Press the right mouse button when selecting one or multiple cells in the table and select the Mark option. It is now possible to change the data label of a value to reliable, doubtful, etc.. or remove the Manual Data Label Marks. A special data label is the Persistent Void or Persistent Unreliable data label, this label is used by the secondary validation module.



Note: It is not possible to change the data label of a missing value.

Editing Data

Historic Events

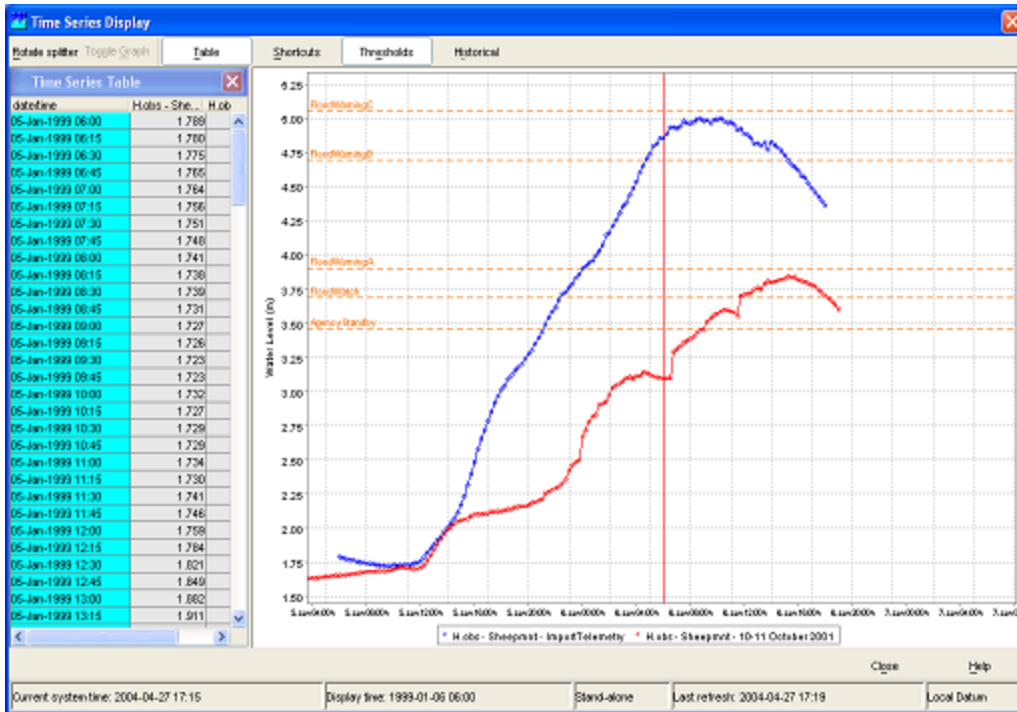
A special option in the Data Display is the option to add historic events to the chart window.

To show historic events for a specific location take following steps:

- Select the location from the location list box in the FEWS explorer
- Select the parameter from the parameter list box
- Open the chart display by pressing the chart button
- Press the



button in the Chart Display and select one of the historical events from the list

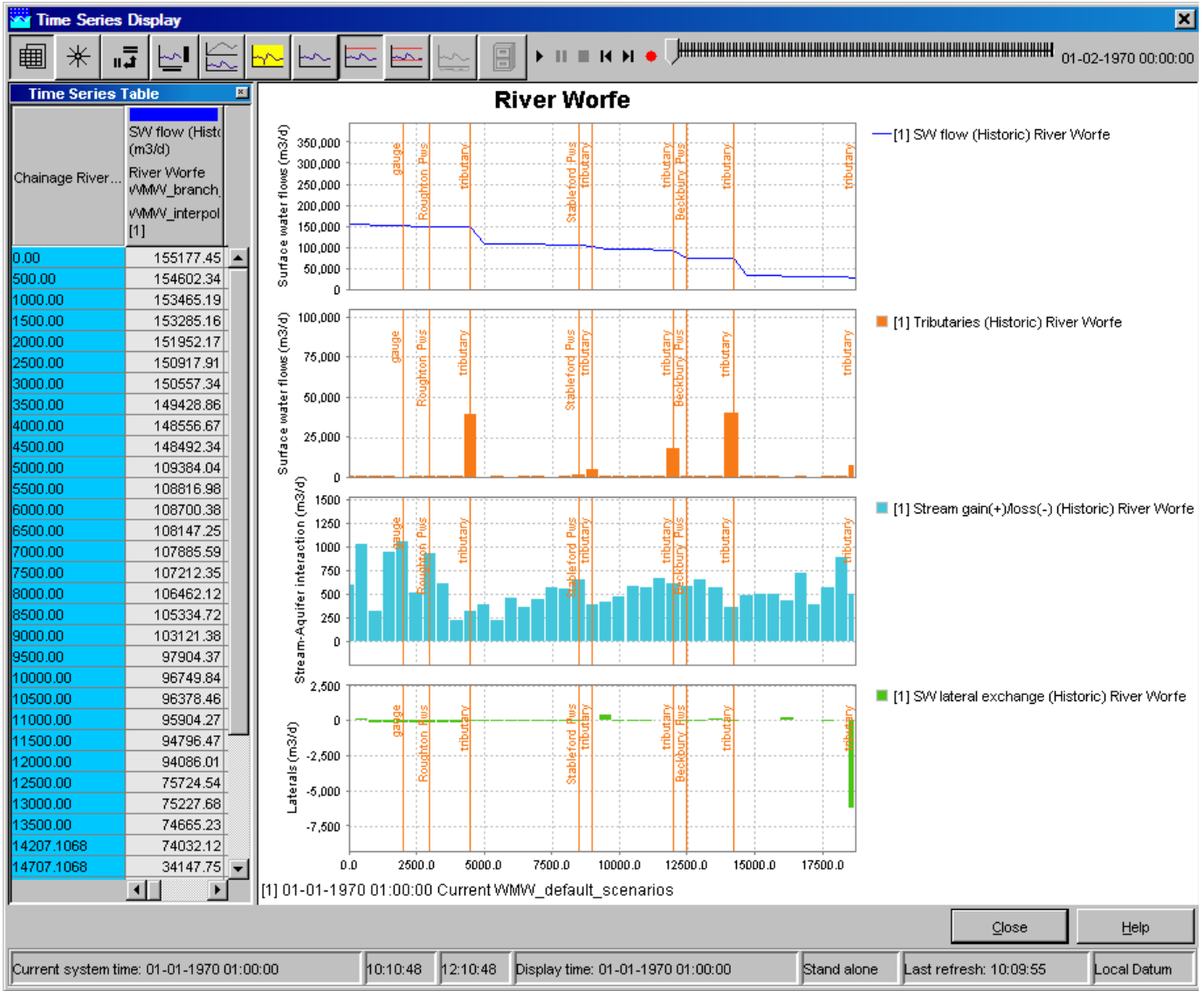


A new (red) line will be added to the chart. This event line can now be shifted forwards and backwards in time using the "+" and "-" keys on your keyboard. To activate this shift procedure press the [Historic Events] button in the Chart Display and select Shift Time.

A small pop-up window shows that you can now shift the historic event forwards and backwards by pressing the "+" or "-" keys on your keyboard. When the shift procedure is completed press [Done].

Longitudinal profile

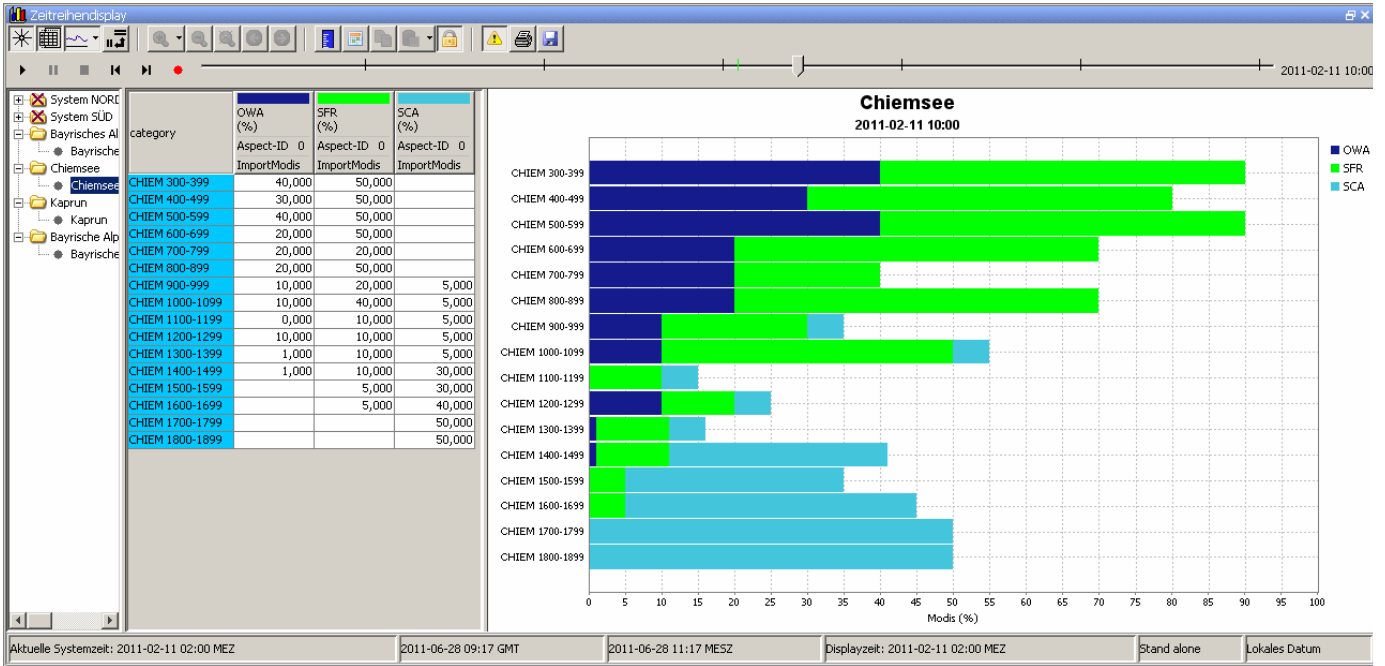
Since release 2007.02, the display offers also the opportunity to show longitudinal profiles. In such graph, the parameter values (Y-axis) are plotted against the river chainage (X-axis). The graph can progress over time, either step by step or animated, via the time control toolbar, described in the Spatial display. Both the graph and table will change over time as they show data along the profile.



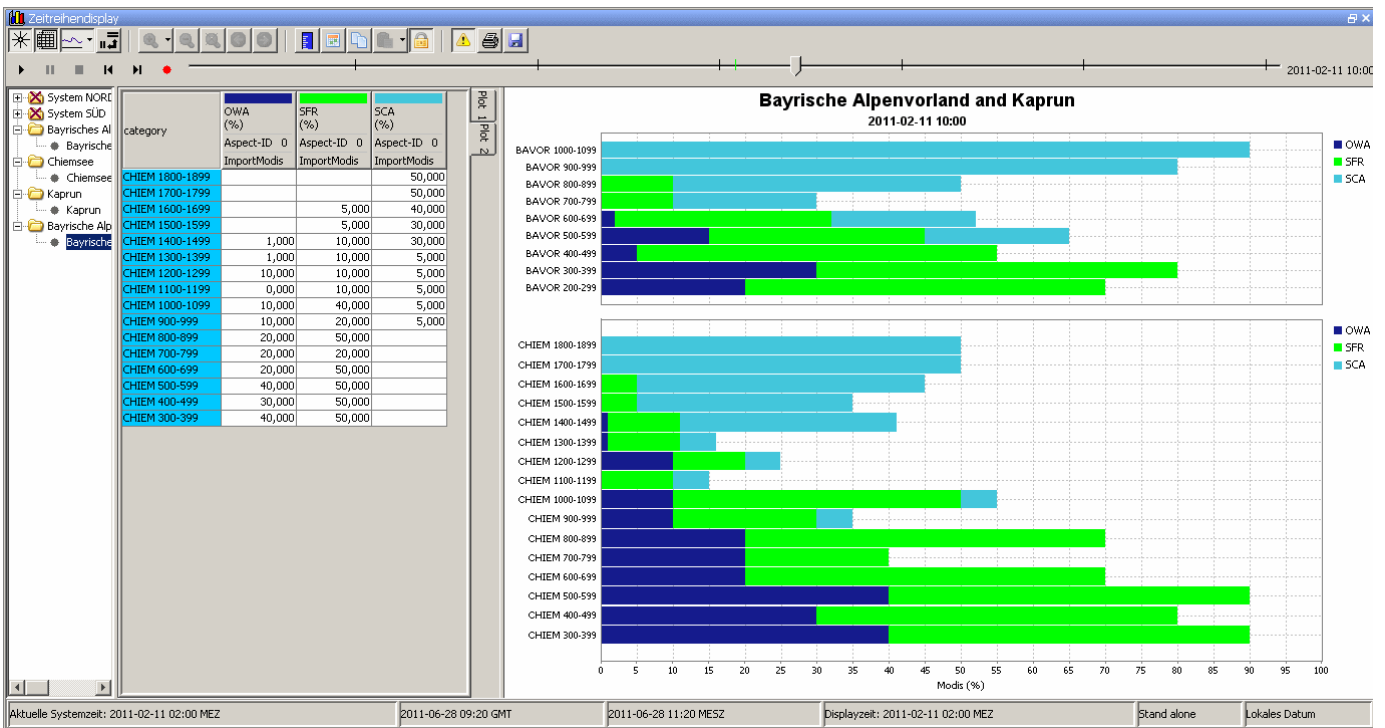
Category plot

This graph type is available in DELFT-FEWS versions 2011.01 and higher.

In Category plot the parameter values (X-axis) are plotted against the locations (Y-axis). The graph can progress over time, either step by step or animated, via the time control toolbar. Both the graph and table will change over time. The detail description of the time toolbar can be found in the paragraph Spatial display.



If there are more subplots in a plot, a separate table will be created for each subplot.



Configuration

To show the data in the category plot, the 'category' plot viewer type should be specified in DisplayGroups.xml with element <plotViewerId> :

```

<plot id="MODISCategory1Plot">
  <subplot>

    <timeSeriesSet>
      <moduleInstanceId>ImportModis</moduleInstanceId>
      <valueType>scalar</valueType>
      <parameterId>OWA</parameterId>
      <qualifierId>Aspect-ID 0</qualifierId>
      <locationSetId>ImportModis</locationSetId>
      <timeSeriesType>external historical</timeSeriesType>
      <timeStep unit="hour" multiplier="1"/>
      <relativeViewPeriod unit="hour" start="-24" end="4"/>
      <readWriteMode>read only</readWriteMode>
    </timeSeriesSet>

    <timeSeriesSet>
      <moduleInstanceId>ImportModis</moduleInstanceId>
      <valueType>scalar</valueType>
      <parameterId>SFR</parameterId>
      <qualifierId>Aspect-ID 0</qualifierId>
      <locationSetId>ImportModis</locationSetId>
      <timeSeriesType>external historical</timeSeriesType>
      <timeStep unit="hour" multiplier="1"/>
      <relativeViewPeriod unit="hour" start="-24" end="4"/>
      <readWriteMode>read only</readWriteMode>
    </timeSeriesSet>

  </subplot>
  <plotViewerId>category</plotViewerId>

</plot>

```

Restrictions

The category plot can be customized in TimeSeriesDisplay.xml and in DisplayGroups.xml, similar to the other plot types. However not all configuration elements are applicable to the category plot. If these elements are still configured, they will be ignored. The category plot is only applicable to scalar timeseries.

Editing Data

- [Table edit functionality](#)
- [Chart edit functionality](#)
 - [Persistence of manual edited imported data](#)

Table edit functionality

By pressing the right mouse button a list with edit actions appears on the screen. These includes the option to copy and fill in data. The display that pops up after clicking the right mouse button on an equidistant timeseries is shown below (figures 1, 1.1, 1.2):




Select All	Ctrl+A
Select Column	Ctrl+Space
Select Row	Shift+Space
Expand Selection	Ctrl+E
Filter by Tree...	Ctrl+Alt+F
Filter by Expression...	Ctrl+Alt+E
Save As...	Ctrl+Shift+S
Edit Value	F2
 Cut	Ctrl+X
 Copy	Ctrl+C
Copy Values Only	Ctrl+Shift+C
Copy Reliable Values Only	
Copy Reliable and Doubtful Values Only	
Copy Times Only	
Copy Headers Only	
 Paste	Ctrl+V
Clear	Delete
Clear Doubtfuls	
Clear Unreliables	
Fill Missing Data	▶
Shift Values in Time	Ctrl+T
Apply Expression...	Ctrl+F
Apply Calibration	Ctrl+M
Trend to value	Ctrl+N
Add Comment	Ctrl+Insert
Clear Comments	
Mark	▶
Show History...	Ctrl+H

figure 1: Timeseries edit options

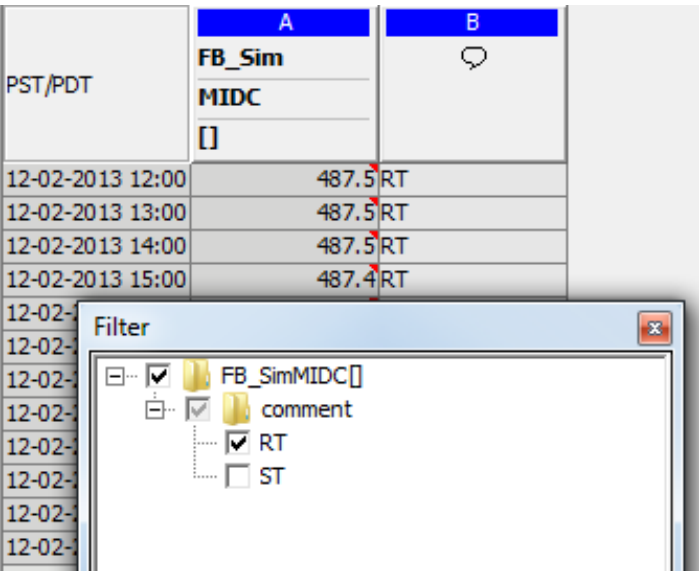
Block	Ctrl+B
Linear	Ctrl+L
Clipboard	Ctrl+Shift+V
Set Maximum Fill Gap	Ctrl+Shift+F

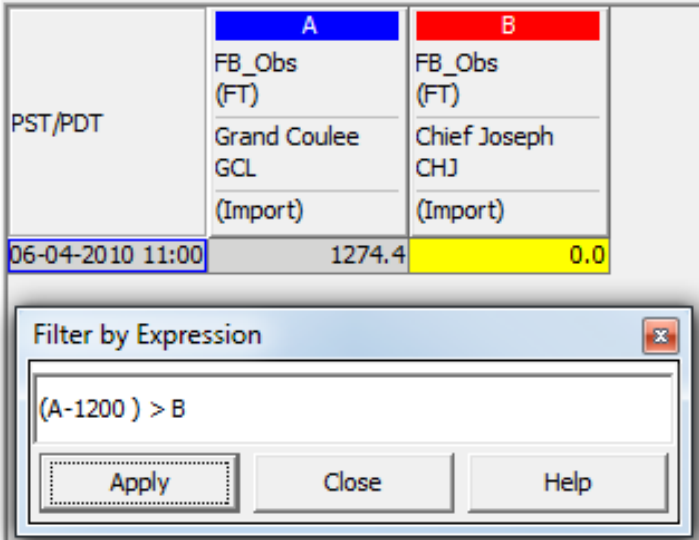
figure 1.1: Timeseries edit option - submenu Fill Missing Data

Reliable	Ctrl+R
Doubtful	Ctrl+D
Unreliable	Ctrl+U
Persistent unreliable	Ctrl+Shift+U
Dried	Ctrl+Y
Inundated	Ctrl+N
Ice	Ctrl+I
Remove Manual Marks Shift+Delete	

figure 1.2: Timeseries edit option - submenu Mark

The options have the following meaning...

[Select All]	Select all data displayed in the editor
[Select Column]	Select all data in the column in which the cursor is placed
[Select Row]	Select all data in the row in which the cursor is placed
[Save As]	Save selected timeseries to file of format: PI xml, GIN xml, csv, Dutch csv, iBever csv, Hymos transfer DB 4.50 mdb or Hymos transfer DB 4.03 mdb
[Save as special]	Filter selected timeseries by reliability and status and save to file of format: PI xml, GIN xml, csv, Dutch csv, iBever csv, Hymos transfer DB 4.50 mdb or Hymos transfer DB 4.03 mdb (see also Export Timeseries from FEWS Explorer). From 2015.01 [Save As Special] has been merged into [Save As].
[Expand Selection]	Select all data in the row in which the cursor is placed
Filter by Tree	<p>Possibility to filter the rows in the table so that you only see the rows which meet the filter selection. You can select on comments, validation flags and user edits (if they are different)</p> 

Filter by Expression	<p>Possibility to filter the rows in the table that you only see the times and values that meets an expression. With a pop-up message you can define the expression, where the time series are referred to as column A, B, C etc.</p> <p>The expression can look like "A>0"where all times are are listed where the value is larger than 0. Or "A>B" where all times (rows) are listed where the value in column A is larger than the value in column B.</p> 
[Edit Value]	The cell on which the cursor is place can be edited
[Cut]	Move the selected data (including the date / time field) to the clipboard
[Copy]	Copy the selected data (included the date / time field) to the clipboard
[Copy Values Only]	Copy the data values in the selection to the clipboard
[Copy Reliable Values Only]	Copy the data values in the selection classified as reliable to the clipboard
[Copy Reliable and Doubtful Values Only]	Copy the data values in the selection classified as reliable and doubtful to the clipboard
[Copy Times Only]	Copy the selected date / time in the selection to clipboard
[Paste]	Paste the data from the clipboard into the selected fields
[Clear]	Delete the data values in the selection
[Clear Doubtfuls]	Delete the data values in the selection classified as doubtful
[Clear Unreliables]	Delete the data values in the selection classified as unreliable
[Block Fill Missing Data]	Fill the selected fields with the last value available value in the same column
[Linear Fill Missing Data]	Apply linear interpolation when filling in the selected fields
[Fill Missing Data from Clipboard]	Fill in the selected fields with data copied to the clipboard
[Set maximum fill gap]	Set the maximum gap size to be interpolated
[Shift Values in Time]	Moves the selected values in time

[Apply Transformation]	Change the selected values using a regular expression
[Apply Calibration]	Undo trend deviance of the selected values using a calibration timeseries
[Trend to value]	Trends a value to a given target level

If the selected timeseries is non-equidistant extra options will be shown (figure 2):




Save as special...	Ctrl+P
Edit Value	F2
Edit Time	Shift+F2
 Insert Time	Insert
 Remove Time	Ctrl+Backspace
 Cut	Ctrl+X

figure 2: Extra edit options for non-equidistant series The extra options are:

[Edit Time]	Edit an existing date/time for which a value already has been entered
[Insert Time]	Insert a date/time for which a value can be entered
[Remove Time]	Remove a date/time. NOTE You can <i>only</i> remove a date/time if you have just inserted one using the Insert Time option and if you have not yet applied the change. Once stored in the database the time <i>cannot</i> be removed. If you need to remove values you can set it to missing using the clear option. The time will remain.

Chart edit functionality

It is possible to edit timeseries directly in the chart (when in edit mode). To do this a user must first select the timeseries the user wants to edit. Selecting a timeseries can be done by:

- clicking the table column header
- clicking the chart legend item.

Once a timeseries is selected the font of its column header and legend will become **bold** (see figure 3). Now the user can click in the chart area using the left mouse button. To save the edits the user must again select the currently selected series to deselect it or must select an other series for editing.

A	B	C
Neerslaghoe (mm)	Neerslaghoeve (mm)	Neerslaghoeve (mm)
0306-AME-0 r0000518	0306-AME-02 r0000519	0306-AME-03 r0002336
RH_RbgDisA	RH_RbgDisAgc	RH_RbgDisAgc

 **Neerslaghoeveelheid 0306-AME-01**  Neerslaghoeveelheid 0306-AME-02  Neerslaghoeveelheid 0306-AME-03

figure 3: Selected table header and chart legend

Persistence of manual edited imported data

When existing imported data is edited a re-import of the data will not rollback the edit. This is not the case for completions and for data that is the result of transformation.

Apply Calibration

With this option a trend deviance can be undone using a calibration timeseries. The series to calibrate and the series to calibrate by can be chosen in the popup, see figure 1.1

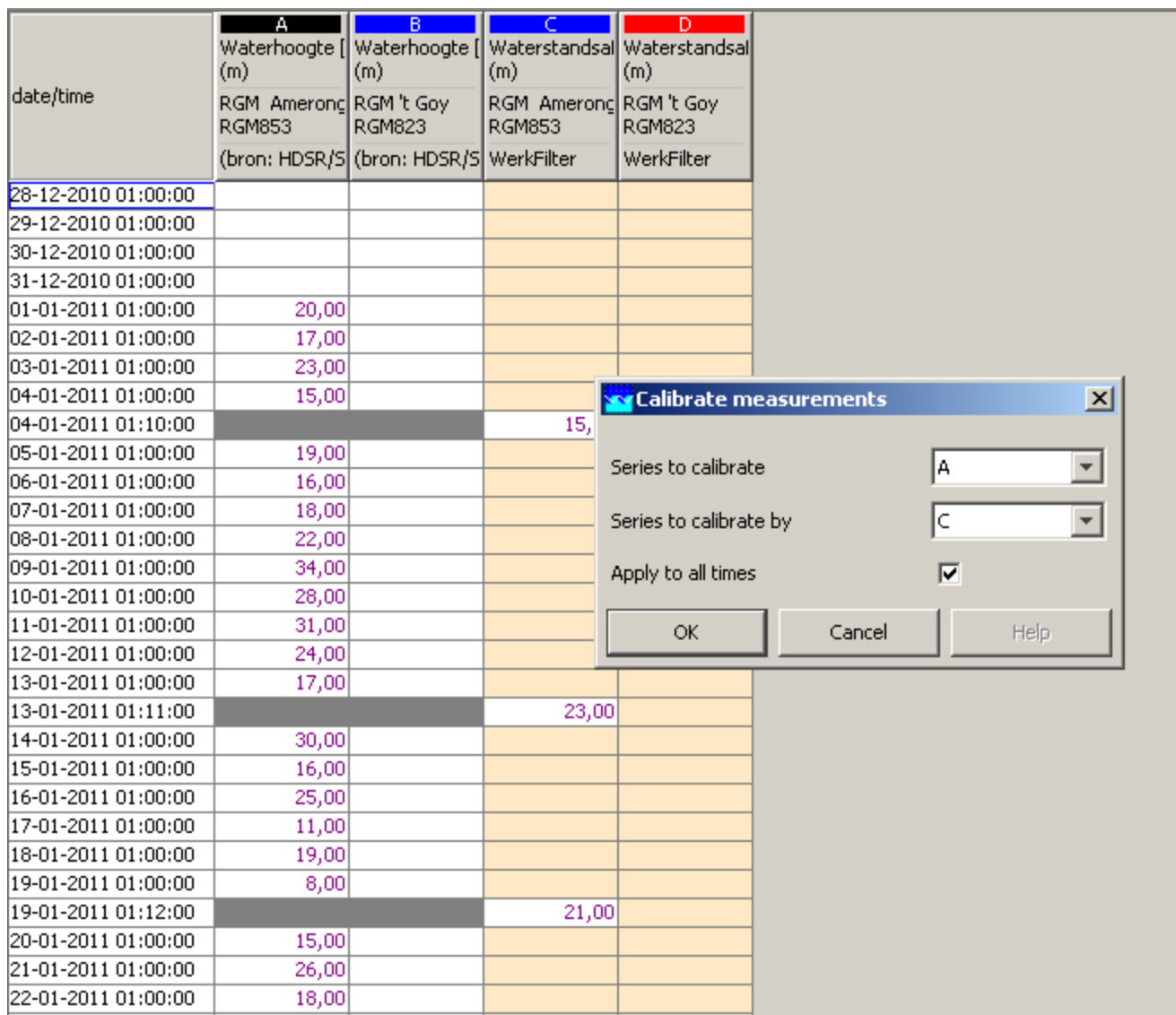


Figure 1.1: Calibrate timeseries A by timeseries C

If the user didn't initially selected any timeseries in the table, all columns ID's are available in the dropdowns boxes, otherwise only the selected column ID's are available.

Column ID's can be found in the coloured area of the column headers .

Choose option "Apply to all times" if the modification should be done for the whole period visible in the table, without selecting all rows in the table.

Note that there is always one time selected in the the table, it is the first time by default.

The timeseries to calibrate must be an equidistant timeseries. The timeseries to calibrate by can be equidistant or nonequidistant timeseries.

Figure 1.2 shows the results of the amending of the timeseries A using calibration timeseries C.

date/time	A	B	C	D
	Waterhoogte [(m)	Waterhoogte [(m)	Waterstandsal (m)	Waterstar (m)
	RGM Amerong RGM853	RGM 't Goy RGM823	RGM Amerong RGM853	RGM 't Goy RGM823
	(bron: HDSR/S	(bron: HDSR/S	WerkFilter	WerkFilter
28-12-2010 01:00:00				
29-12-2010 01:00:00				
30-12-2010 01:00:00				
31-12-2010 01:00:00				
01-01-2011 01:00:00	20,00			
02-01-2011 01:00:00	17,00			
03-01-2011 01:00:00	23,00			
04-01-2011 01:00:00	15,00			
04-01-2011 01:10:00			15,00	
05-01-2011 01:00:00	19,67			
06-01-2011 01:00:00	17,33			
07-01-2011 01:00:00	20,00			
08-01-2011 01:00:00	24,67			
09-01-2011 01:00:00	37,33			
10-01-2011 01:00:00	32,00			
11-01-2011 01:00:00	35,67			
12-01-2011 01:00:00	29,33			
13-01-2011 01:00:00	23,00			
13-01-2011 01:11:00			23,00	
14-01-2011 01:00:00	32,17			
15-01-2011 01:00:00	20,33			
16-01-2011 01:00:00	31,50			
17-01-2011 01:00:00	19,67			
18-01-2011 01:00:00	29,83			
19-01-2011 01:00:00	21,00			
19-01-2011 01:12:00			21,00	
20-01-2011 01:00:00	15,00			
21-01-2011 01:00:00	26,00			
22-01-2011 01:00:00	18,00			
23-01-2011 01:00:00	21,00			

Figure 1.2: Result of calibration of timeseries A by timeseries C

By selecting a certain period the calibration will only be performed for this period, see figures 2.1 and 2.2

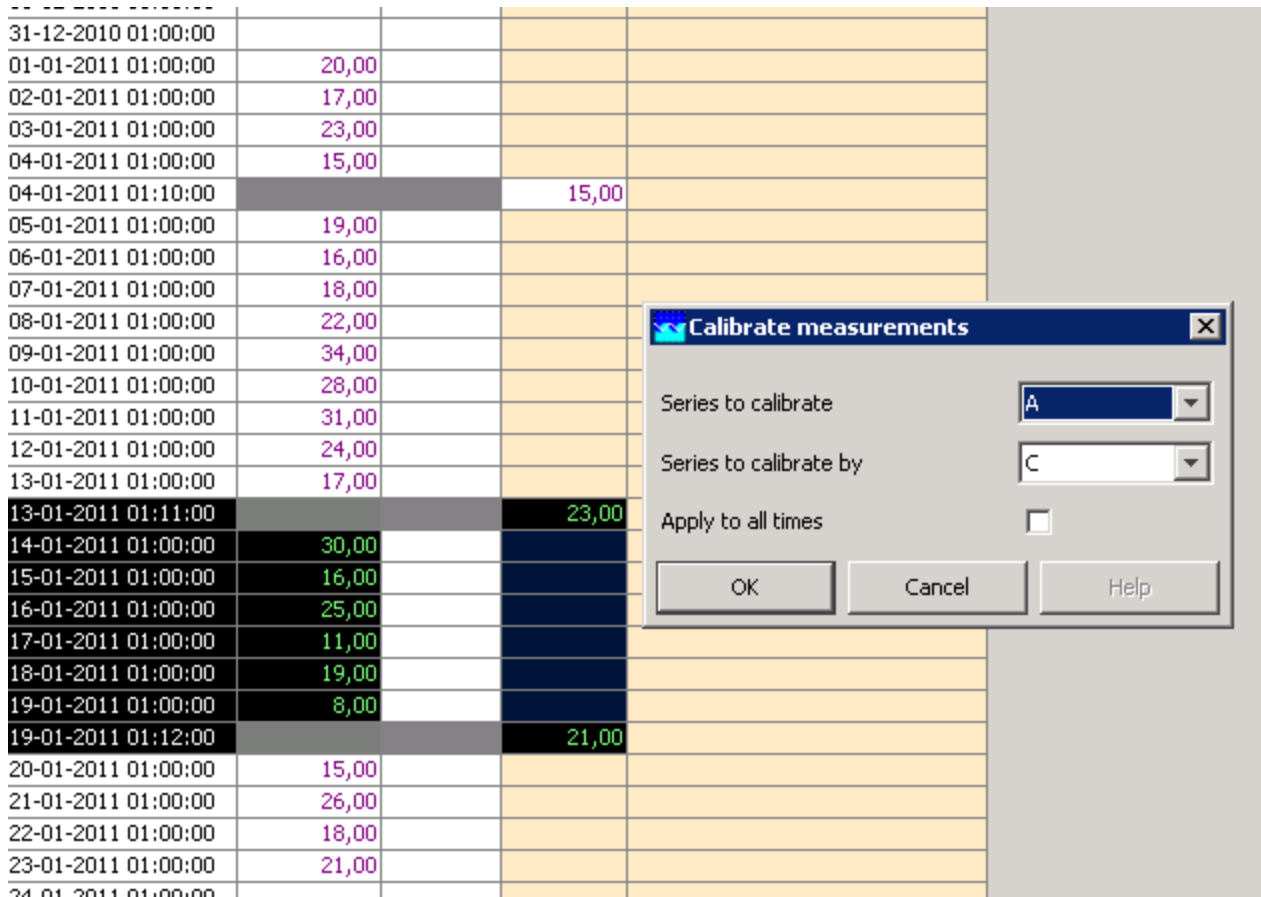


Figure 2.1: Calibrate values in selected period

31-12-2010 01:00:00			
01-01-2011 01:00:00	20,00		
02-01-2011 01:00:00	17,00		
03-01-2011 01:00:00	23,00		
04-01-2011 01:00:00	15,00		
04-01-2011 01:10:00		15,00	
05-01-2011 01:00:00	19,00		
06-01-2011 01:00:00	16,00		
07-01-2011 01:00:00	18,00		
08-01-2011 01:00:00	22,00		
09-01-2011 01:00:00	34,00		
10-01-2011 01:00:00	28,00		
11-01-2011 01:00:00	31,00		
12-01-2011 01:00:00	24,00		
13-01-2011 01:00:00	17,00		
13-01-2011 01:11:00		23,00	
14-01-2011 01:00:00	32,17		
15-01-2011 01:00:00	20,33		
16-01-2011 01:00:00	31,50		
17-01-2011 01:00:00	19,67		
18-01-2011 01:00:00	29,83		
19-01-2011 01:00:00	21,00		
19-01-2011 01:12:00		21,00	
20-01-2011 01:00:00	15,00		
21-01-2011 01:00:00	26,00		
22-01-2011 01:00:00	18,00		
23-01-2011 01:00:00	21,00		
24-01-2011 01:00:00			

Figure 2.2: Result of calibration in selected period

Apply Transformation

With this option s selection of values can be transformed using a regular expression (see figure 1).

02-02-2010 15:25:00	0.033	0.064	0.033
02-02-2010 15:30:00	0.021	0.064	0.020
02-02-2010 15:35:00	0.033	0.064	0.035
02-02-2010 15:40:00	0.032	0.064	0.033
02-02-2010 15:45:00	0.036	0.064	0.038
02-02-2010 15:50:00	0.032	0.064	0.035
02-02-2010 15:55:00	0.036	0.063	0.035
02-02-2010 16:00:00	0.043	0.063	0.043
02-02-2010 16:05:00			
02-02-2010 16:10:00			
02-02-2010 16:15:00			
02-02-2010 16:20:00			
02-02-2010 16:25:00			
02-02-2010 16:30:00			
02-02-2010 16:35:00			
02-02-2010 16:40:00	0.081	0.063	0.079

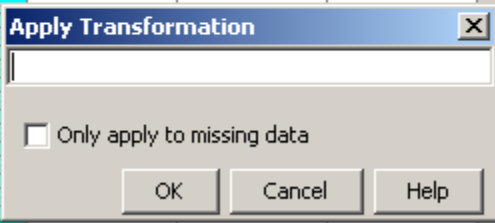


figure 1: Apply Transformation window

By selecting the 'Only apply to missing data' checkbox, the transformation will only be performed for the selected fields that do not already contain a value.

A regular expression can be composed using the following elements:

VARIABLES

The variables that can be used to compose an expression are the alphabetical indexes of columns. These can be found in the coloured area of the column headers (see figure 2) and are case sensitive.

A	B	C
Neerslaghoeve (mm)	Neerslaghoeve (mm)	Neerslaghoeve (mm)
0306-AME-0	0306-AME-02	0306-AME-03

figure 2: Alphabetical column indices

OPERATORS

operator	description	example
+	add	A+3
-	subtract	B-C
*	multiply	A*0.5
/	divide	B/A
^	power	A^2

FUNCTIONS

function	description	example
sum	sum of values	sum(A,B,...)
abs	absolute value	abs(A)
pow	power function	pow(A,2)
sqrt	square root	sqrt(B)
min	minimum of list	min(A,B,C)
max	maximum of list	max(A,B,C)

average	average of list	average(A,B,C)
exp	exponential (e^x)	exp(A)
ln	natural logarithm	ln(A)
log	logarithm base 10	log(A)
atanh	inverse hyperbolic tangent	atanh(A)
acosh	inverse hyperbolic cosine	acosh(A)
asinh	inverse hyperbolic sine	asinh(A)
tanh	hyperbolic tangent	tanh(A)
cosh	hyperbolic cosine	cosh(A)
sinh	hyperbolic sine	sinh(A)
atan	arc tangent	atan(A)
acos	arc cosine	acos(A)
asin	arc sine	asine(A)
tan	tangent	tan(A)
cos	cosine	cos(A)
sin	sine	sin(A)
if	logical expression	if(evaluation,expression1,expression2)
isMissing	check for NaN	isMissing(A)

Shift Values in Time

With this option a selection of values can be moved by a given time period, both forward and backward (see figure 1).

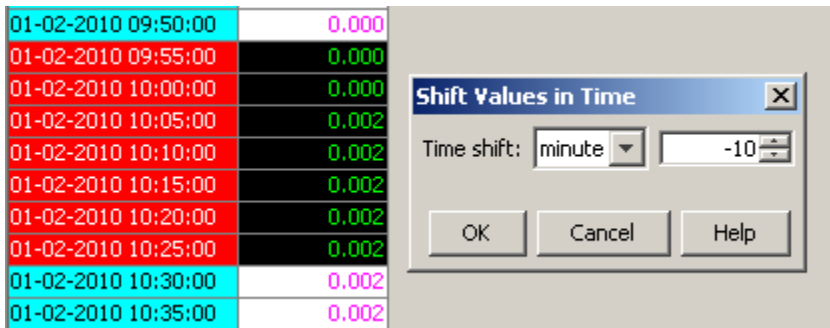


figure 1: Shift Values in Time window (back 10 mins)

This operation performs the following actions on the selected timeseries:

Equidistant timeseries

- copy the selected values to clipboard
- *clear* all values in the period that results from merging the selected period with the shift period
- move the selected values in time and *paste* them back in the table

Non-equidistant timeseries

- copy the selected values to clipboard
- *delete* all values in the period that results from merging the selected period with the shift period
- move the selected values in time and *insert* them back in the table

Trend to value

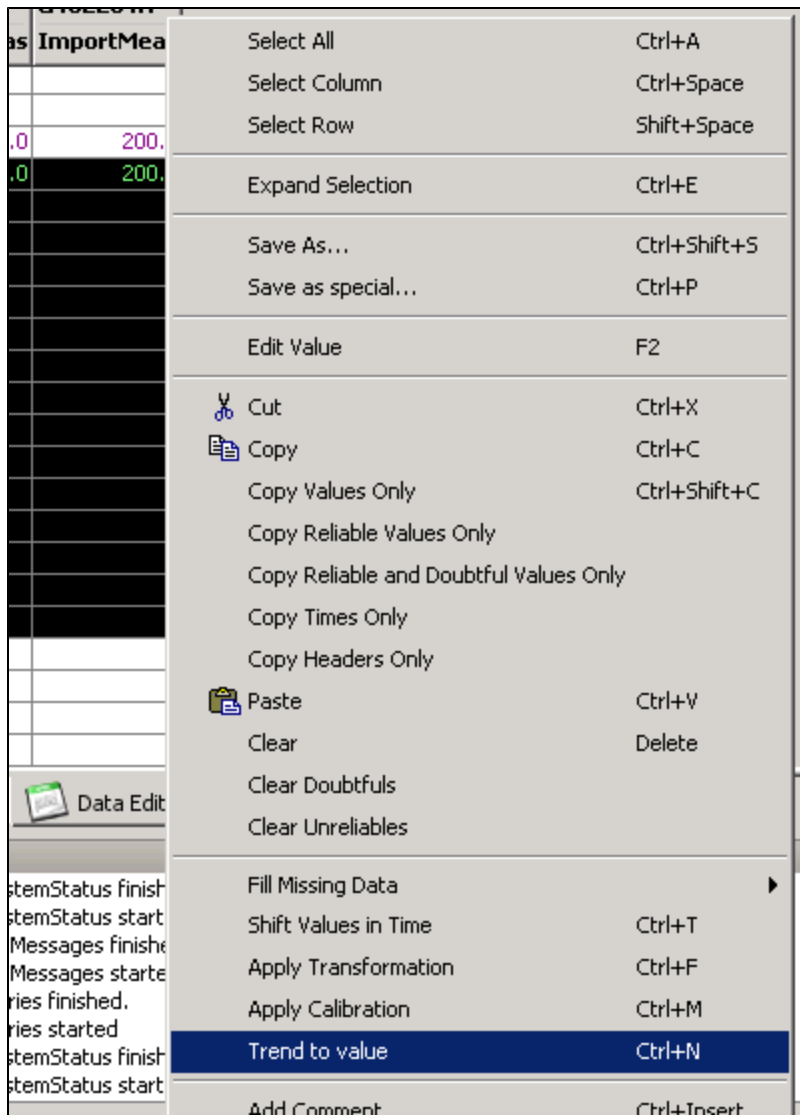
With this option a column selection can be filled by extending the first value of the selection using a trending function. A target level can be provided to indicate either a maximum or minimum for trending output. The coefficient value will define how fast the trending function will converge to the target value. Trending can be applied to multiple selected columns at the same time.

In order for trending function to succeed the first value of a selected column may not be empty.

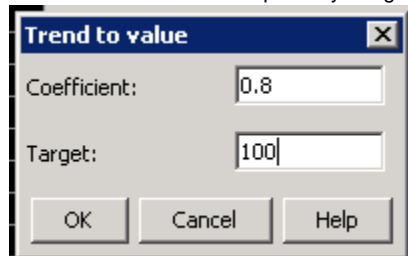
- Select one or more columns and right mouse click for edit options to appear.

	A	B
GMT+10	P.obs (mm) Mongans Bri G402203A ImportMeas	P.obs (mm) Osbornes Flæ G402204A ImportMeas
Wed 17-04-2013 20:00:00		
Wed 17-04-2013 21:00:00		
Wed 17-04-2013 22:00:00	230.0	200.0
Wed 17-04-2013 23:00:00	230.0	200.0
Thu 18-04-2013 00:00:00		
Thu 18-04-2013 01:00:00		
Thu 18-04-2013 02:00:00		
Thu 18-04-2013 03:00:00		
Thu 18-04-2013 04:00:00		
Thu 18-04-2013 05:00:00		
Thu 18-04-2013 06:00:00		
Thu 18-04-2013 07:00:00		
Thu 18-04-2013 08:00:00		
Thu 18-04-2013 09:00:00		
Thu 18-04-2013 10:00:00		
Thu 18-04-2013 11:00:00		
Thu 18-04-2013 12:00:00		
Thu 18-04-2013 13:00:00		

- Select the option 'Trend to value' to make the trending dialog appear.



- Enter the 'Coefficient' and optionally 'Target'. If the target is omitted it will default to 0 when trending down or infinity when trending up.



- Press 'OK' for the calculations to start. This will fill the rest of the selection. Press 'Apply' to save changes.

Cancel		Apply	
GMT+10	A P.obs (mm) Mongans Bridg G402203A ImportMeasure	B P.obs (mm) Osbornes Fla G402204A ImportMeas	
Wed 17-04-2013 20:00:00			
Wed 17-04-2013 21:00:00			
Wed 17-04-2013 22:00:00	230.0	200.0	
Wed 17-04-2013 23:00:00	230.0	200.0	
Thu 18-04-2013 00:00:00	184.0	160.0	
Thu 18-04-2013 01:00:00	147.2	128.0	
Thu 18-04-2013 02:00:00	117.8	102.4	
Thu 18-04-2013 03:00:00	100.0	100.0	
Thu 18-04-2013 04:00:00	100.0	100.0	
Thu 18-04-2013 05:00:00	100.0	100.0	
Thu 18-04-2013 06:00:00	100.0	100.0	
Thu 18-04-2013 07:00:00	100.0	100.0	
Thu 18-04-2013 08:00:00	100.0	100.0	
Thu 18-04-2013 09:00:00	100.0	100.0	
Thu 18-04-2013 10:00:00	100.0	100.0	
Thu 18-04-2013 11:00:00	100.0	100.0	
Thu 18-04-2013 12:00:00	100.0	100.0	
Thu 18-04-2013 13:00:00	100.0	100.0	
Thu 18-04-2013 14:00:00	100.0	100.0	
Thu 18-04-2013 15:00:00	100.0	100.0	
Thu 18-04-2013 16:00:00	100.0	100.0	
Thu 18-04-2013 17:00:00			

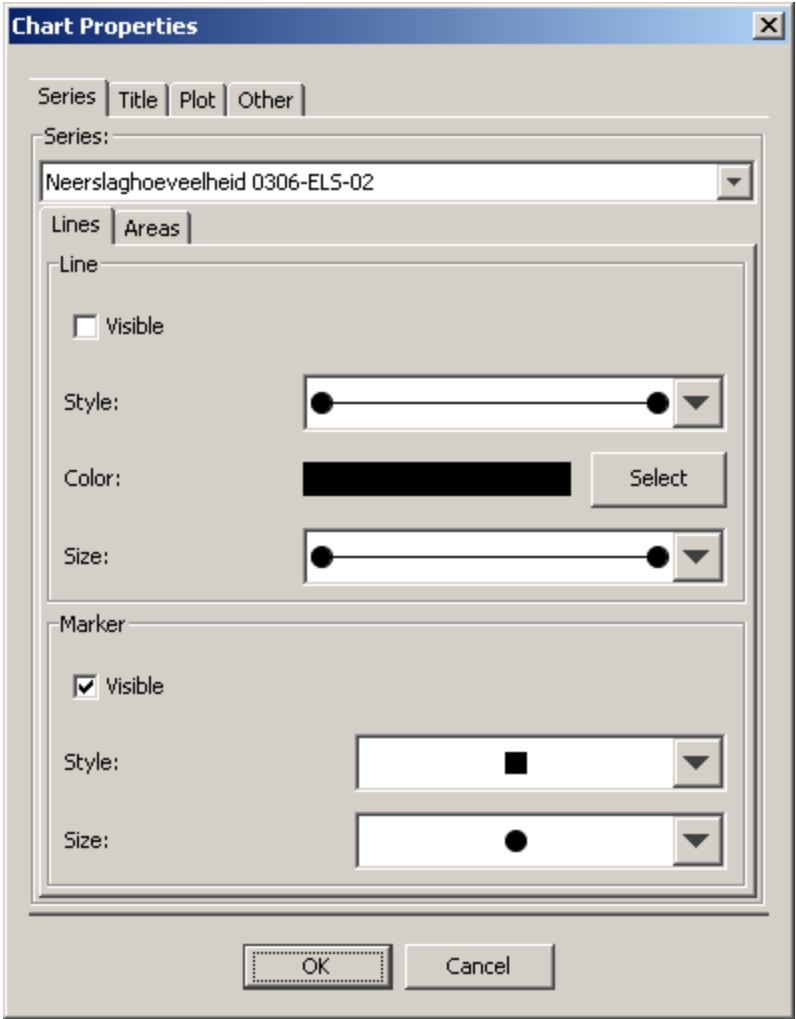
Changing display properties

In the Time series dialog window it is possible to change the look and feel of the displayed timeseries. By pressing the right mouse button, in the chart area of the display, a list will appear containing the option **Properties...** (see figure 1).



figure 1: Right mouse pop up menu of the chart display

Selecting the Properties... menu item will make the **Chart Properties editor** appear (see figure 2).



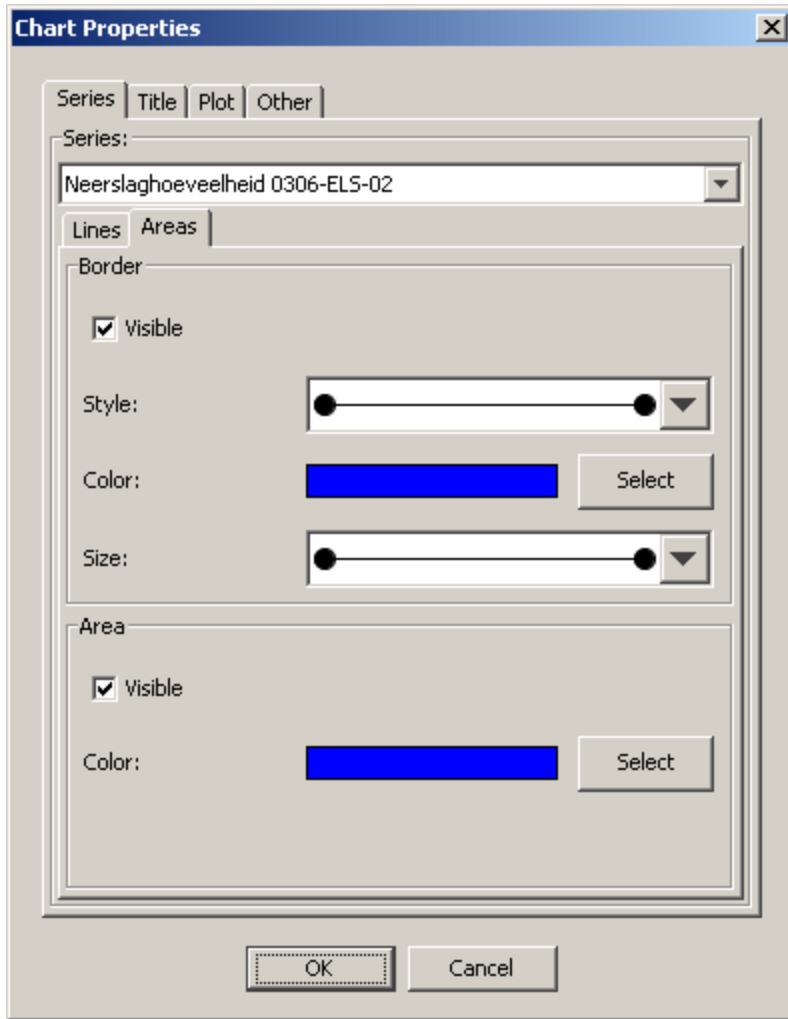


figure 2: Chart Properties editor; left - Lines tab, right - Areas tab

Using the **Series** tab is possible to alter the display properties of the timeseries arrays. To change the properties of an array select the series descriptor in the drop down box at the top of the panel. Then select either the **Lines** tab or the **Area** tab depending if the selected series is line or a bar.

Lines tab

The lines tab allows the user to change the properties of lines and line markers.

- **Line - visible:** toggles visibility of line
- **Line - style:** change the line style
- **Line - color:** change the line color
- **Line - size:** change the line width
- **Marker - visible:** toggles visibility of line markers
- **Marker - style:** change the marker shape
- **Marker - size:** change size of marker

Areas tab

The areas tab allows the user to change the properties of areas such as bars and markers

- **Border - visible:** toggles visibility of area border
- **Border - color:** change the border color
- **Border - size:** change the border width
- **Area - visible:** toggle the visibility of the fill color
- **Area - color:** change the area fill color

Note! These changes are not persistent and only remain in affect until the next update of the chart.
This does give the user enough time to save the altered display as an image.

Interactively modifying display colours

Modifying display colours from within the client.

Users can interactively modify the colours used in their OC for a numbers of displays. This will not affect the configuration, but changes will persist between different sessions for that operator client (settings are saved in a user_settings file in the root directory).

Map display

Colours for map layers can be changed from the Layers pop-up, which holds the Map legend. Double clicking on an item there allows the user to modify the fill and line colour of the this layer. Color changes will impact the map as shown in the Grid display as well, as long as the layers in there have the same ID. The colour chooser will always open up with the default, configured colour to enable a reset.

Grid display

Colours for the classification of data in the grid display can be changed by double clicking on the colour-box in the legend. After modifications are made, the (right click) context menu will show an option 'Discard user-defined classification colours' to revert to the original, configured colour scheme.

Timeseries display

Timeseries: Colours for timeseries can be changed by double clicking on the legend for a timeseries. The colour chooser will always open up with the default, configured colour to enable a reset.

Thresholds/Time markers: These can be changed by double-clicking on these lines in the plot itself. The colour chooser will always open up with the default, configured colour to enable a reset.

The F12 debug menu (Timeseries Display)

In the FEWS Explorer and the TimeSeries Display, a number of debug options are available under the <F12>. Although useful for debugging and testing, support is not provided for these features. Currently, these are the options available in 2015.02.

1 open most recent current forecast and adjust system time	
2 open most recent forecast and adjust system time	
3 run last created task	
4 open last forecast for selection	
5 set system time to last available for selection	
6 save temporary time series	
7 ids visible	
✓ 8 names visible	
9 descriptions visible	
A verbose location tool tips	
B clear time series memory caches	
C run workflow test	
D restart	
E release plugin bin dirs	
F compact local datastore	
G rolling barrel local data store	
H delete local data store	
I acknowledge all	
J open database viewer	
K open workflow navigator	
L open tabular config files display	
M start embedded vjdbc server	
N terminate local runs	Shift+F5
O rollback modifier changes	
P set water coach wall clock time	
Q select locations by attributes	
R database	▶
S screen recording	▶
T convert	▶
U clipboard	▶
V export	▶
W misc	▶
X open most recent running forecast and adjust system time	
Y restart and disable UserSettings	

copy current map scale
copy current map extent
copy selected time series sets
copy selected time series sets as display group
paste selected time series sets as filter
copy grib geometry from file
encrypt password

Statistical functions

The F12 debug menu (Timeseries Display)

04 Data Display and Data Editor

Filtering data

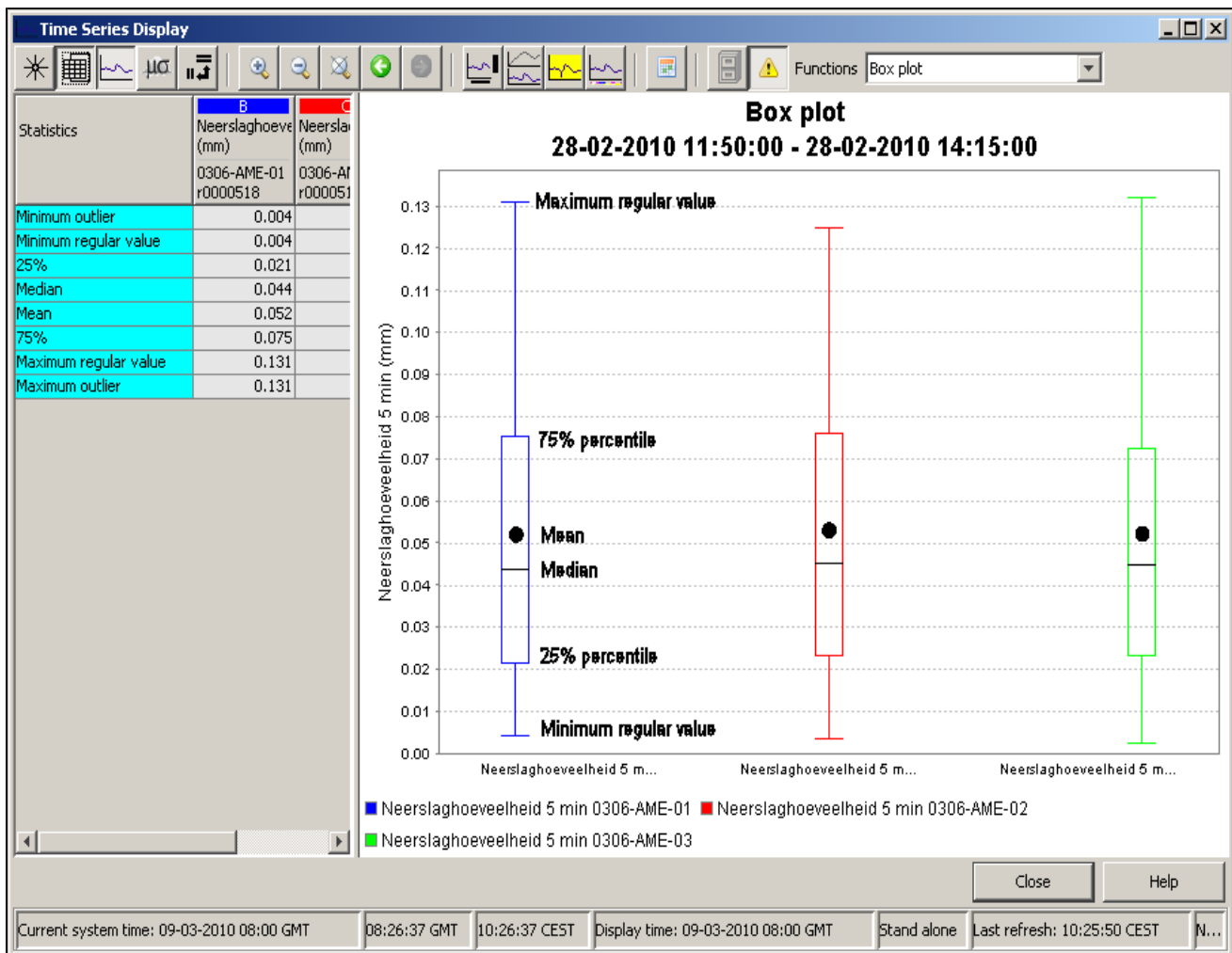
Statistical functions

- Statistical functions
 - Box plot
 - Calendar aggregation

- Moving average
- Central moving average
- Differences
- Display lows below value & Display peaks above value
- Display lows below value & Display peaks above value (per year and season)
 - Normalize duration
 - Split peaks
- Double Mass curve
- Duration curve
- Elevation
- Ensemble Percentile Exceedence
- Frequency distribution
- Gaussian curve
- Cumulative
- Accumulation Per Interval
- Historical Analysis
- Normalized Flow
- Principal Component Analysis
- Scatter Plot
- Historical Scatter Plot (per year and season)
- Show statistics for specific timeseries
- Hide original time series

Box plot

The box plot function will calculate a set of statistical values for each of the selected timeseries and displays these values in the chart as a Box and Whisker Plot.



In the table the following list of statical values is shown for each of the timeseries:

Statistical variables

Minimum outlier: minimum outlier value for selection.

Minimum regular value: minimum value for selection that is not defined as an outlier. Also known as the Whiskers

25%: 25th percentile

Median: 50th percentile

Mean: average value for selection

75%: 75th percentile *Maximum regular value:* maximum value for selection that is not defined as an outlier. Also known as the Whiskers

Maximum regular value: maximum value for selection that is not defined as an outlier. Also known as the Whiskers

Maximum outlier: maximum outlier value for selection.

The chart shows the same values as the table, however the chart also can include some extra values that are not shown in the table. These are the outliers and the far-out indicators.

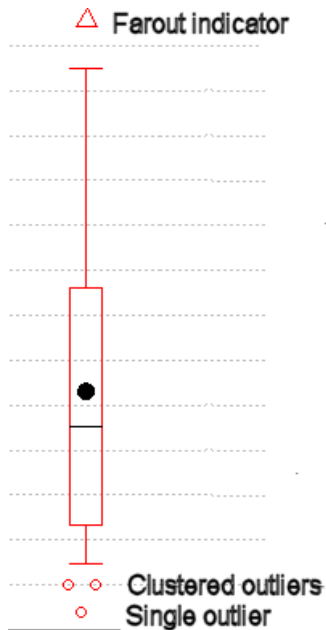
Far-out indicator: indicates that there are values that lie outside the plotted range of the axis.

Single outlier: a single outlier value.

Clustered outlier: multiple outliers that are located too close together to be plotted separately.

Outliers: cases where the values are between 1.5 and 3 box-lengths from the 75th percentile or 25th percentile.

Farout values: cases where the values are more than 3 box-lengths from the 75th percentile or 25th percentile.

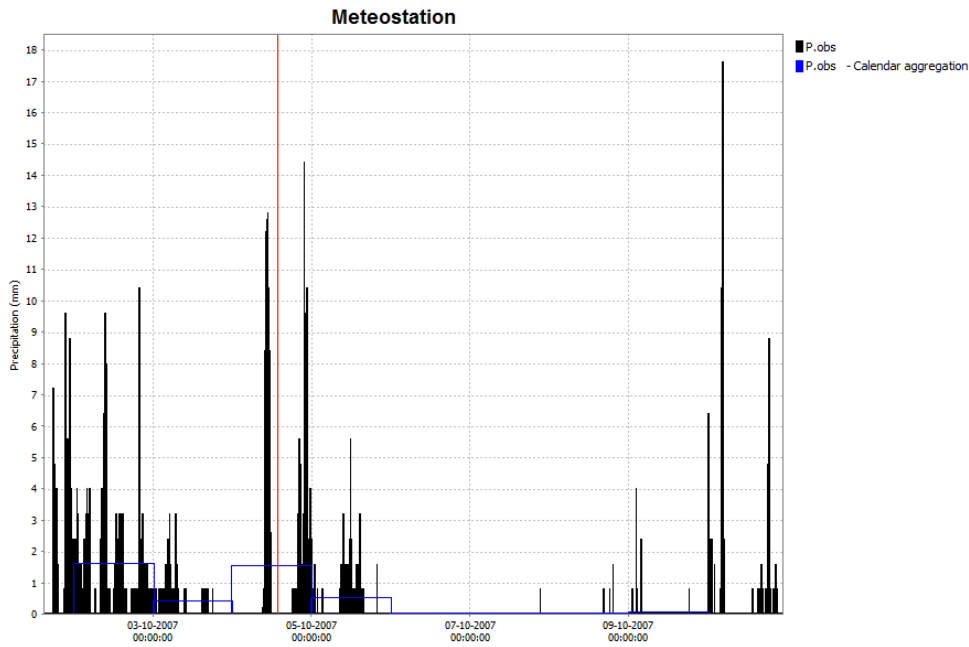


Config example:

```
<statisticalFunctions>
  <statisticalFunction function="boxPlot">
    <timeStep id="daily"/>
    <timeStep id="weekly"/>
    <timeStep id="monthly"/>
    <timeStep id="seasons"/>
  </statisticalFunction>
</statisticalFunctions>
```

Calendar aggregation

Aggregation by calendar day (00.00h-24.00h)



Config example:

```

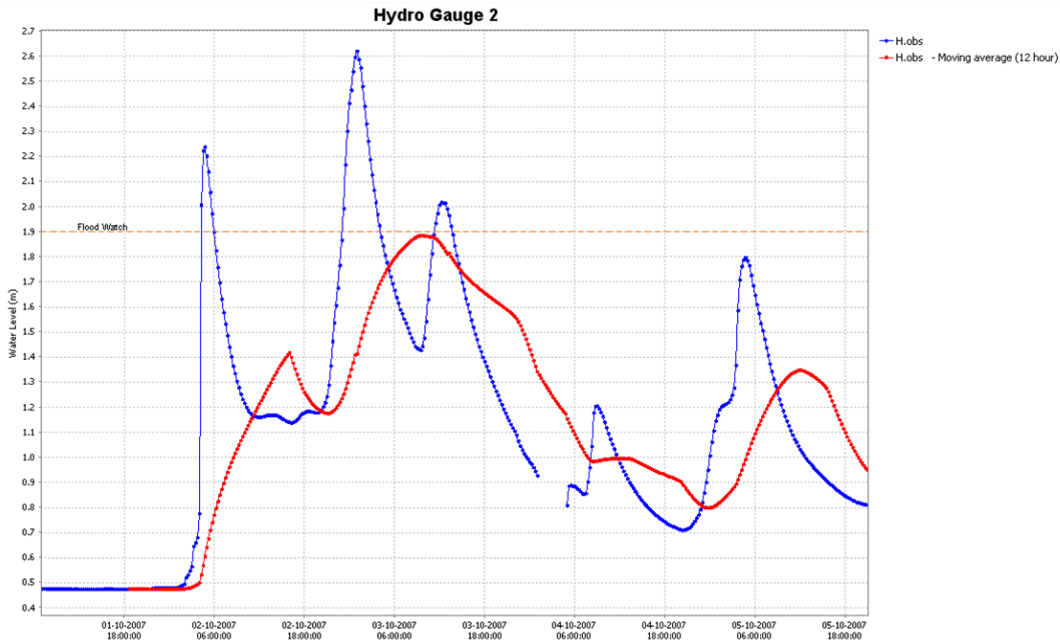
<statisticalFunctions>
<statisticalFunction function="calendarAggregation">
  <movingAccumulationTimeSpan unit="week" multiplier="1"/>
  <movingAccumulationTimeSpan unit="week" multiplier="2"/>
  <movingAccumulationTimeSpan unit="week" multiplier="4"/>
  <movingAccumulationTimeSpan unit="week" multiplier="12"/>
  <movingAccumulationTimeSpan unit="day" multiplier="365"/>
</statisticalFunction>

```

In addition to the calendar aggregation, there is also the option for accumulationAggregation and relativeAggregation. There is also a very similar function called accumulationInterval where the accumulation is displayed at every timestep (for configuration see example above).

Moving average

Moving average where the value is stamped at the end of each averaging period.



Config example:

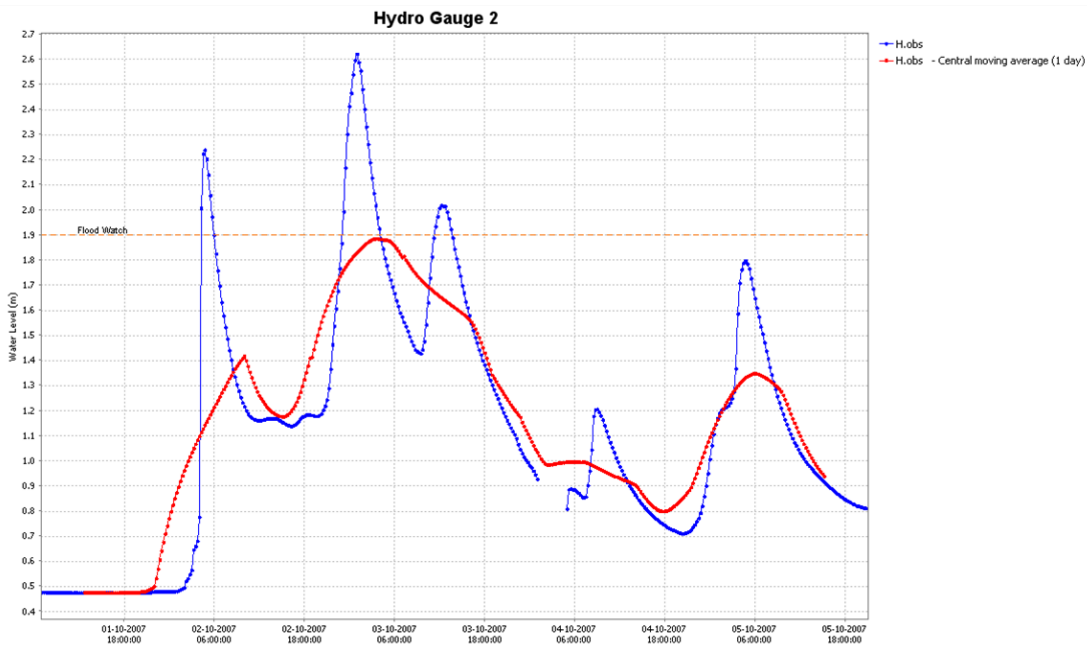
```

<statisticalFunctions>
  <statisticalFunction function="movingAverage" ignoreMissings="true">
    <movingAccumulationTimeSpan unit="hour" multiplier="1"/>
    <movingAccumulationTimeSpan unit="hour" multiplier="3"/>
    <movingAccumulationTimeSpan unit="hour" multiplier="6"/>
    <movingAccumulationTimeSpan unit="hour" multiplier="12"/>
  </statisticalFunction>
</statisticalFunctions>

```

Central moving average

Moving average where the value is stamped in the middle of each averaging period.



Config example:

```
<statisticalFunctions>
  <statisticalFunction function="centralMovingAverage"
  ignoreMissings="true">
    <movingAccumulationTimeSpan unit="hour" multiplier="1"/>
    <movingAccumulationTimeSpan unit="hour" multiplier="3"/>
    <movingAccumulationTimeSpan unit="hour" multiplier="6"/>
    <movingAccumulationTimeSpan unit="hour" multiplier="12"/>
  </statisticalFunction>
```

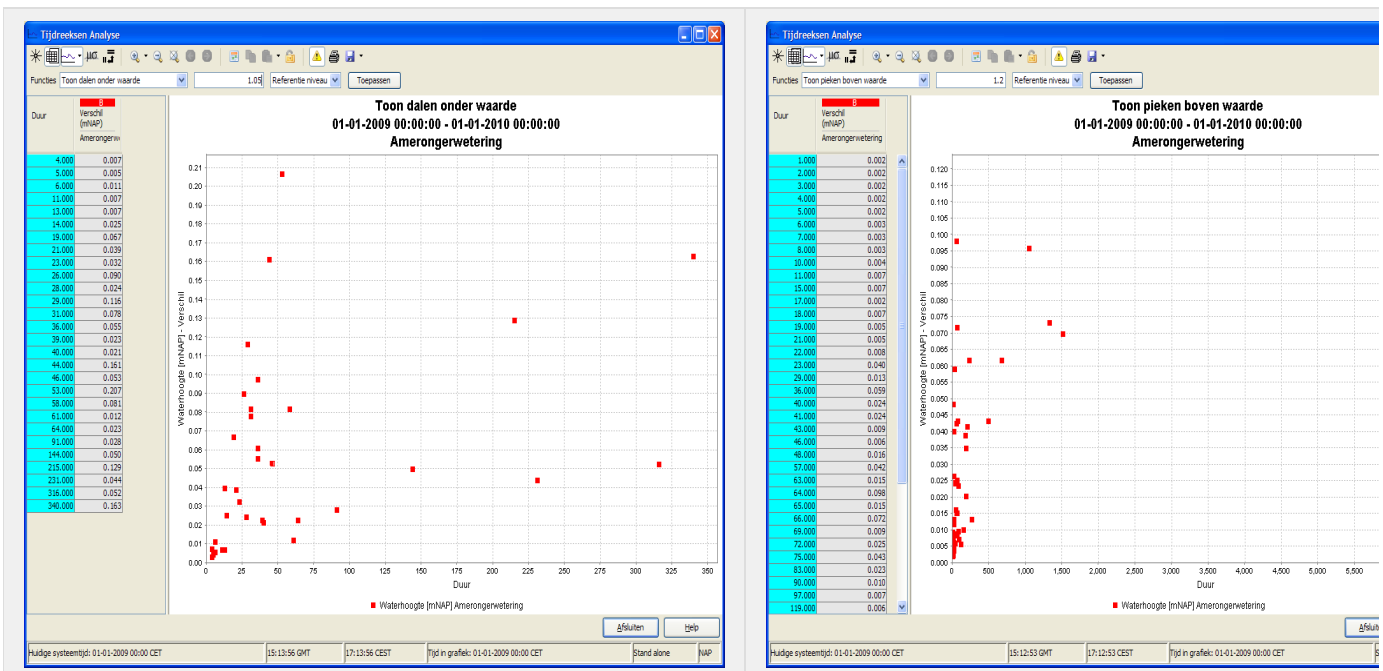
Differences

Displays the difference between two selected series

Config example:

```
<statisticalFunction function="differences"/>
```

Display lows below value & Display peaks above value



Shows all peak heights or dip depths and duration above or below a reference level. This level is set by default but can be altered in the toolbar. After adjusting, press the apply button to recalculate the peaks or dips. From now on we will only mention the peaks and how values are above a level, but this functionality is symmetrical for the valleys and values being below a level. The default value for the reference level is set by determining the 'low' areas according to the maximum available value of the input time series array.

After setting the reference level, every continuous series of values above that level is considered a peak and will be depicted as a dot in the XY plot. The X axis shows what the duration of this peak is, with this value corresponding to the amount of time entries that make up that peak. The Y axis shows the average height of the peak above the reference level. The parameter used on the Y axis is equal to that of the selected time series.

When hovering above a point in the XY plot, a tooltip will appear. Here is an overview of the tooltip format with some of the elements being optional:

- |Parameter Id| |Location Id| (|Peak duration|, |Average peak height|), Max Difference = |Max peak height|, Percentile Difference = |Percentile peak height| at time |Peak time|
- Parameter Id: Parameter Id from selected timeseries
- Location Id: Location Id from selected timeseries
- Peak duration: Number of time entries in peak
- Average peak height: Average of all differences between reference level and the time entries value
- Max peak height (optional): Maximum of all differences between reference level and the time entries value
- Percentile peak height (optional): Relation between the average and max peak height
- Peak time: Time of the first time entry in the peak

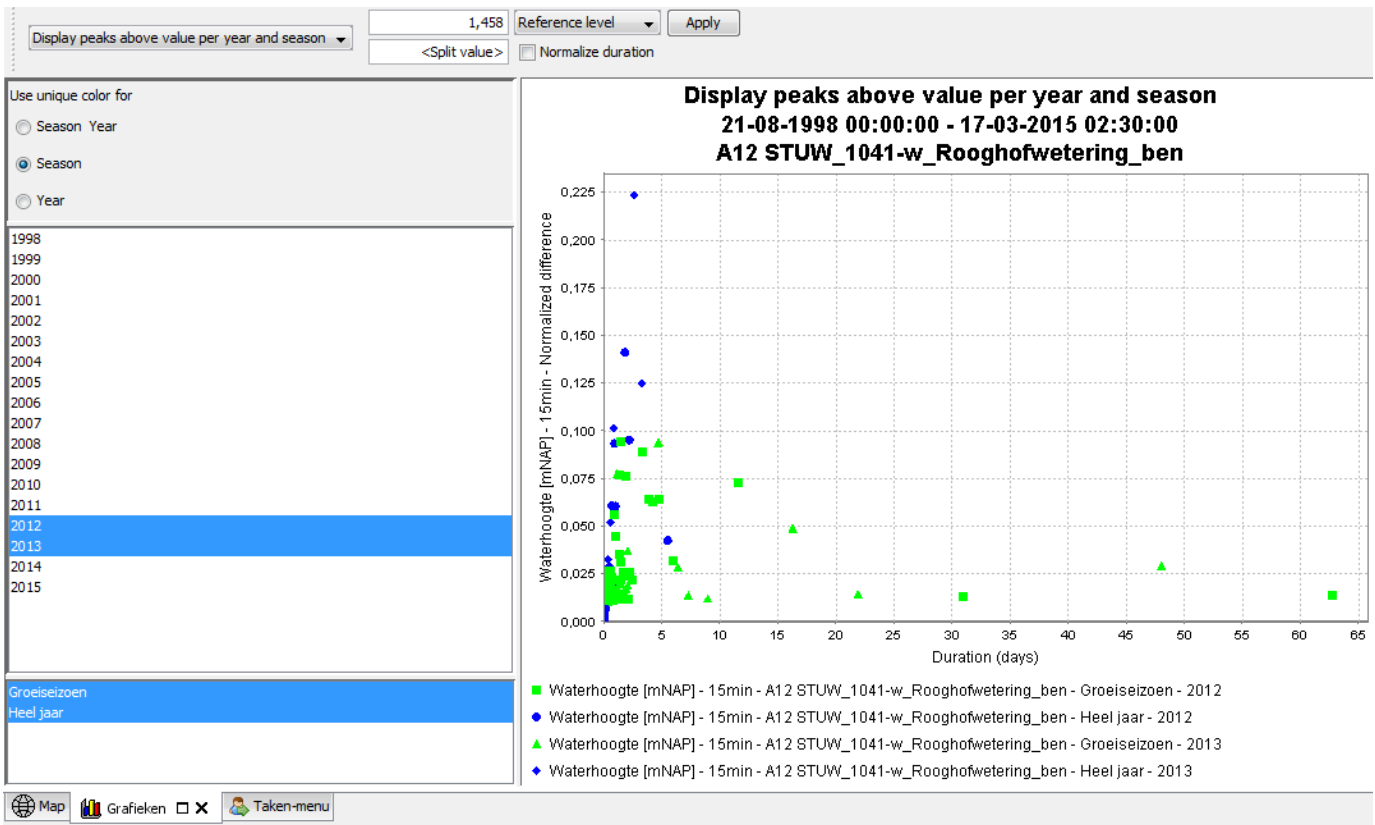
Config example:

```
<statisticalFunction function="showLowsBelow" />
  <statisticalFunction function="showPeaksAbove" />
```

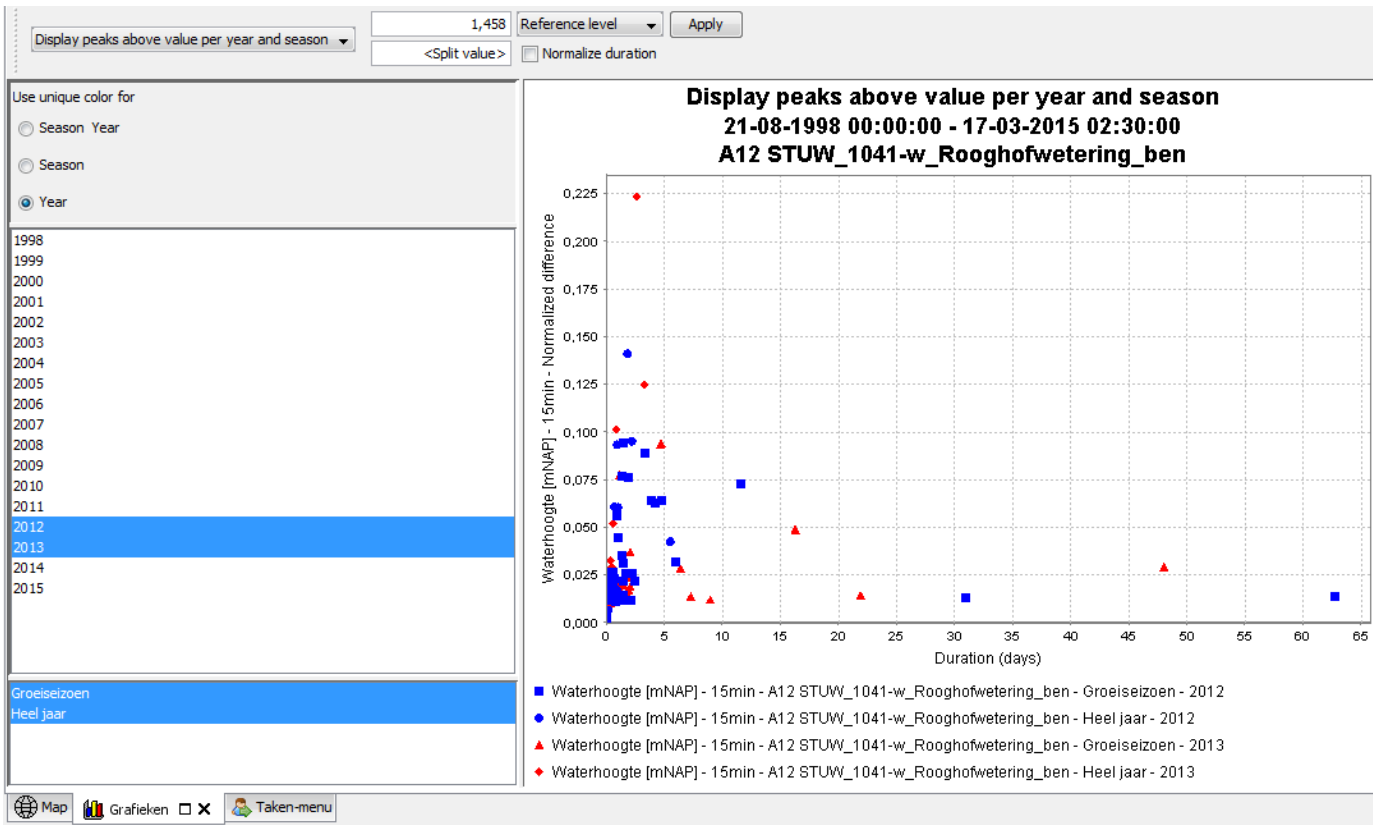
Display lows below value & Display peaks above value (per year and season)

(Since 2016.02) The same as the function above but then with the extension of selecting multiple different years and seasons, plus a choice of how the different seasons and years should be uniquely colored.

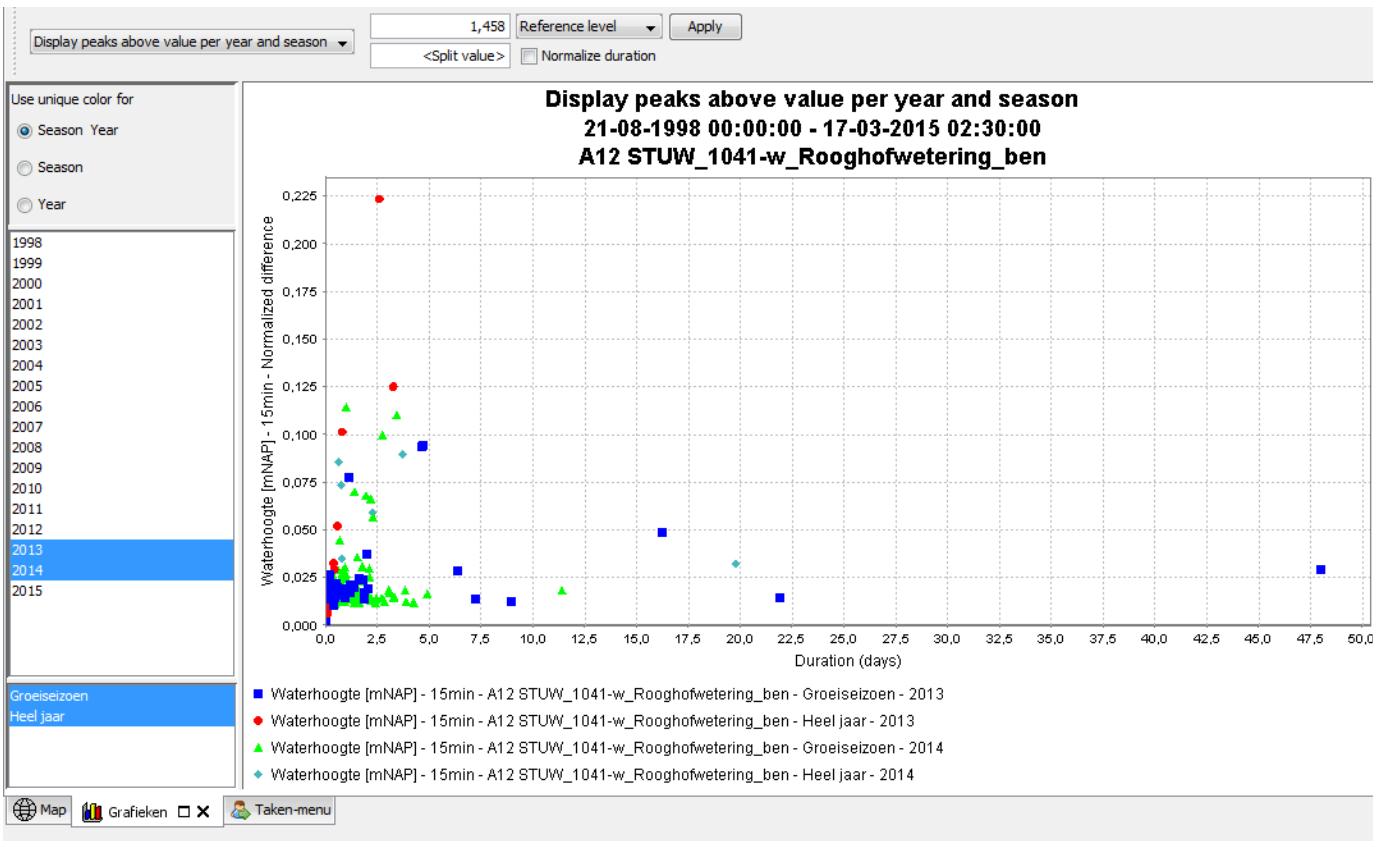
Unique color per season



Unique color per year:



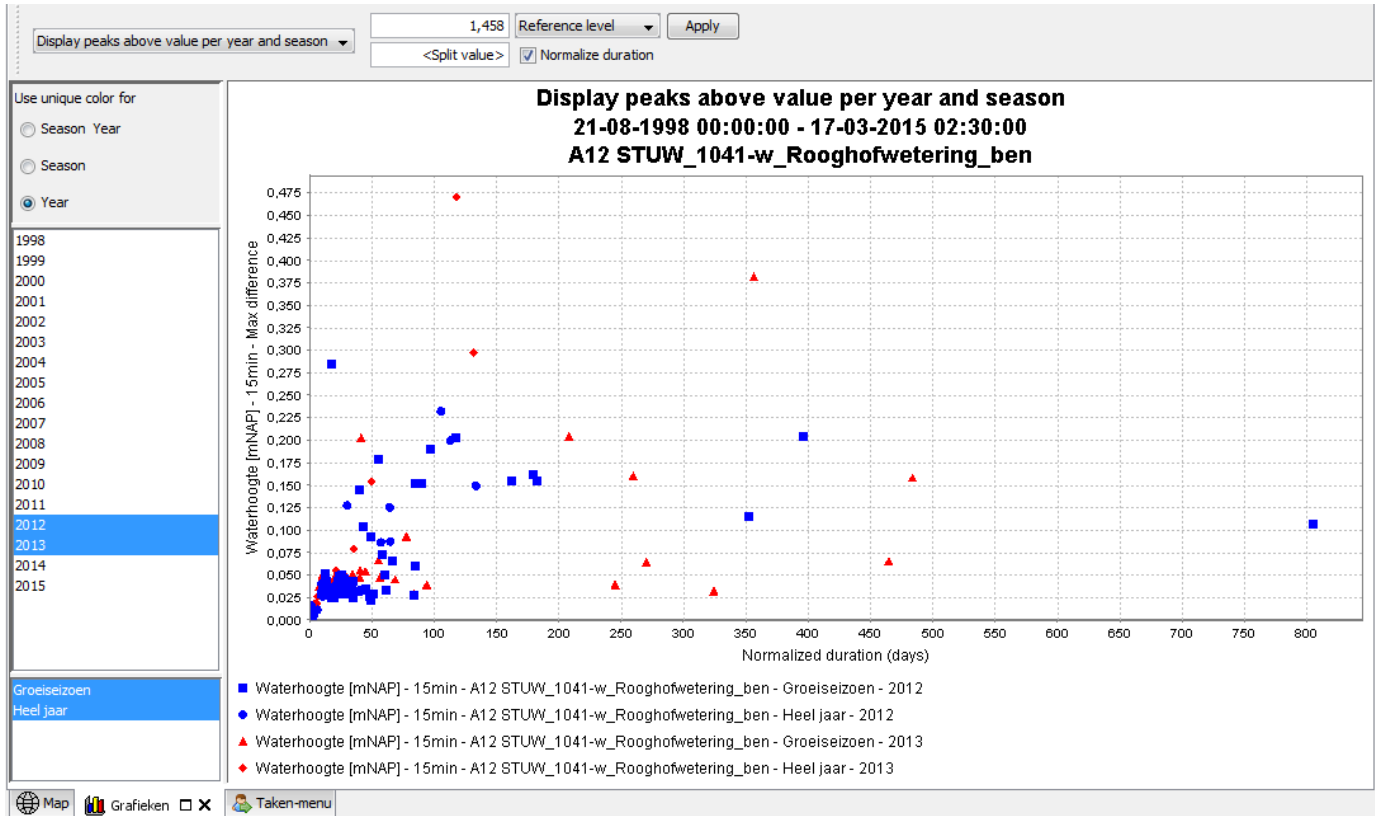
Unique color per year and season:



```
<statisticalFunction function="historicalShowLowsBelow"/>
<statisticalFunction function="historicalShowPeaksAbove"/>
```

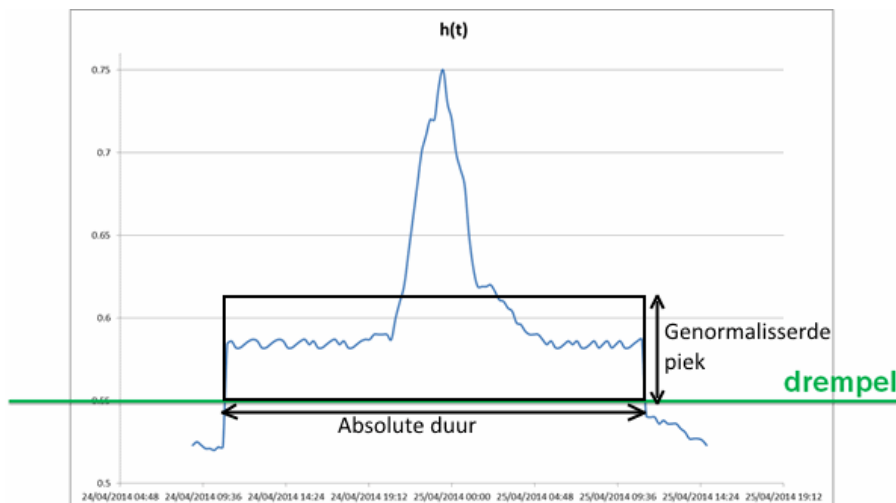
Normalize duration

(Since 2016.02) for the peaks above/below functions a checkbox is added to normalize over duration. This changes The y-axis from Normalized difference to Max difference and the X-axis from (total) duration the Normalized duration.

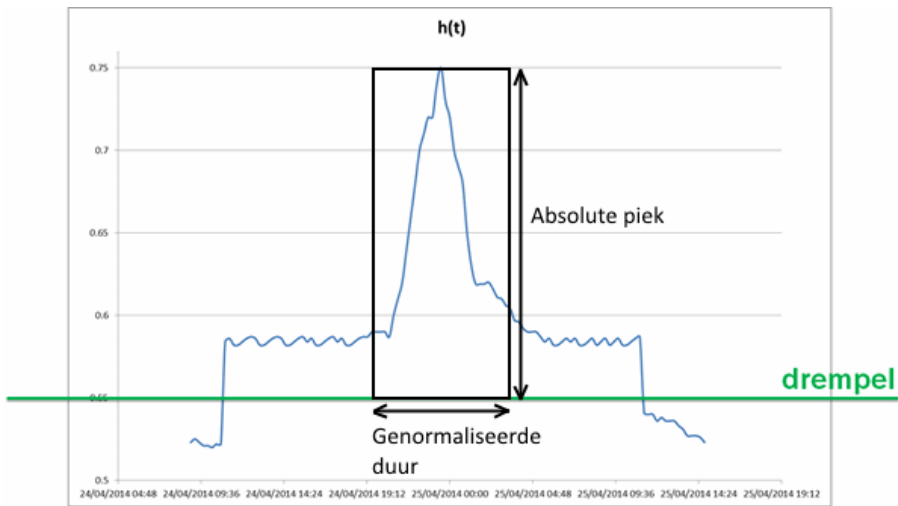


The differences between normalization can best be shown in a pictures

Normalized difference:



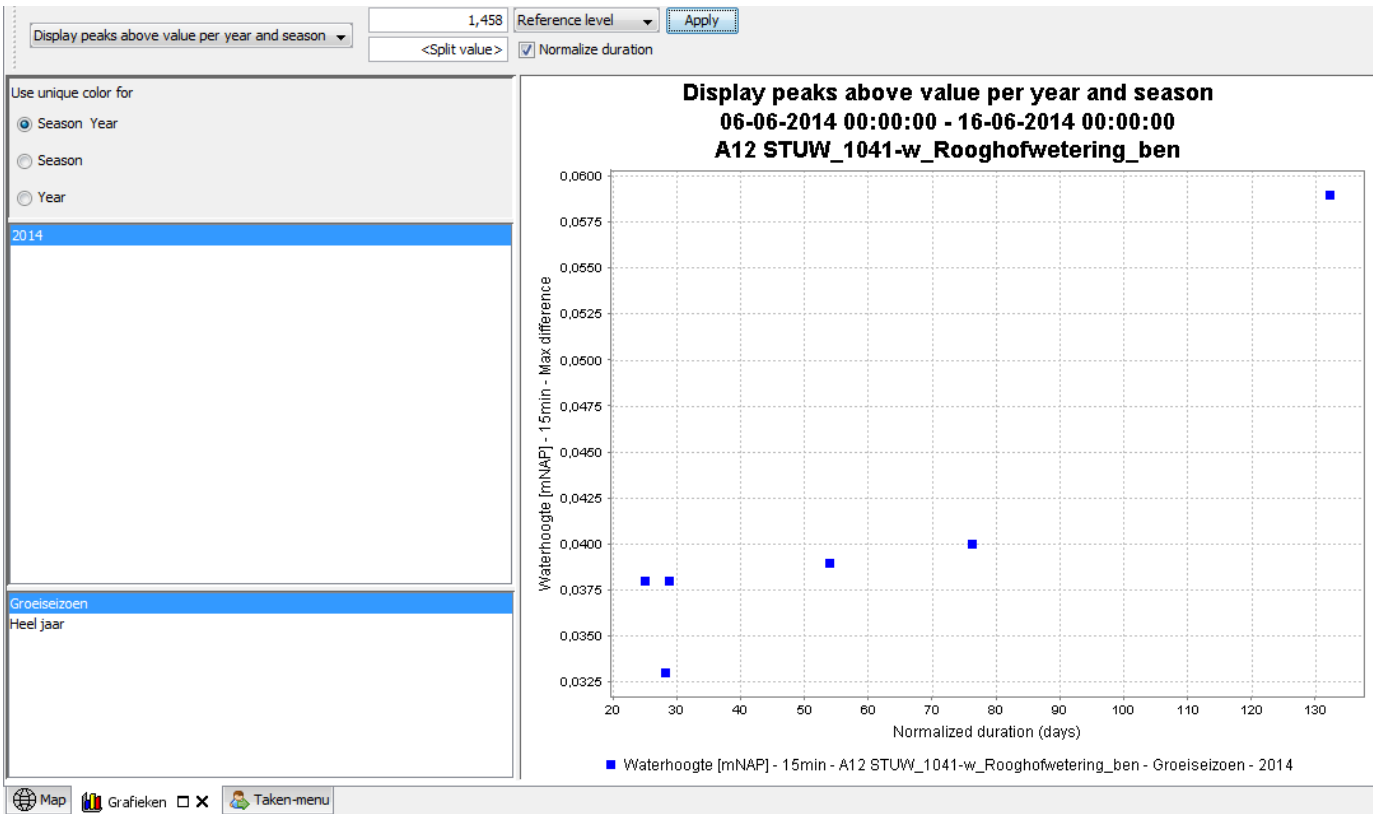
Normalized duration:



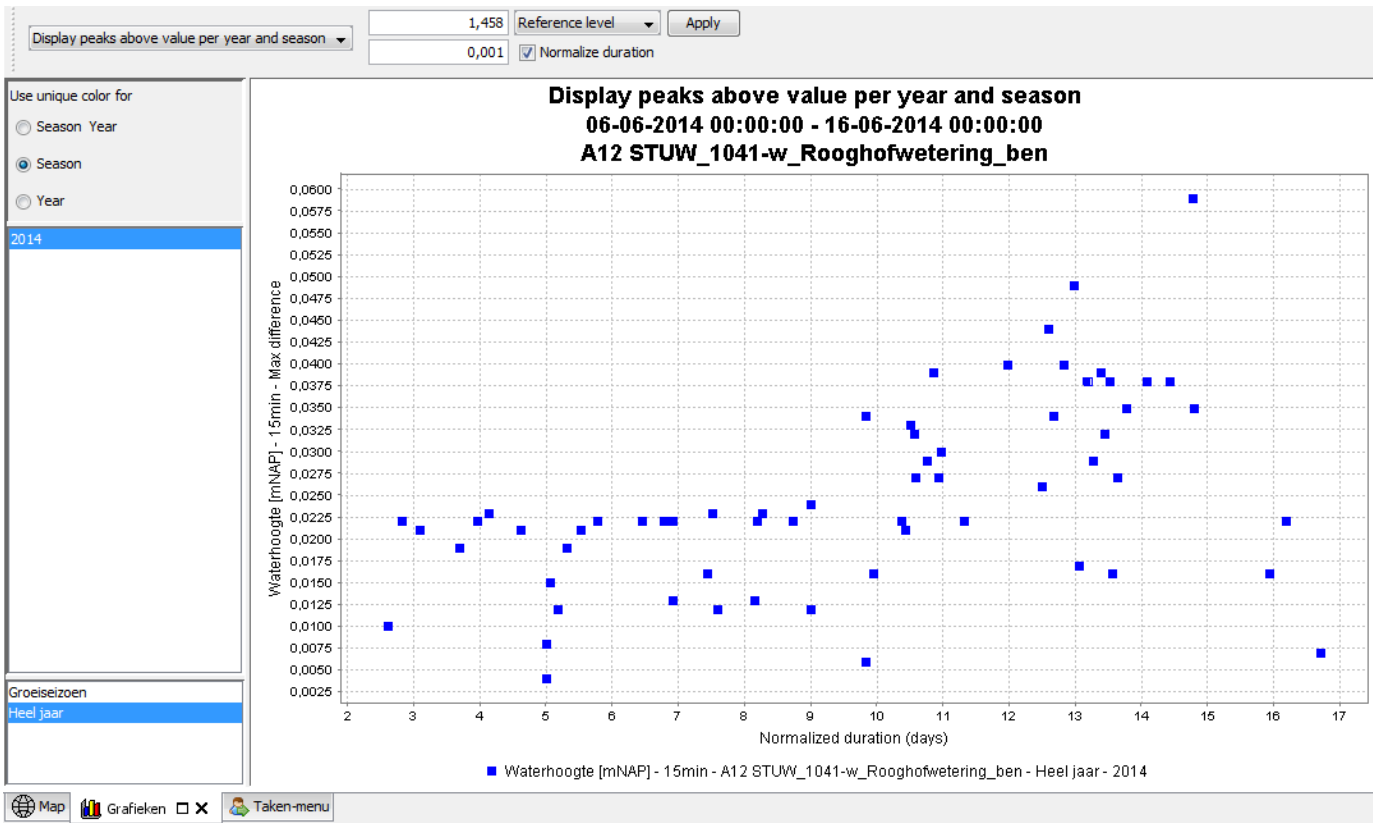
Split peaks

(Since 2016.02) for the peaks above/below functions a possibility is added to split the peaks when they have multiple local maxima.

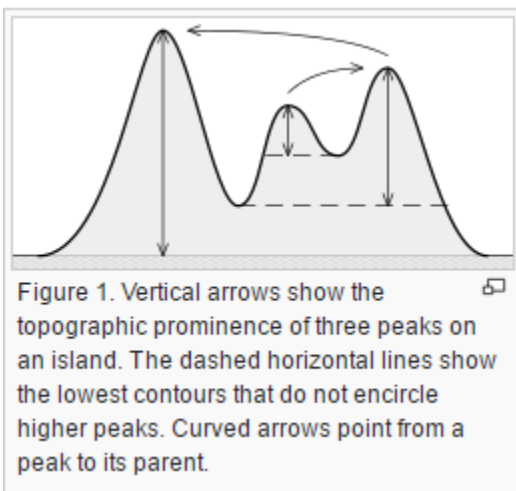
No split:



Split when local maxima have a low between them with a value difference of at least 0,001. As can be seen this results in a lot more separate peaks.



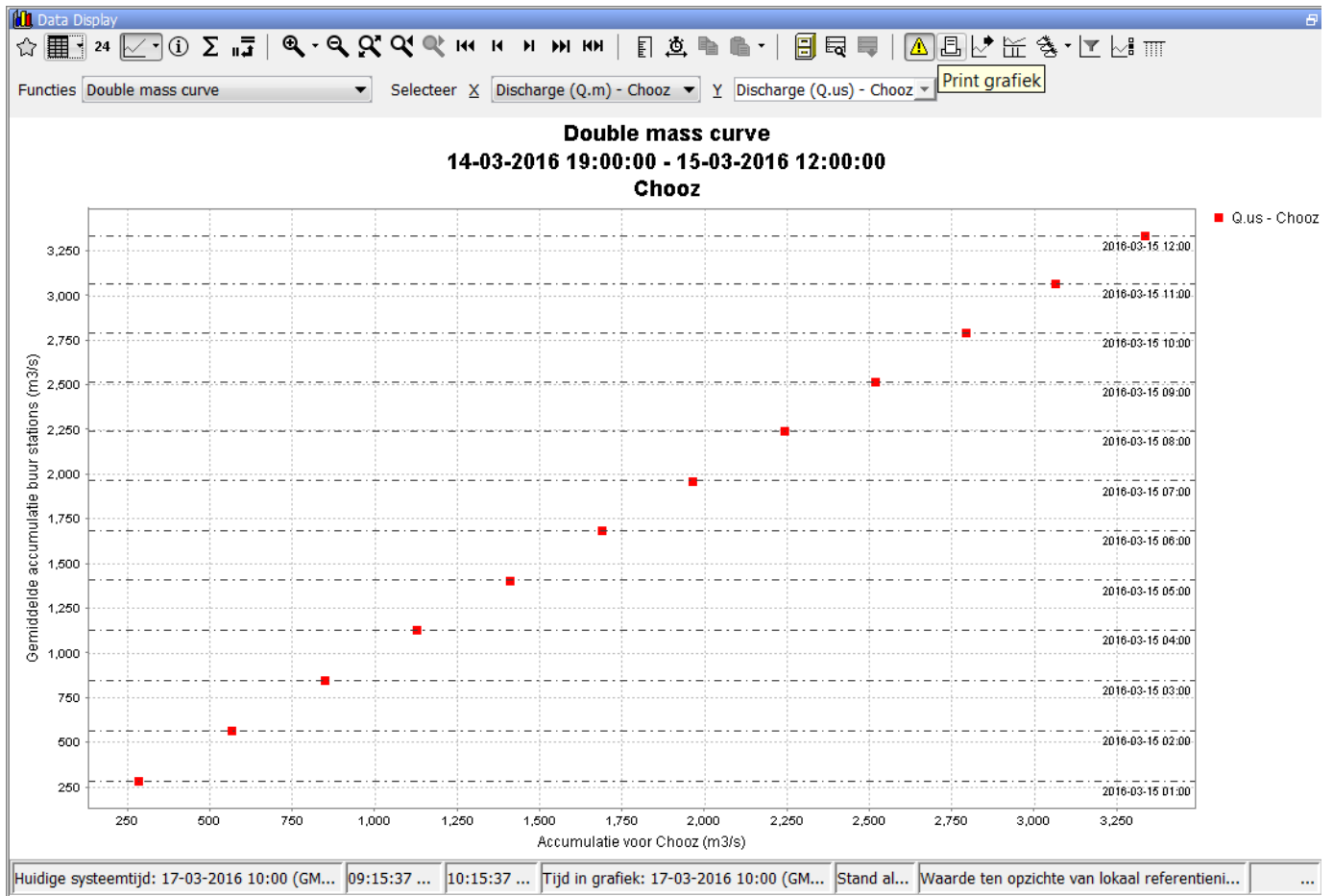
For the value difference the measure Prominence is used, which is an official measure for determining separate peaks.



Source: https://en.wikipedia.org/wiki/Topographic_prominence

Double Mass curve

Isused in the study of the consistency and long-term trend test of hydrometeo--rological data. This method was first used to analyze the consistency of precipitation data in Susquehanna watershed United States by Merriam at 1937 (Merriam, 1937), and Searcy made a theoretical explanation of it (Searcy, et al., 1960). The theory of the double-mass curve is based on the fact that a plot of the two cumulative quantities during the same period exhibits a straight line so long as the proportionality between the two remains unchanged, and the slope of the line represents the proportionality. This method can smooth a time series and suppress random elements in the series, and thus show the main trends of the time series. In recent 30 years, Chinese scholars analyzed the effect of soil and water conservation measures and land use/ cover changes on runoff and sediment using double mass curve method, and have achieved good results (Mu, et al., 2010). In this study, double-mass curves of precipitation vs streamflow and precipitation vs sediment are plotted for the two contrastive periods to estimate changes in regression slope (proportionality) to quantify the overall efficiency of soil conservation measures before and after transition years. An example of the doubleMassCurve plot is given here:



Config example:

```

<statisticalFunction function="doubleMassCurve">
  <dateFormat>yyyy-MM-dd hh:mm</dateFormat>
</statisticalFunction>

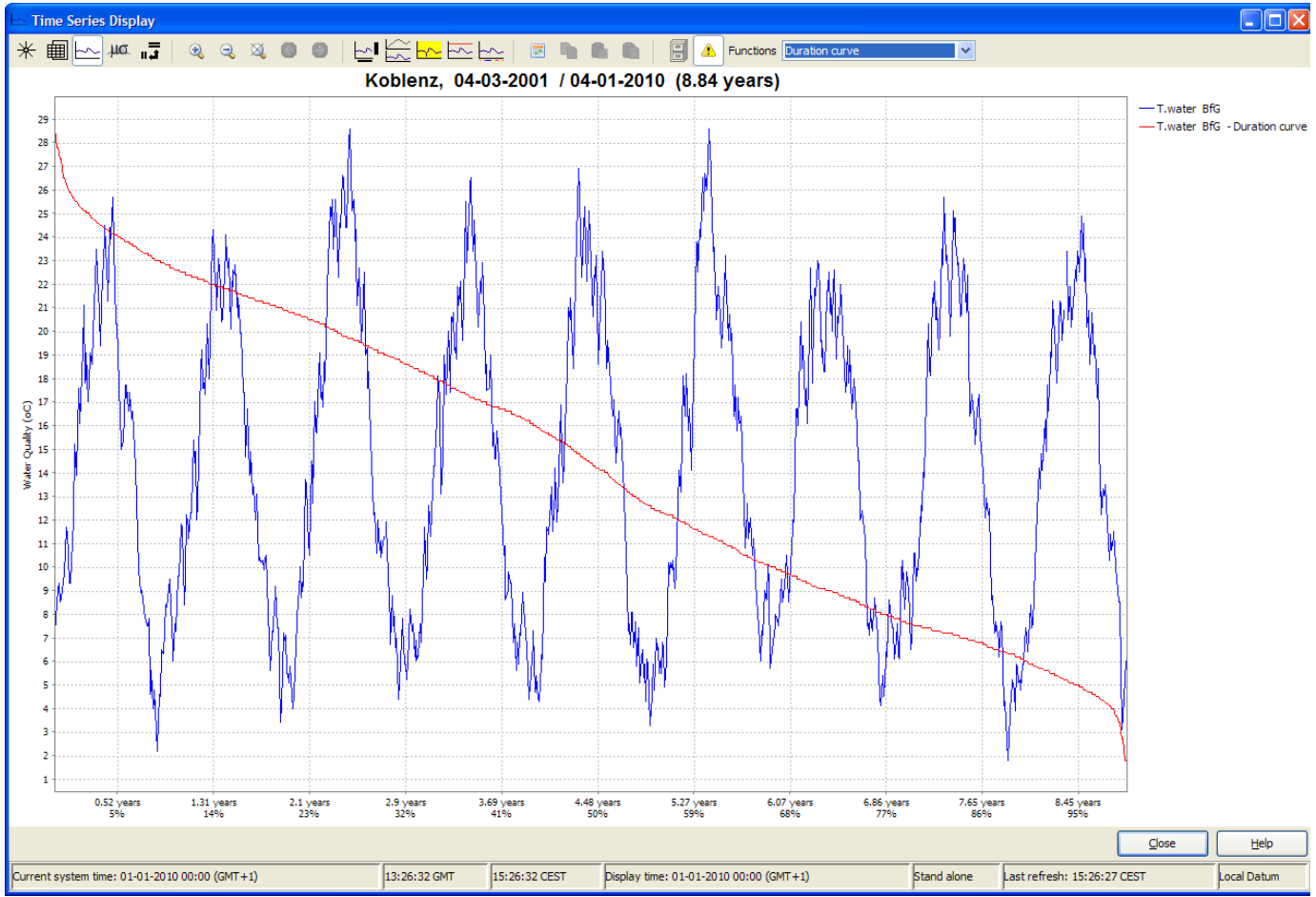
```

Duration curve

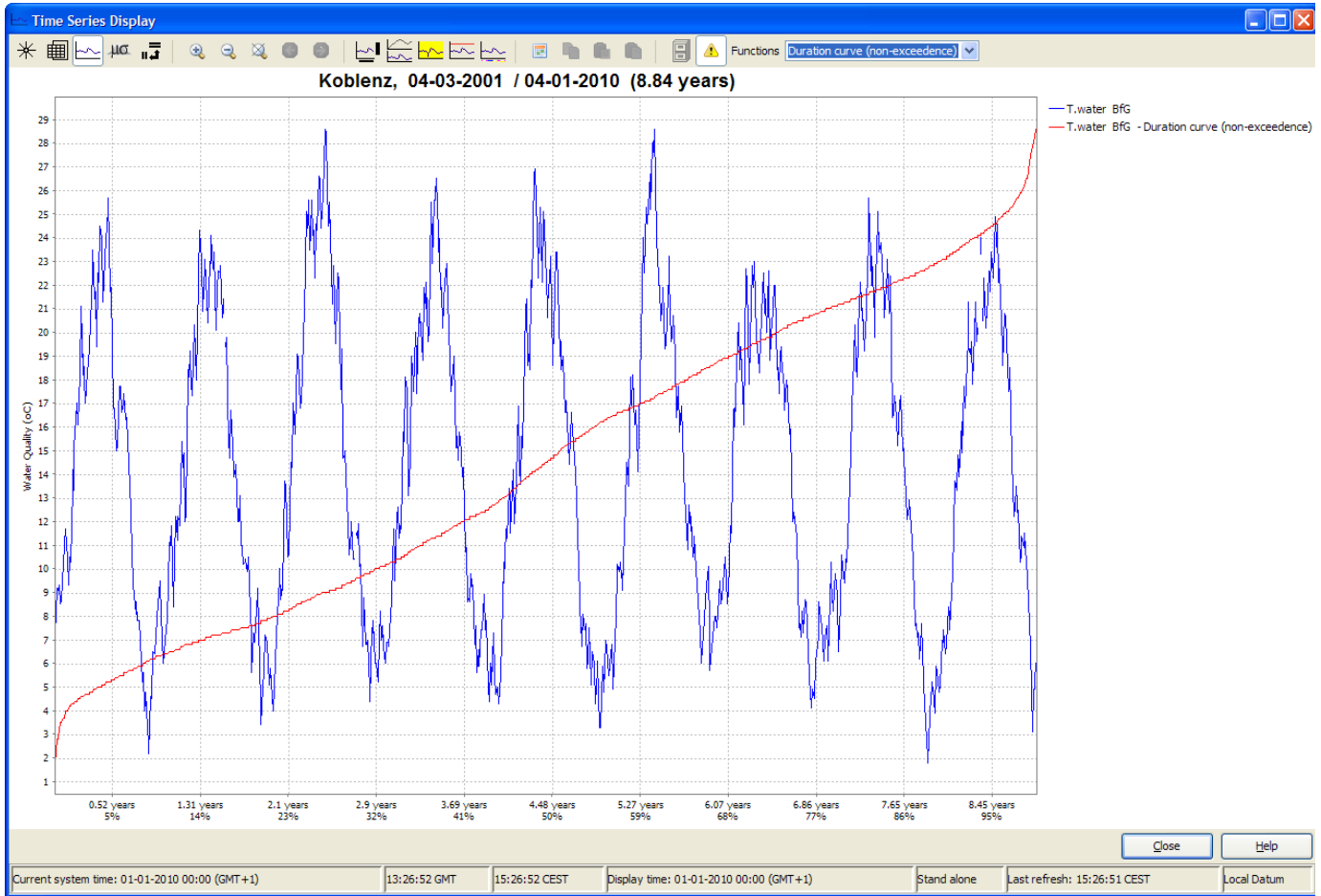
A convenient way to show the variation of hydrological quantities through time may be done by means of duration curves. For the selected time period the values of the selected quantity are sorted descending (durationExceedence) or ascending (durationNonExceedence). When the duration curve is plotted in the timeseries display, the x-axis will show the entire length in time of the selected view period. Percentages are shown as duration with respect to the entire chosen view period.

In the configuration of this statistical function there is the option to omit missing values which may occur in the selected view period. If this option is set to true, all entries with missing values will be disregarded before the duration curve is calculated. If this option is not defined (default) or is set to false, missing values will be added to the the end of the array. In this case the plotted duration curve will never reach the 100%.

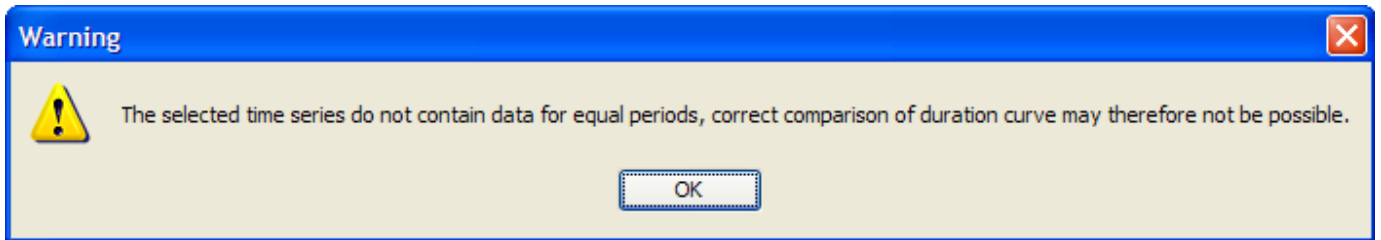
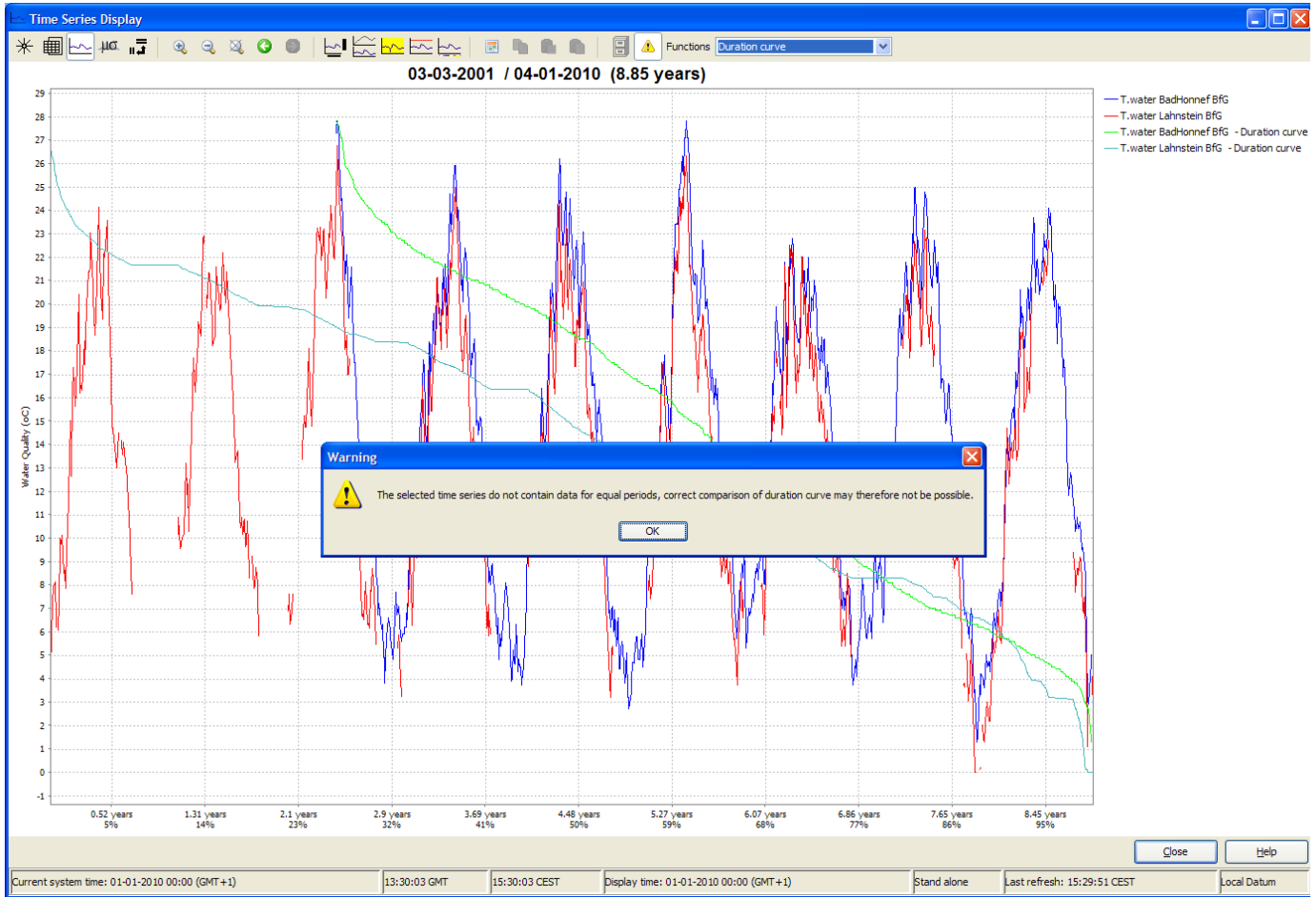
An example of the durationExceedence plot is given here:



An example of the durationNonExceedence plot is given here:



When selecting more than one location it could occur that the view periods of these selected timeseries do not cover the same period in time. In this case it is difficult to make a correct comparison of the calculated duration curves because they are analysed on different periods in time. A warning message will be given in order to ensure that the user is aware of this. The pop-up message will be shown each time the user zooms in or out until all view periods are an exact match.



Config example:

```

<statisticalFunction function="durationExceedence" ignoreMissings="true"/>
<statisticalFunction function="durationNonExceedence"
ignoreMissings="true"/>

```

Elevation

The Elevation statistical function show parameter values against the elevation of the location on one particular time. The time for which the values are shown can be altered with a slider bar.

An example of the elevation plot is given here:

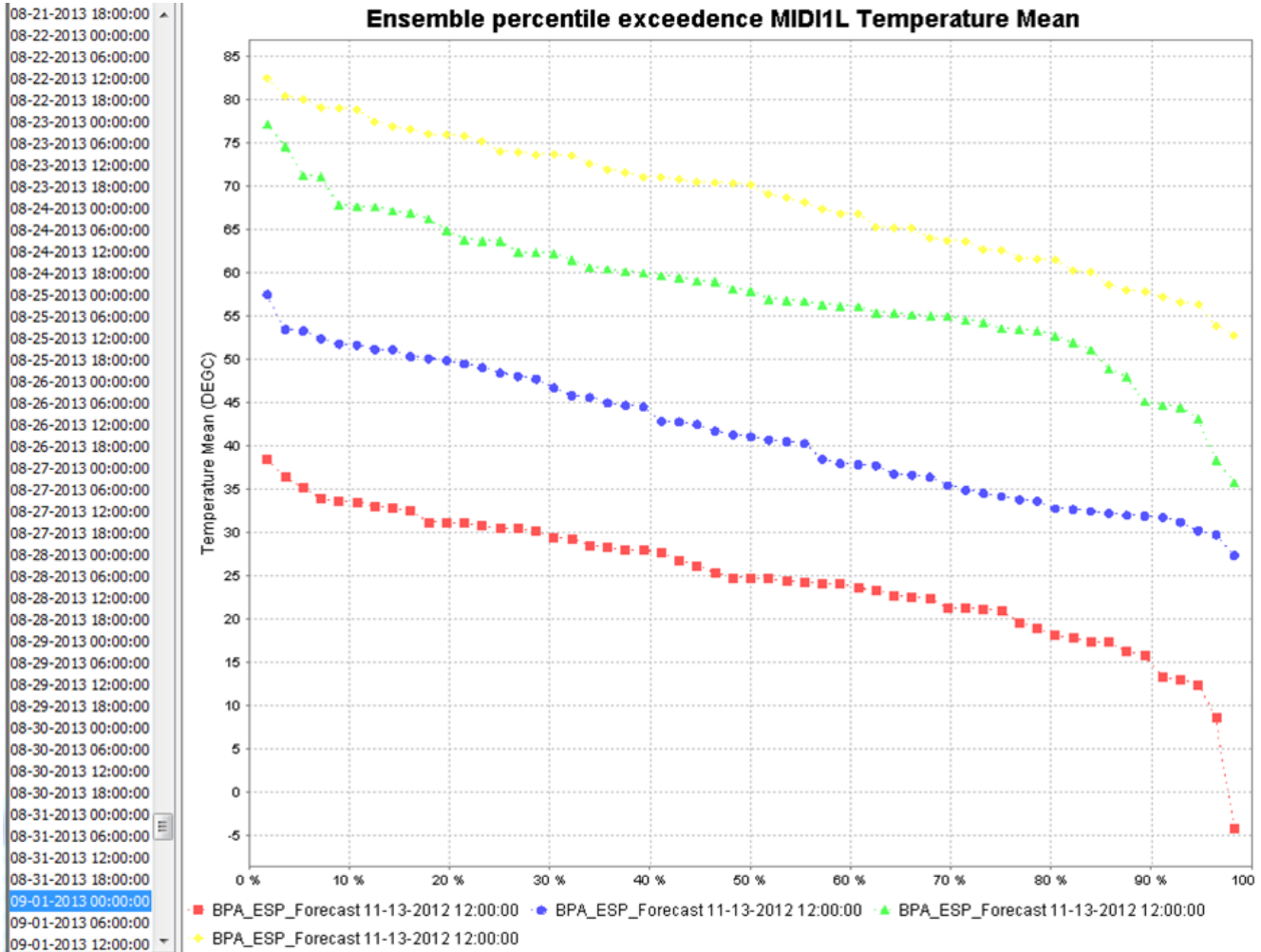
Configuration example:

```
<statisticalFunction function="elevation"/>
```

Ensemble Percentile Exceedence

Plots for the selected time stamp(s) each member of an ensemble along the horizontal axis, sorted by value. The result is exceedence diagrams for an ensemble forecast at a selected timestamp(s) within the timeseries.

The function allows multiple locations and/or multiple time stamps and/or multiple forecasts in one diagram. If multiple forecasts include the same selected timestamp, the legend only can distinguish between these forecasts if a taskdescription is used during job submission.



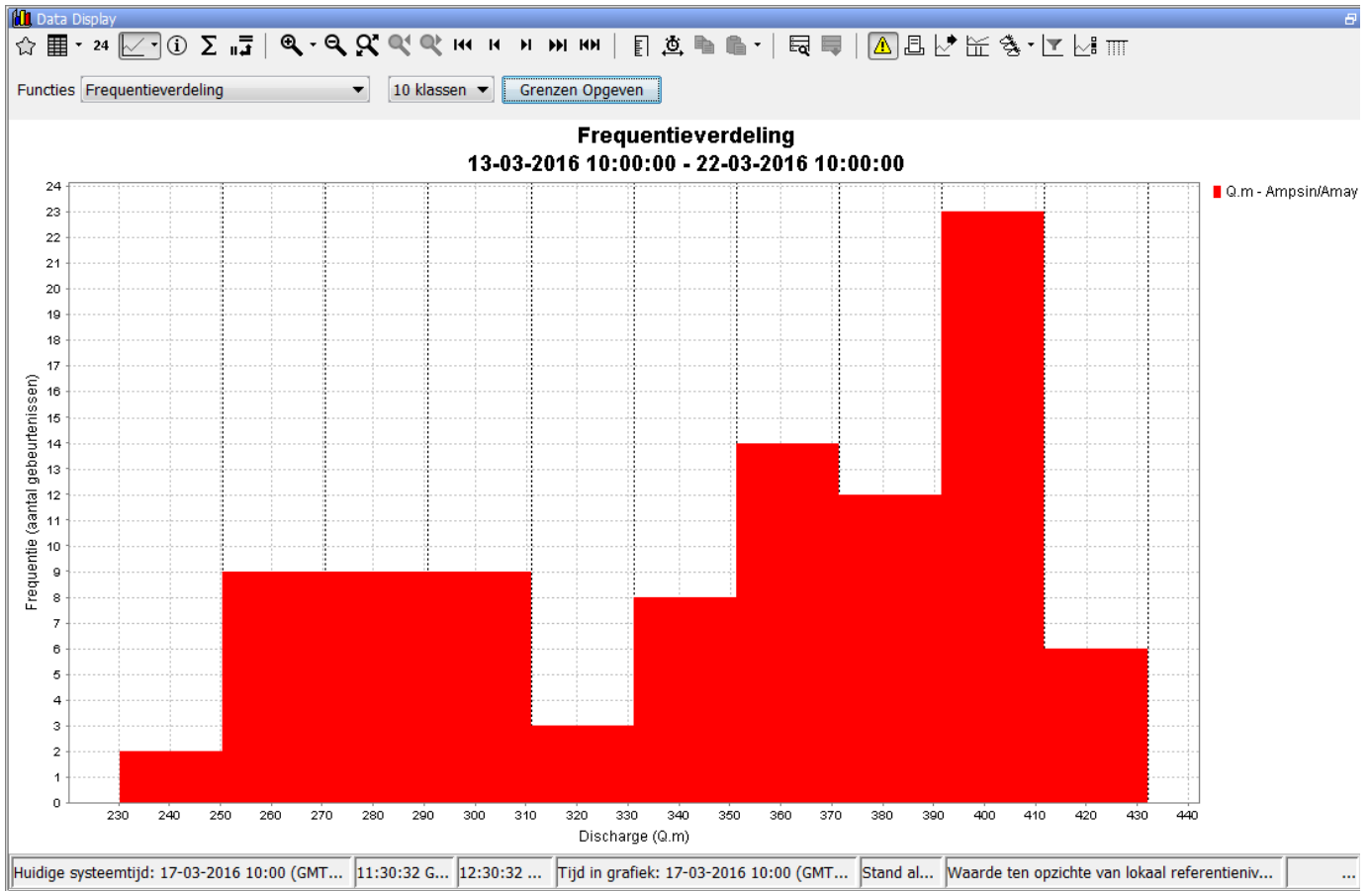
Configuration example:

```
<statisticalFunction function="ensemblePercentileExceedence"/>
```

Frequency distribution

The frequency distribution function divides the distance between the min and max value of the timeseries by the number of samples to create a classification. It then evaluate each value in the timeseries and assigns it to a class. The result is a frequency distribution diagram listing the number of occurrences per class. Number of classes (samples) can be selected in dropdown box. Also the class boundaries can be chosen in a

popup window.



Popup window for selecting class boundaries.

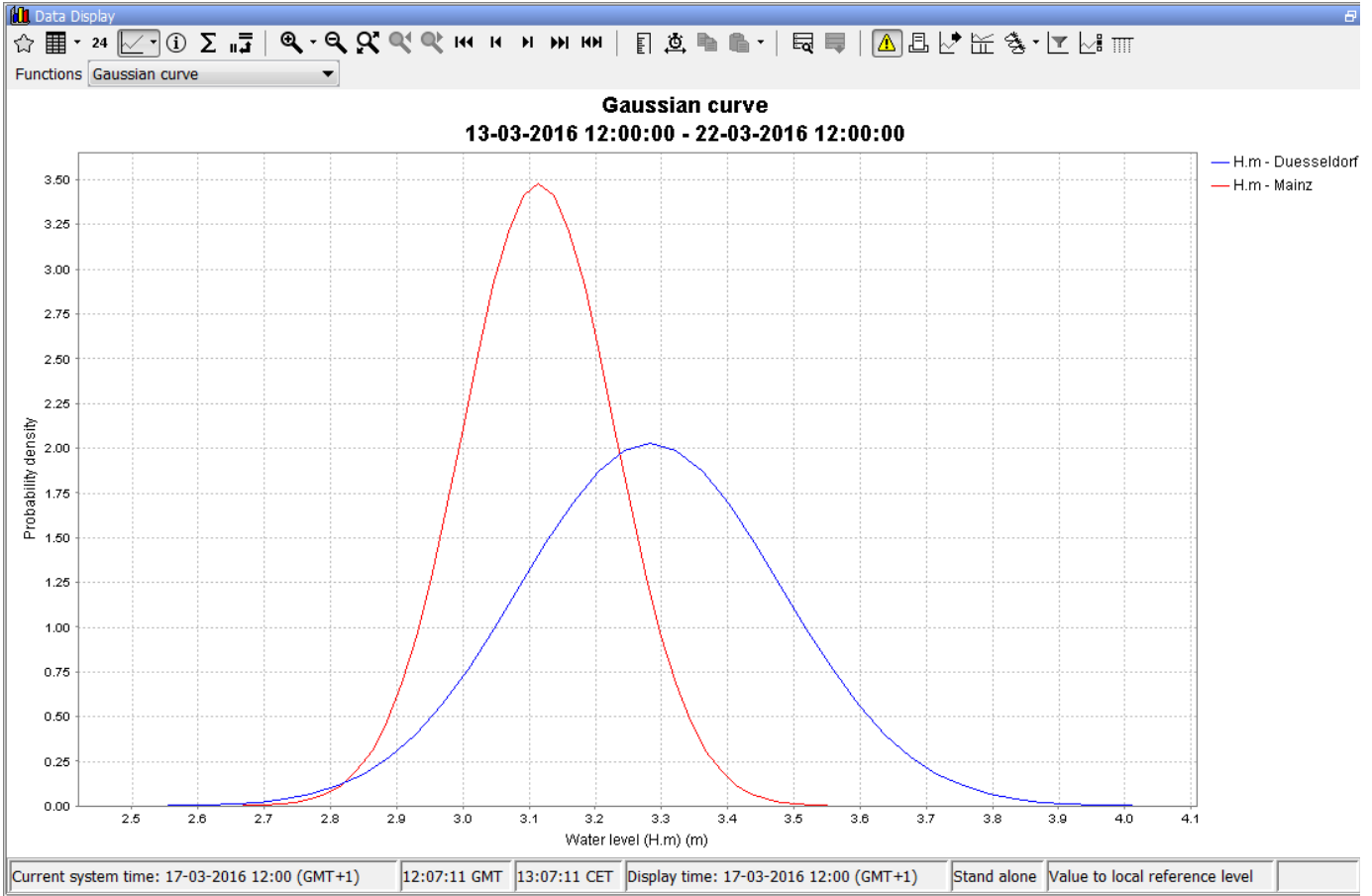
The dialog box "Grenzen Opgeven" has the following fields and buttons:

- Laagste klasse grens: 230.27
- Hoogste klasse grens: 431.96
- Buttons: OK, Annuleren, Automatisch

```
<statisticalFunction function="frequencyDistribution">  
  <samples amount="5"/>  
  <samples amount="10"/>  
  <samples amount="20"/>  
</statisticalFunction>
```

Gaussian curve

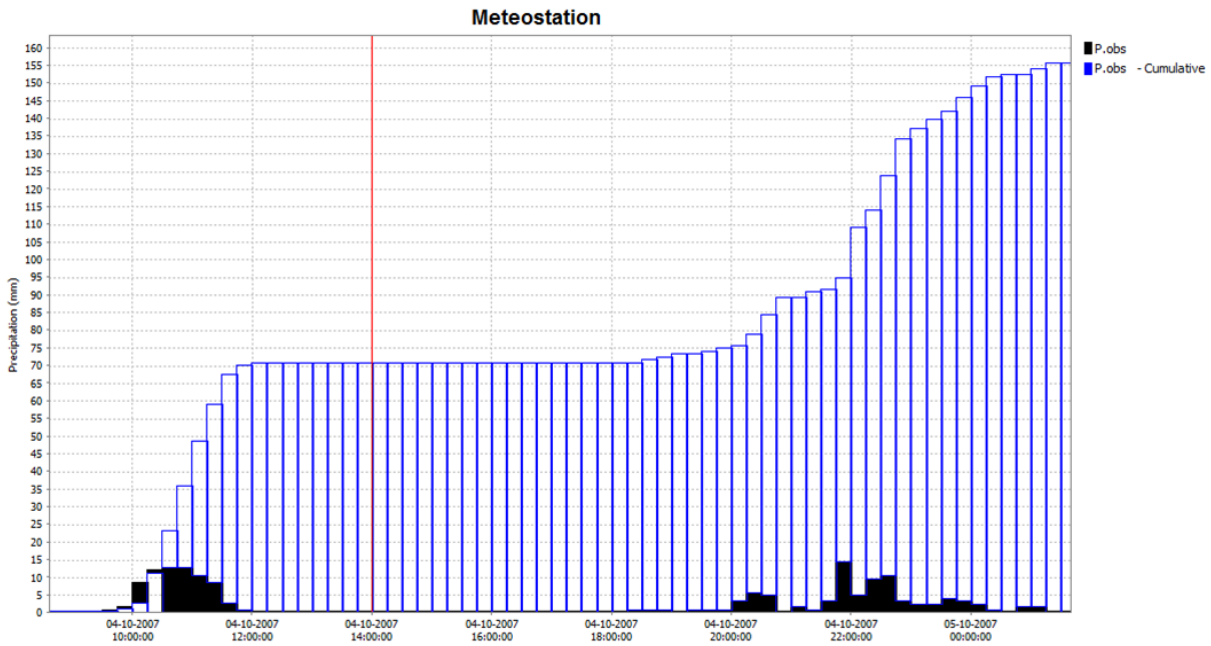
Gaussian or bell-shaped curve shows a particular distribution of probability over the values of a random variable.



```
<statisticalFunction function="gaussianCurve" />
```

Cumulative

Continuous accumulation over entire timeseries.

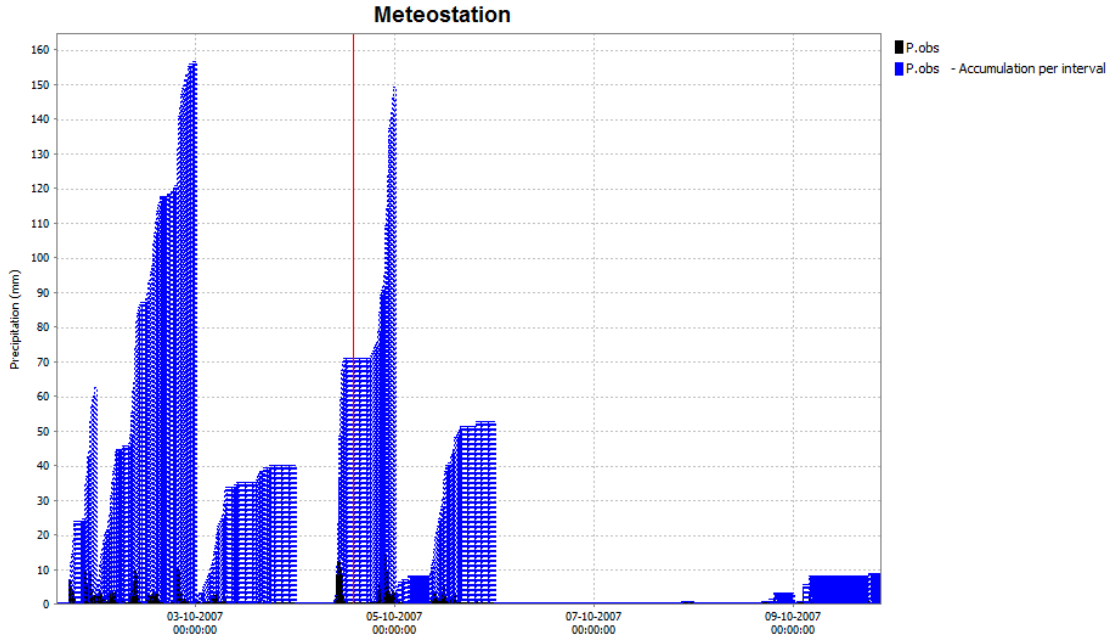


Config example:

```
<statisticalFunction function="cumulative"/>
```

Accumulation Per Interval

Accumulation per Interval, starting at zero at the beginning of the next interval. Interval can be selected in dropdown box.



Config example:

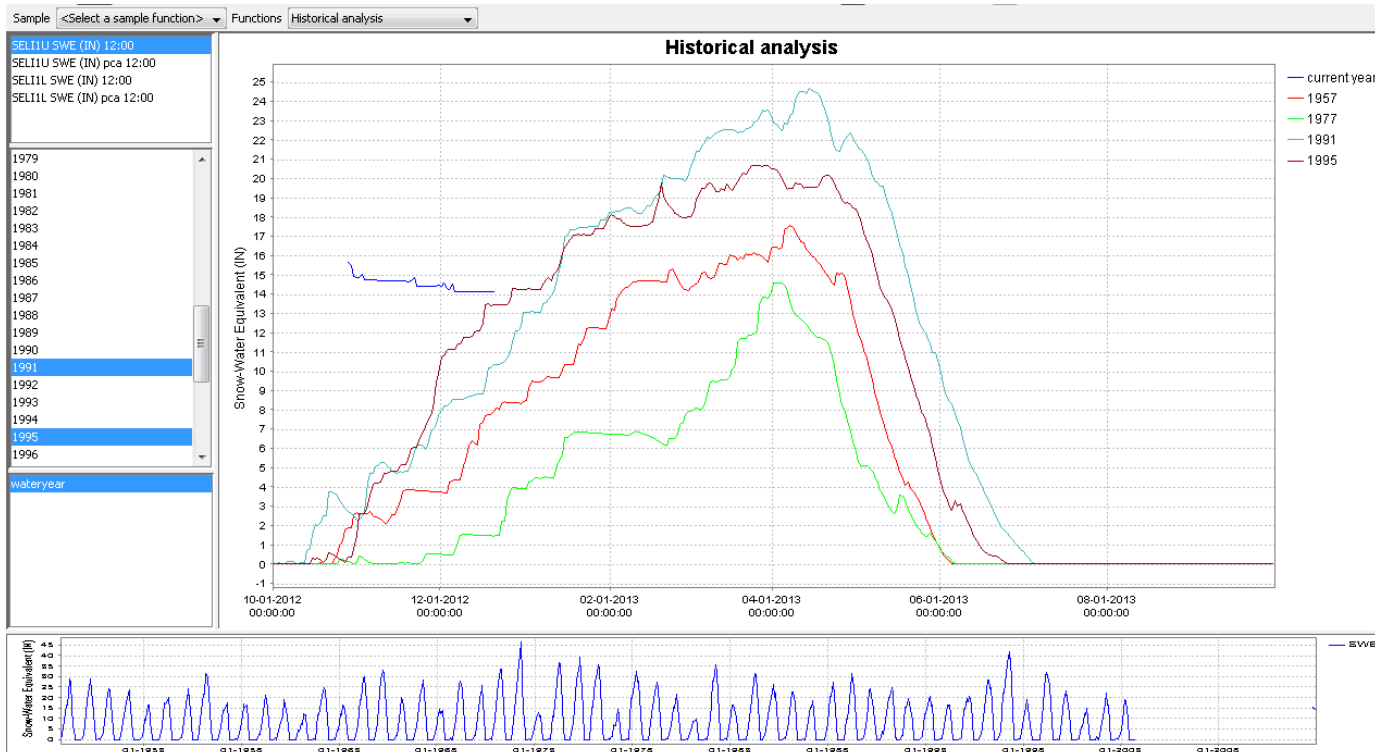
```
<statisticalFunction function="accumulationInterval">  
  <movingAccumulationTimeSpan unit="hour" multiplier="1"/>  
  <movingAccumulationTimeSpan unit="hour" multiplier="3"/>  
  <movingAccumulationTimeSpan unit="hour" multiplier="6"/>  
</statisticalFunction>
```

Historical Analysis

Allows comparison of the current situation with selected previous years at the same moment within the year. Can be used to compare seasonal behaviour, e.g. deficit accumulation, snow accumulation/melt, runoff.

The bottom of the window shows the full timeseries to assist in picking relevant historical years.

The function requires a multi-year historical series, where the view period on the x-axis stretches over multiple years before the function is selected. You can use the |<>| button to stretch the x-axis from the current view period to the full available length. The display requires a fixed season definition for the x-axis, to be included in the configuration. The user needs to select the historical year of interest to plot this against the current year. Multiple years can be selected by holding the CTRL-key. Holding the SHIFT-key will select a range of years.



```

<statisticalFunction function="historicalAnalysis">
  <historicalPeriods>
    <historicalPeriod>
      <startForwardLookingPeriod>--01-01</startForwardLookingPeriod>
      <season startMonthDay="--01-01" endMonthDay="--12-01"
label="wateryear"/>
    </historicalPeriod>
  </historicalPeriods>
</statisticalFunction>

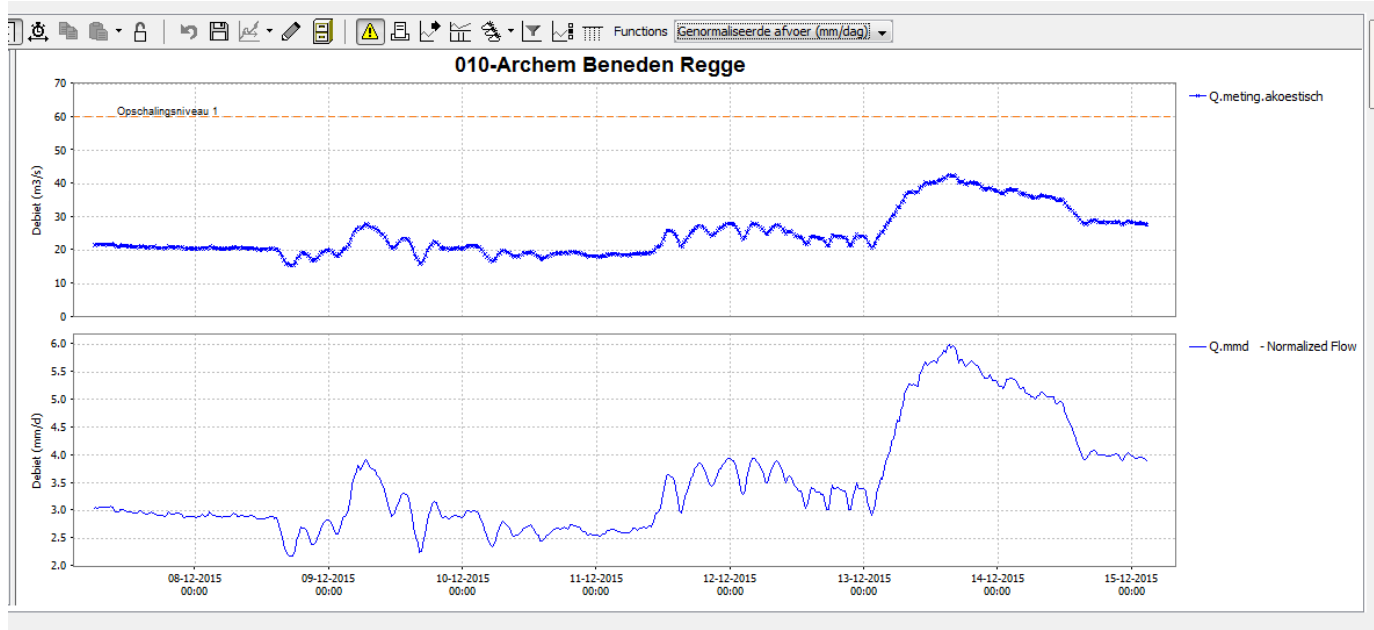
```

Normalized Flow

Allows comparison of the current situation with selected previous years at the same moment within the year. Can be used to compare seasonal behaviour, e.g. deficit accumulation, snow accumulation/melt, runoff.

The bottom of the window shows the full timeseries to assist in picking relevant historical years.

The function requires a multi-year historical series, where the view period on the x-axis stretches over multiple years before the function is selected. You can use the |<>| button to stretch the x-axis from the current view period to the full available length. The display requires a fixed season definition for the x-axis, to be included in the configuration. The user needs to select the historical year of interest to plot this against the current year. Multiple years can be selected by holding the CTRL-key. Holding the SHIFT-key will select a range of years.



```

<statisticalFunction function="normalizedFlow" label="Flow (mm/day)"
ignoreMissings="true">
  <areaFunction>@AREA_HA*10/86400</areaFunction>
  <parameterId>Q.mmd</parameterId>
  <allowedInputParameterId>Q.obs</allowedInputParameterId>
</statisticalFunction>

```

....and / or

```

<statisticalFunction function="normalizedFlow" label="Flow (l/s.ha)"
ignoreMissings="true">
  <areaFunction>@AREA_HA@/1000</areaFunction>
  <parameterId>Q.lsha</parameterId>
  <allowedInputParameterId>Q.obs</allowedInputParameterId>
</statisticalFunction>

```

Principal Component Analysis

The Principal Component Analysis function uses independent historical data (observations) and dependent data (e.g. a simulated basin value) to compute a number of regression equations using the Principal Component Analysis technique. The resulting equation is applied with current observations to estimate the current basin value.

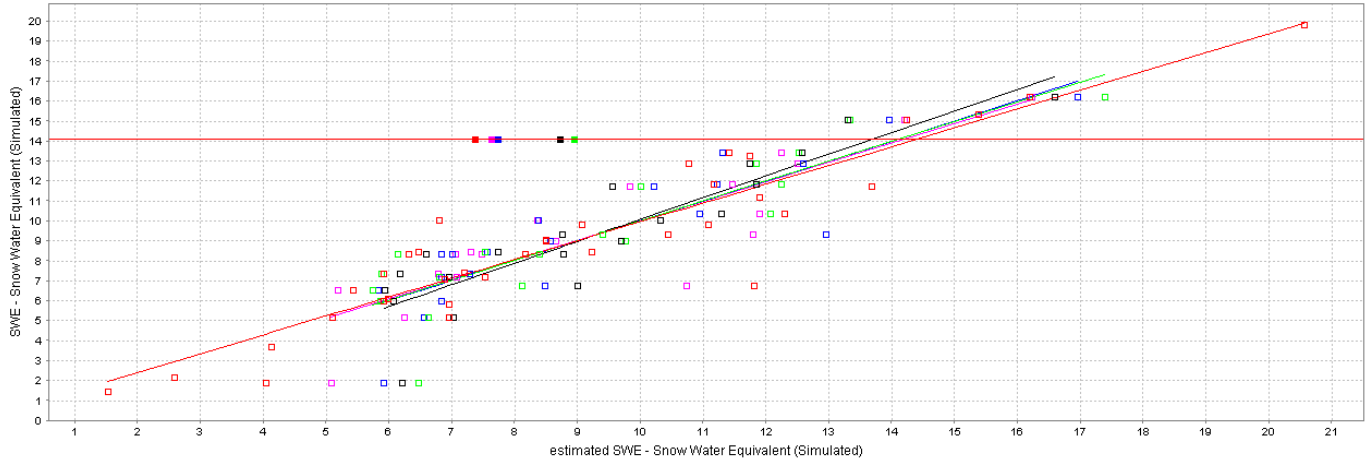
This functionality starts with the timeseries data available in the display. The independent and dependent parameters should correspond to the specification in the TimeSeriesDisplayConfig for the simulated (dependent) and observed (independent) parameter.

Typically, this functionality is intended to work in combination with the Topology and the Filters, such that you can have a default set of locations which you can modify from the map or via the Filters. You can also exclude locations from the analysis by making the timeseries invisible in the graph. By default the function shows the scatterplot of the best 5 equations (lowest root mean square error). By selecting one item in the legend, this item and its confidence interval is shown.

The PCA-estimate for the basin value can be utilized in a modifier if the ModifierTypes-configuration refers to the statistical function for the default value.

rank	simulated	pca	rmse	period of record	equation	max	min	mean	method	preprocessing	normalized
0	14.1	7.36	1.5	1967 - 2002	$Y = 0.809 * TWLM8 - 2.106$	19.81	1.45	8.94	PCA	NONE	no
1	14.1	8.72	1.5	1983 - 2002	$Y = 0.152 * HEMI1 + 1.694 * NZCM8 - 0.97$	16.21	1.91	9.31	REGRESSION	SQUAREROOT	no
2	14.1	8.95	1.55	1984 - 2002	$Y = 0.207 * CRAI1 + 1.707 * NZCM8 - 1.84$	16.21	1.91	9.27	REGRESSION	SQUAREROOT	no
3	14.1	7.74	1.6	1983 - 2002	$Y = 0.913 * LPSI1 + 0.528$	16.21	1.91	9.31	REGRESSION	NONE	no
4	14.1	7.63	1.6	1983 - 2002	$Y = 0.18 * HEMI1 + 0.328 * LPSI1 + 0.273 * TWLM8 - 0.411$	16.21	1.91	9.31	PCA	NONE	no

PCA 12-20-2012
SELI1U - Selway R nr Lowell (UPPER)



□ pca=7.363; rmse=1.5; 36 year; TWLM8=100%
 □ pca=8.721; rmse=1.5; 20 year; HEMI1=19.57% NZCM8=80.43%
 □ pca=8.947; rmse=1.55; 19 year; CRAI1=27.23% NZCM8=72.77%
□ pca=7.74; rmse=1.6; 20 year; LPSI1=100%
 □ pca=7.63; rmse=1.6; 20 year; HEMI1=28.05% LPSI1=32.2% TWLM8=39.74%

Scatter Plot

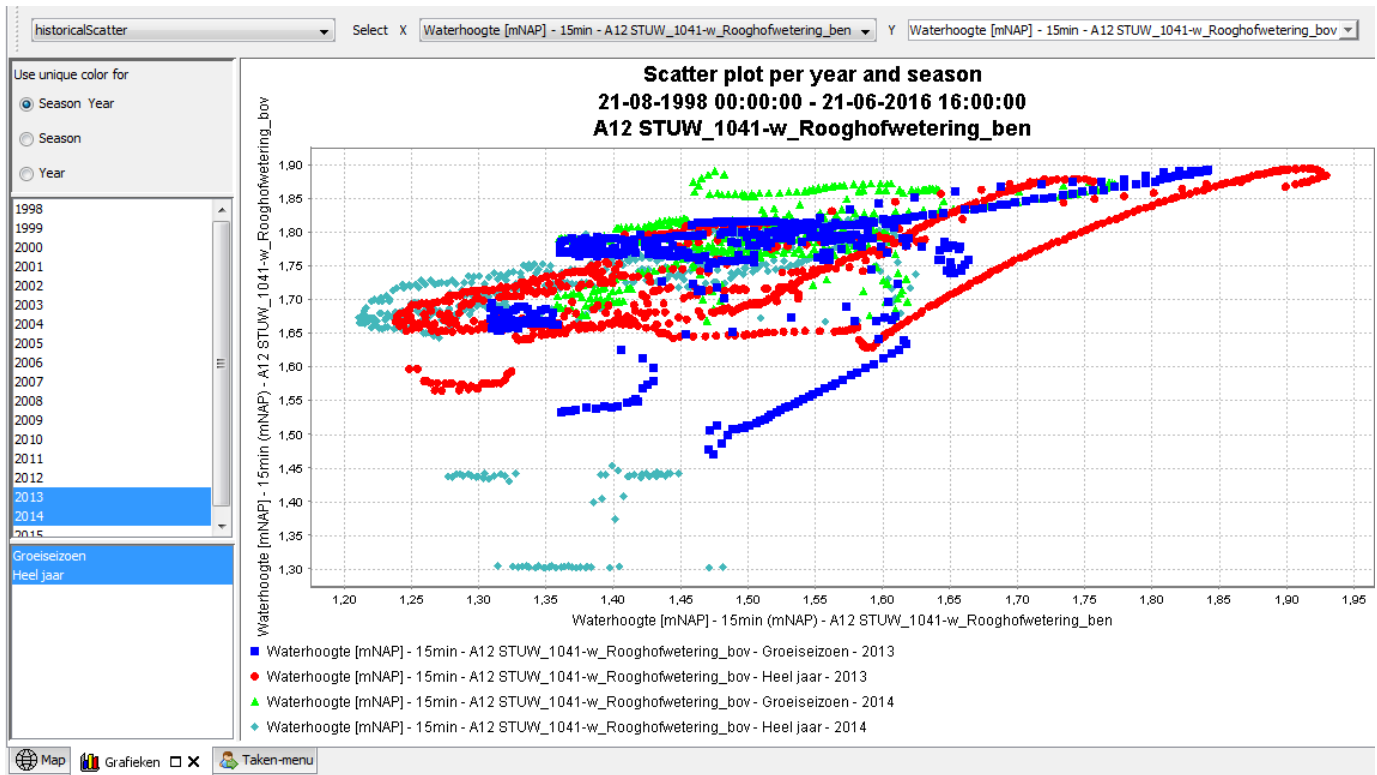
Creates a scatter plot of two selected series

Config example:

```
<statisticalFunction function="scatterPlot" />
```

Historical Scatter Plot (per year and season)

(Since 2016.02) There is also a scatter plot available where you can select years and seasons separately and choose unique coloring



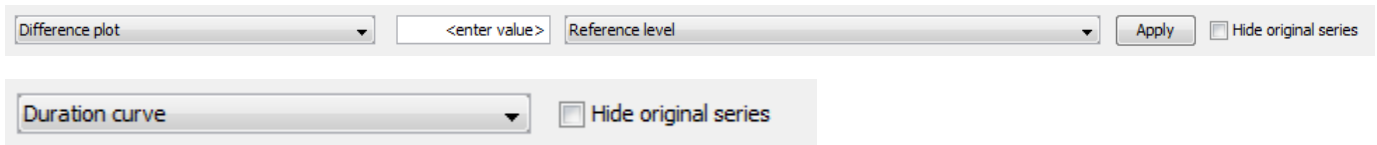
```
<statisticalFunction function="historicalScatterPlot" />
```

Show statistics for specific timeseries

By default the statistical results are displayed for all timeseries. To display the statistics for a specific timeseries, the relevant timeseries can be selected by clicking the legend or by selecting the timeseries in the graph. Using the CTRL button more than one timeseries can be selected this way.

Hide original time series

Since 2016.02 a checkbox has been added which offers the user the choice to hide the original time series. The status of this checkbox will be stored in the user settings so choice will be remembered between different statistical functions and when restarting FEWS:



The images show the checkbox for 2 functions but this checkbox is available for each statistical function which plotted the original time series together with the statistical time series.

Filtering data

The table context menu (available by right-clicking) gives access to two types of filtering: [Filter by Tree...] and [Filter by Expression...] (the latter since FEWS-2014.02). These options, which can be applied simultaneously, allow the user to apply a filter to data shown in the table, hiding all records that do not satisfy the filter criteria. With the filter(s) applied, data can be selectively copied to clipboard or edited. The display in the graph is not affected by the filters.

- Filter by Tree
- Filter by Expression

Filter by Tree

This option allows the user to filter records based on a number time series *properties*: user, comment, and flagSource (validation). The main branches of the filter tree are formed by the time series that are selected. The properties then appear as subbranches, and for each property the available options are listed as the tree leaves.

When selecting one of the leaves, the data shown in the table is shrunk to all records that have the specified property. When choosing multiple leaves from the *same* branch, the data selection is expanded to the union of the individual leaves. A filter based on leaves of *different* branches will shrink the data selection to the intersection of the individual branches. For example, suppose the user chooses the leaves HN and ROF in the validation branch of time series A, and leaf HN in the validation branch of time series B. In that case only those records are shown for which the flagSource of time series A equals HN *or* ROF, *and* the flagSource of time series B equals HN.

	A	B	C	D	E	F
GMT+1	H.meting (m NAP) 0003 - Gemaal A: TMX ruw	⚠	💬	H.meting (m NAP) 0003 - Gemaal A: TMX ruw	⚠	💬
15-10-2013 10:00	7.254	ROF	Afkeur op sprin...	<6.106	HN	Meetwaarde on...

Filter

- H.meting(m NAP)0003 - Gemaal Assisi, Krooshek, benedenTMX ruw
 - user
 - Matthijs den Toom
 - comment
 - Afkeur op levendigheid (R)
 - Afkeur op springerigheid (R)
 - Meetwaarde onder min meetbereik sensor (R)
 - Zachte limietgrens onderschreden (R)
 - validation
 - <empty>
 - HN
 - ROF
 - SN
 - SR
- H.meting(m NAP)0003 - Gemaal Assisi, Krooshek, bovenTMX ruw
 - comment
 - Afkeur op springerigheid (R)
 - Meetwaarde onder min meetbereik sensor (R)
 - validation
 - <empty>
 - HN
 - ROF

Figure 1: Filter by Tree.

Filter by Expression

This option (available since FEWS-2014.02) allows the user to filter the records based on expressions, involving the active table columns. The

expressions are therefore not limited to the data column, but may also involve the user or comment column. A column is referenced by its alphabetical index (mind to use capitals). The following operators and functions are available for constructing expressions:

OPERATORS

operators	description	example
< > <= >=	relations	A>=10
== !=	equality	A!=10
+ -	add, subtract	A+3>10
* /	multiply, divide	A*0.5>10
^	power	A^2>10
&&	logical AND	A>10&&E>5
	logical OR	A>10 E>5

FUNCTIONS

function	description	example
sum	sum of values	sum(A,E,...)>10
abs	absolute value	abs(A)>10
pow	power function	pow(A,2)>10
sqrt	square root	sqrt(A)>10
min	minimum of list	min(A,E)>10
max	maximum of list	max(A,E)>10
average	average of list	average(A,E)>10
exp	exponential (e^x)	exp(A)>10
ln	natural logarithm	ln(A)>10
log	logarithm base 10	log(A)>10
atanh	inverse hyperbolic tangent	atanh(A)>10
acosh	inverse hyperbolic cosine	acosh(A)>10
asinh	inverse hyperbolic sine	asinh(A)>10
tanh	hyperbolic tangent	tanh(A)>10
cosh	hyperbolic cosine	cosh(A)>10
sinh	hyperbolic sine	sinh(A)>10
atan	arc tangent	atan(A)>10
acos	arc cosine	acos(A)>10
asin	arc sine	asine(A)>10
tan	tangent	tan(A)>10
cos	cosine	cos(A)>10
sin	sine	sin(A)>10
isMissing	check for NaN	isMissing(A)

An example application is shown in Figure 2.

GMT+1	A H.meting (m NAP) 0003 - Gemaal TMX ruw	B ⚠	C 👤	D 💬	E H.meting (m NAP) 0003 - Gemaal A TMX ruw	F ⚠	G 👤	H 💬
26-10-2013 00:00	7.236		Matthijs den To...		7.239			
26-10-2013 00:10	7.236		Matthijs den To...		7.239			
26-10-2013 00:20	7.236		Matthijs den To...		7.239			
26-10-2013 00:30	7.236		Matthijs den To...		7.239			
26-10-2013 00:40	7.236		Matthijs den To...		7.239			
26-10-2013 00:50	7.236		Matthijs den To...		7.239			
26-10-2013 01:00	7.236		Matthijs den To...		7.239			
26-10-2013 01:10	7.236		Matthijs den To...		7.239			
26-10-2013 01:20	7.236		Matthijs den To...		7.239			
26-10-2013 01:30	7.236		Matthijs den To...		7.239			
26-10-2013 01:40	7.236		Matthijs den To...		7.239			
26-10-2013 01:50	7.236		Matthijs den To...		7.239			
26-10-2013 02:00	7.236		Matthijs den To...		7.239			
26-10-2013 02:10	7.236		Matthijs den To...		7.239			
26-10-2013 02:20	7.236		Matthijs den To...		7.239			
26-10-2013 02:30	7.236		Matthijs den To...		7.239			
26-10-2013 02:40	7.236		Matthijs den To...		7.239			
26-10-2013 02:50	7.236		Matthijs den To...		7.239			
26-10-2013 03:00	7.236		Matthijs den To...		7.239			
26-10-2013 03:10	7.236		Matthijs den To...		7.239			
26-10-2013 03:20	7.236		Matthijs den To...		7.239			
26-10-2013 03:30	7.236		Matthijs den To...		7.239			
26-10-2013 03:40	7.236		Matthijs den To...		7.239			
26-10-2013 03:50	7.236		Matthijs den To...		7.239			
26-10-2013 04:00	7.236		Matthijs den To...		7.239			
26-10-2013 04:10	7.236		Matthijs den To...		7.239			
26-10-2013 04:20	7.236		Matthijs den To...		7.239			
26-10-2013 04:30	7.236		Matthijs den To...		7.239			
26-10-2013 04:40	7.236		Matthijs den To...		7.239			
26-10-2013 04:50	7.236		Matthijs den To...		7.239			
26-10-2013 05:00	7.236		Matthijs den To...		7.239			
26-10-2013 05:10	7.236		Matthijs den To...		7.239			
26-10-2013 05:20	7.236		Matthijs den To...		7.239			
26-10-2013 05:30	7.236		Matthijs den To...		7.239			
26-10-2013 05:40	7.236		Matthijs den To...		7.239			
26-10-2013 05:50	7.236		Matthijs den To...		7.239			
26-10-2013 06:00	7.236		Matthijs den To...		7.239			
26-10-2013 06:10	7.236		Matthijs den To...		7.239			

Filter by Expression ✖

A>7&&C=="Matthijs den Toom"

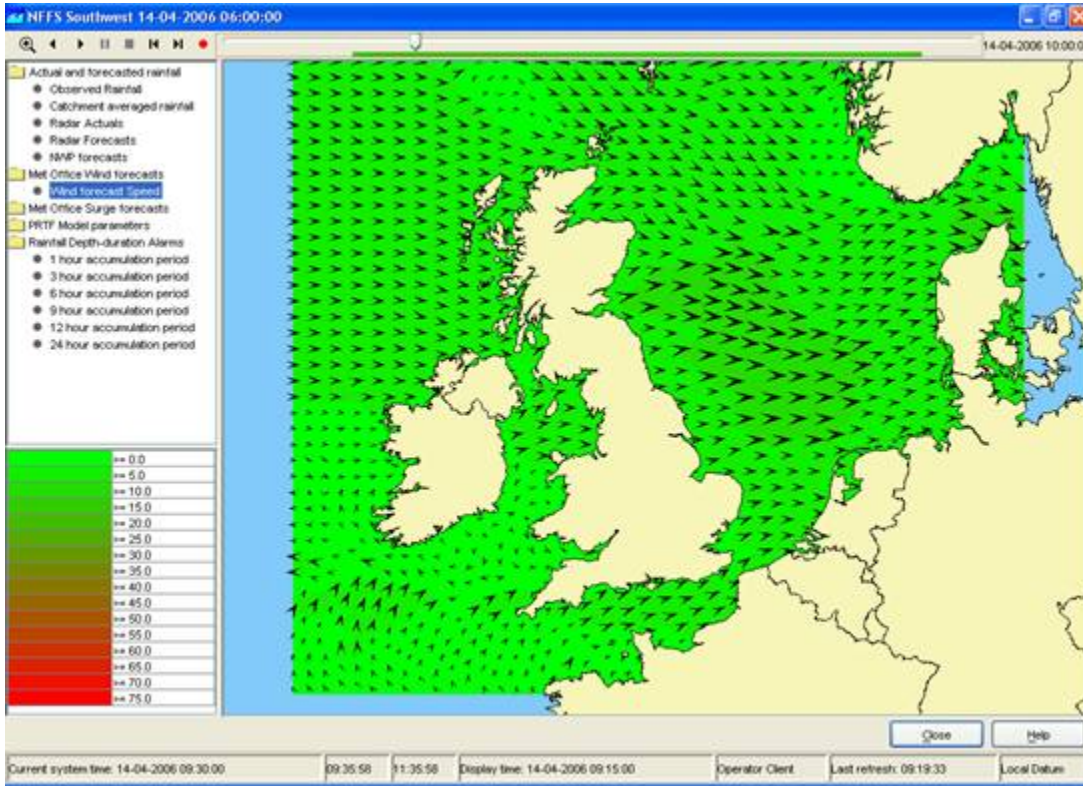
Apply Close Help

Figure 2: Filter by Expression.

05 Spatial Display

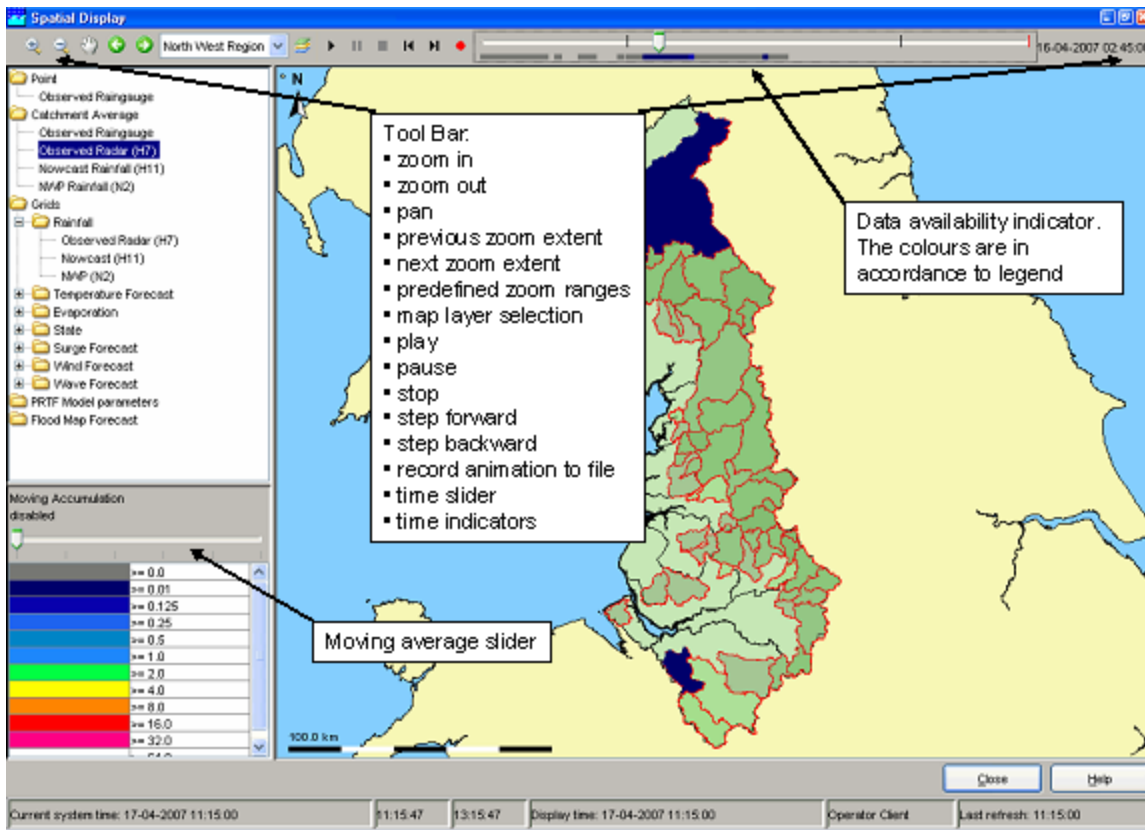
Spatial Display

The Spatial Display grid display can be used to display time series of any type: scalar, polygon or grid. The display will depict the data on a map background. The display time is then set using a ruler that can be moved manually or made to move automatically.



The spatial display consists of following components:

- Spatial Display selection filters
- Control Toolbar with following options:
- Manual zoom and zoom previous buttons
- Predefined zoom range selector
- Play, pause, stop, step forward, step backward and record buttons
- Time slider with time slice indicator
- Data availability and maximum value indicator
- Moving average slider
- Legend
- Contours button
- Export time step data in ascii grid-file



Grid display selection filters

The selection filters show which displays have been configured. Select a filter to display the data. Note that each grid display may be configured differently, i.e. with a different period of data to be displayed, with a different background map, etc. The configuration allows filters to be highlighted in **bold**.

Control Toolbar

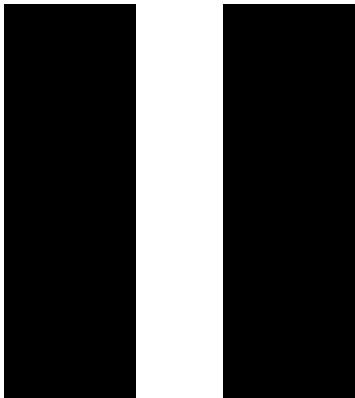
The toolbar provides the controls for displaying the spatial information via through the following buttons:

Button	Description
--------	-------------

Play. Starts continuous play mode. The slider will indicate the time slice being shown.

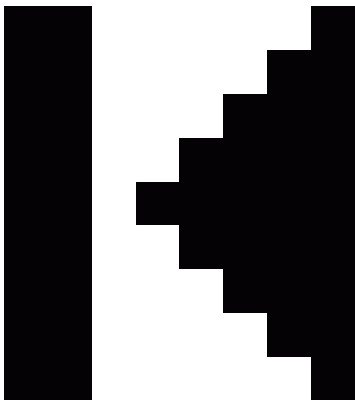


Pause. Stops continuous play mode. The time slider remains at the time displayed at the moment.

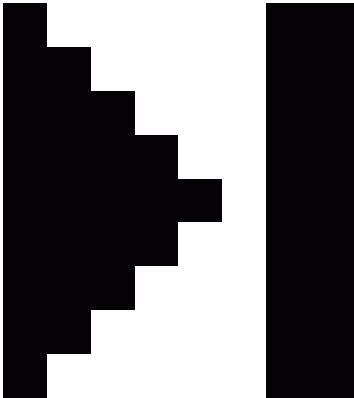
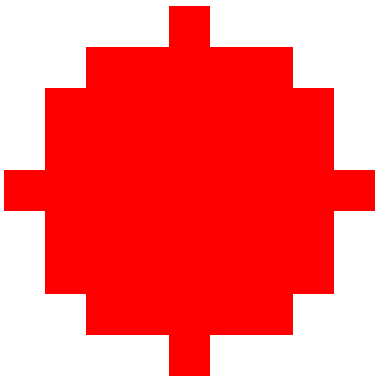




Stop. Stops continuous play mode. The time reverts back to the start time.



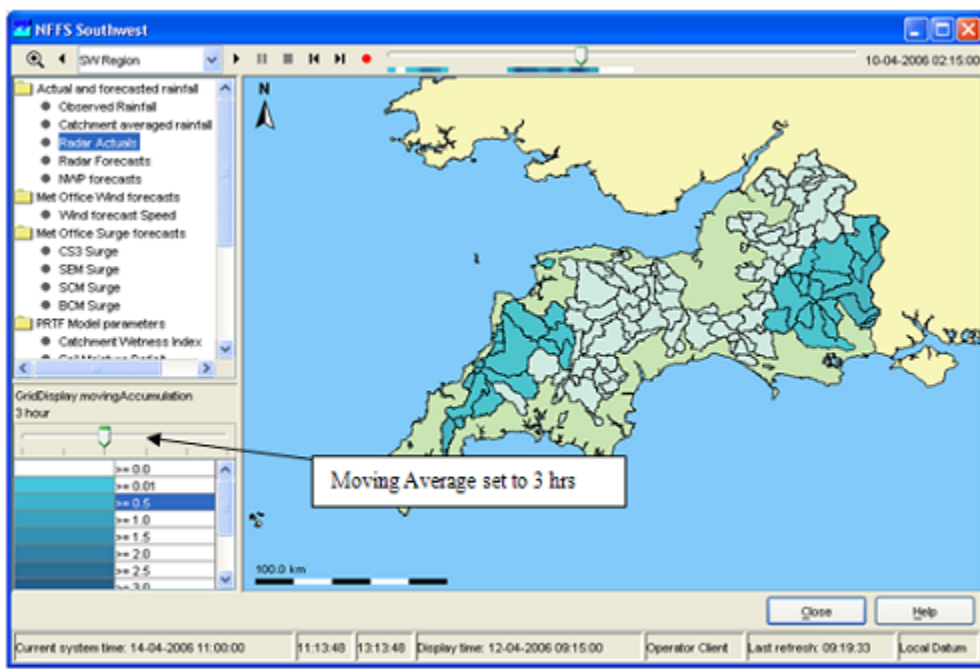
Step backwards. Moves the time slider back one timestep.

	<p>Step forwards. Moves the time slider forwards one timestep.</p>
	<p>Record. Creates an AVI or animated gif movie file. The avi format is used by default unless the filename ends with '.gif'. After opening the file, the display will start playing from the current time position, until the stop button is clicked.</p>
<p>Time slider</p>	<p>The time slider can be dragged to specific time slice.</p>
<p>Data availability</p>	<p>The data availability indicator provides a visual clue as to where you can find data. For those times where data is available, the colour of the data availability indicator will be set to the maximum value found in the data for that time slice.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Note: For grids that contain horizontal flow data in the form of u,v vectors the data availability indicator might over-estimate the maximum values. In other words, for u,v vector data the availability indicator colours might indicate values greater than the actual maximum values found in the data. This is a known issue and was implemented to improve performance.</p> </div>

For the functionality of the zoom buttons is referred to the FEWS Explorer section (see 2.2).

Moving Average Slider

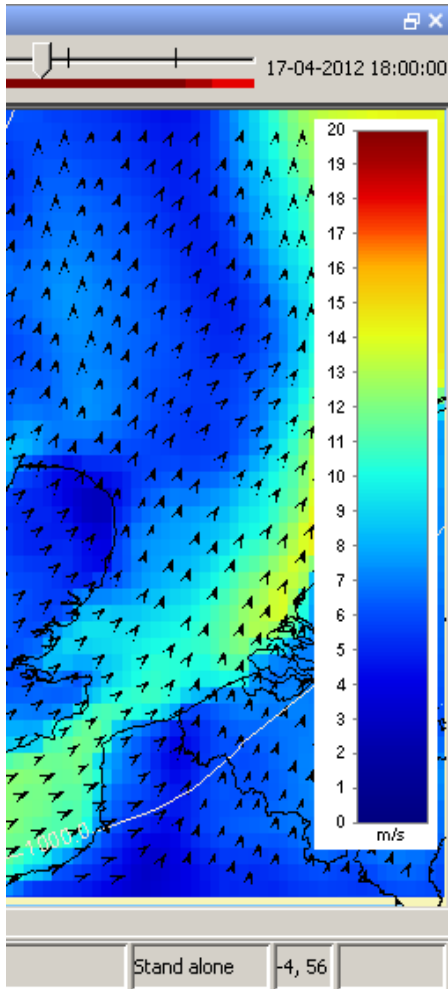
The moving average slider can be configured to allow the user to select a number of moving average settings. Each moving average window is then recalculated for the entire period.



Legend

The legend identifies the colour used for each range of values. The range of values used for each colour can be rescaled by right clicking on the display and selecting 'Rescale Classification' from the pop-up menu. The display colours will be updated to reflect the new classification. After rescaling, the lowest and highest values in the legend will correspond to the minimum and maximum values of the data in the current zoom extent of the display (for the selected time slice). When the display is zoomed in on an area where all data points or grid cells have similar colours, rescaling can be used to see more clearly the differences in the data values. To return to the default classification right click on the display and select 'Back To Default Classification' from the pop-up menu. When selecting a different plot, the classification always changes back to the default classification for that plot.

The legend can be shown as table legend or as bar legend. Bar legend displays fluent scale bar as shown in the picture below:



Contours button



To turn on/off contour lines (regular grids configured with contour lines only). Numbers appear when the animation has stopped or paused. The colors, which indicate the value remain visible.

Export time step data in ascii grid-file

By right clicking on the display, the grid data for a specific timestep can be exported in an ascii file. Select the desirable time step with the control toolbar.

Extracting scalar time series from grid

Scalar time series can be extracted from the grid by double clicking the point of interest. Depending on the type of data, which is displayed, the scalar time series will be relevant to either a point, polygon or grid cell. This can also be done in the following way. First select the point of interest either by right clicking and selecting 'Draw Point' from the pop-up menu or by left clicking. A coloured dot will be drawn to indicate the selected point. For grid data an additional green dot will be drawn to indicate the centre of the selected grid cell. Then extract the time series for the selected point either by right clicking and selecting 'Show Time Series' from the pop-up menu or by pressing the F3 key.

A series, that is extracted from a grid, is not related to a known location or polygon ID. The series will then be identified using the grid coordinates.

The graph will automatically pop up with the time series of the selected point, polygon or grid cell. When animating the grid display, a marker will move over the time series graph as well.

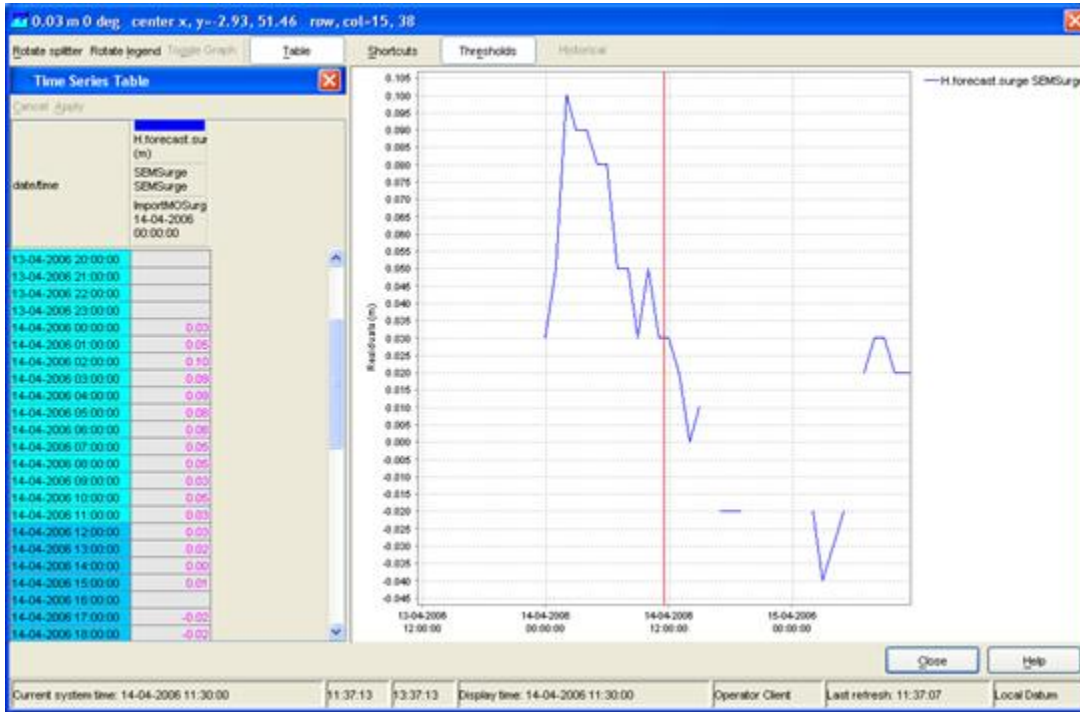
To extract a different scalar time series double-click on another point of interest. This will draw a new dot and extract a scalar time series for that point. Please be aware that when extracting a scalar time series from a data point in the display, then the dot drawn on top of the data point has a different colour from the point itself. This way it may look like the data point has a different colour because of the dot. The dot can be erased by right clicking and selecting 'Delete Point' from the pop-up menu.

Note:

Make sure that you stop the grid movie before you make a time series graph, this can cause the system to slow down because multiple processes have to be executed that take a lot of processing time.

Note:

Extraction of scalar time series is not available for rotated pole geodatum types. In some cases extraction of scalar time series can exhibit unexpected behaviour near the North Pole or South Pole.



Extracting longitudinal profiles (Xsections) from a grid time series

Longitudinal profiles time series can be extracted from grid data and shown in a separate graph as well. The profile (or cross section) is defined by drawing a profile sketch. Start drawing a profile sketch either by right clicking and selecting 'Start Drawing Profile' from the pop-up menu or by Ctrl+left clicking on the desired start point for the profile. A coloured dot will be drawn to indicate the selected start point. Add additional line segments to the profile by left clicking in the display. Finish drawing by double-clicking on the desired end point for the profile. Green dots along the profile indicate which grid cells are used for the profile.

Once a profile sketch has been drawn, extract the profile either by right clicking and selecting 'Show Profile' from the pop-up menu or by pressing the F2 key. The graph of the profile will show automatically.

To extract a different profile just start drawing another profile. This will erase the previous sketch. The profile sketch can also be erased by right clicking and selecting 'Delete Sketch' from the pop-up menu.

When animating the grid, the profile follows the same animation. When animating the profile only, the grid animation remains fixed. Note that the same cross section can be reused when switching to another plot (F2 will open a new window).

Note:

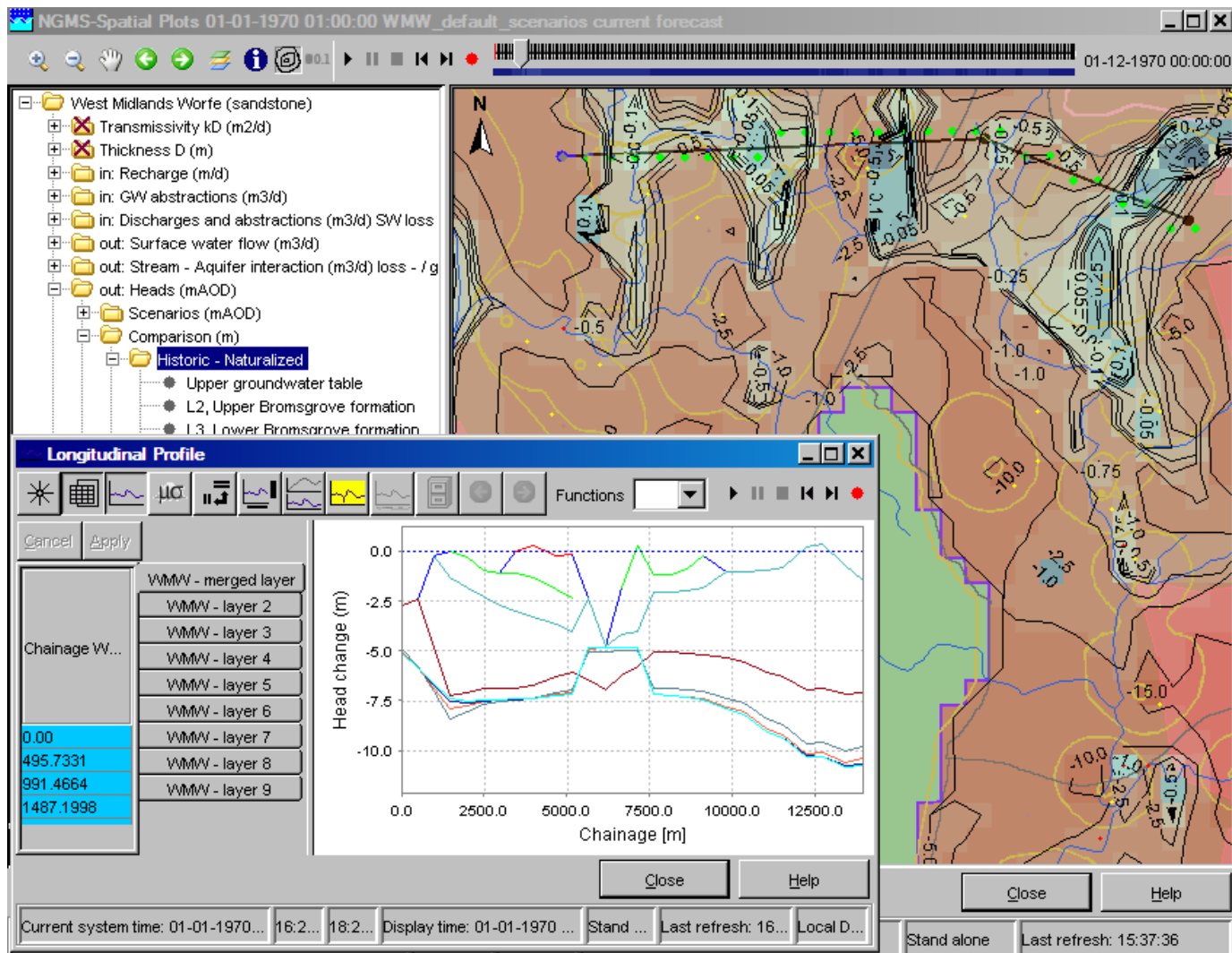
Even more essential than for scalars, it is wise to pause the grid animation when dragging a cross section to be shown.

Note:

Extraction of longitudinal profiles is not available for irregular grids, points and polygons. The profile sketch will be erased when switching to a plot that contains data of one of these types. Extraction of longitudinal profiles is also not available for rotated pole geodatum types. In some cases extraction of longitudinal profiles can exhibit unexpected behaviour for profiles crossing the dateline or located near the North Pole or South Pole.

Note:

If longitudinal profile data is displayed in the spatial display, then there is no need to draw a profile sketch. Just press the F2 key or right click and select 'Show Profile' from the pop-up menu to show the graph of the profile.



Extracting data for an area from a grid time series (available since build 18645)

For certain types of data it is possible to extract time series data for a specific part of a grid and show this in a separate graph. This is only possible for scalar data with dimension L3/T, L3, L/T, L or 'amount of substance' and for horizontal flow data with dimension L3/T or L/T. The specific part of the grid is defined by drawing an area sketch (a closed polygon surrounding the desired area). Start drawing an area sketch either by right clicking and selecting 'Start Drawing Area' from the pop-up menu or by Shift+left clicking on an edge for the desired area. A coloured dot will be drawn to indicate the selected point. Add additional line segments along the edge of the desired area by left clicking in the display. Finish drawing by double-clicking. The last point in the sketch will be connected to the first point automatically to create a closed polygon that surrounds the desired area. Each grid cell inside the area is marked with a green dot.

Once an area sketch has been drawn, extract the desired data by right clicking and selecting 'Calculate Budget' from the pop-up menu. The corresponding graph will show automatically. The 'Calculate Budget' option will perform one of the following calculations, depending on the type and the dimension of the selected data (The dimension can be defined in a parameterGroup in the region configuration).

Grids that contain scalar data (e.g. water levels or rainfall data):

- For dimensions L3/T (e.g. flow in m³/s), L3 (e.g. volume in m³) and 'amount of substance' the calculation will be 'volume summation'. This calculates the sum of the values inside the area. This uses all grid cells that are (partially) inside the area. The value of each grid cell is weighted using the fraction of the grid cell that is inside the area.
- For dimensions L/T (e.g. velocity in m/s) and L (e.g. water level in m) the calculation will be 'area times average level'. This calculates the average level inside the area multiplied by the size of the area. This uses all grid cells that are (partially) inside the area. The value of each grid cell is weighted using the fraction of the grid cell that is inside the area.
- If another dimension, or no dimension, is configured for the selected data, then the options 'Start Drawing Area' and 'Calculate Budget' are not available.

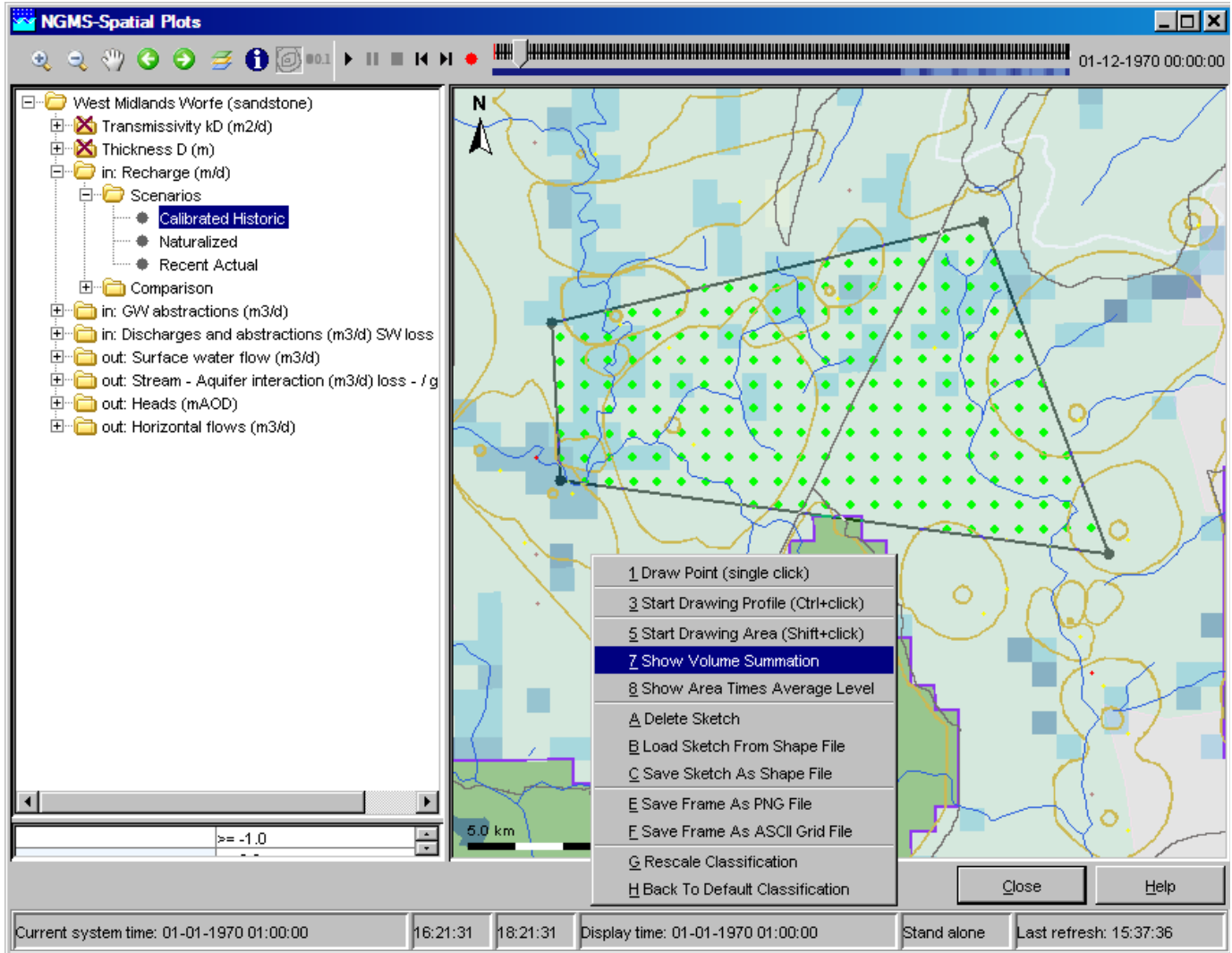
Grids that contain horizontal flow data in the form of u,v vectors:

- For dimension L3/T (e.g. flow in m³/s) the calculation will be 'mass balance horizontal flux'. This calculates the net horizontal flow into/out

- of the area. This uses all grid cells that are for at least 50% inside the area.
- For dimension L/T (e.g. velocity in m/s) the calculation will be 'mass balance horizontal velocity'. First for each grid cell the value of u , respectively v , is multiplied by the height of the gridcell, respectively the width of the grid cell, to get flow values (The height of the flowing water mass is taken to be 1). Then the net horizontal flow into/out of the area is calculated. This uses all grid cells that are for at least 50% inside the area.
- If another dimension, or no dimension, is configured for the selected data, then the options 'Start Drawing Area' and 'Calculate Budget' are not available.

To extract data for a different area just start drawing another area. This will erase the previous sketch. The area sketch can also be erased by right clicking and selecting 'Delete Sketch' from the pop-up menu.

When animating the grid display, a marker will move over the time series graph as well. Note that the same area sketch can be reused when switching to another plot (right clicking and selecting one of the relevant options will open a new window).



Note:

Even more essential than for scalars, it is wise to pause the grid animation when dragging an area for extracting data.

Note:

Extraction of data for an area is not available for quadrilateral grids, irregular grids, points and polygons. The area sketch will be erased when switching to a plot that contains data of one of these types. Extraction of data for an area is also not available for rotated pole geodatum types. In some cases extraction of data for an area can exhibit unexpected behaviour for areas crossing the dateline or located near the North Pole or South Pole.

Note:

The green dots only mark grid cells of which the cell centre is inside the area. The actual calculations also use grid cells that are partially inside the area.

Extracting data for multiple plots at once (available since build 18645)

It is possible to extract data for multiple plots at once. In the selection filters select a folder that contains more than one plot (as direct children). The first plot in the folder will be displayed. Then extract scalar time series, longitudinal profiles or data for an area in the usual way. The extracted

data for all the plots in the selected folder will be shown in a combined diagram, where each plot has a separate graph.

Saving and loading sketches from shape files (available since build 18645)

Once a profile sketch or an area sketch has been drawn, the sketch can be saved as a shape file (*.shp file) by right clicking and selecting 'Save Sketch As Shape File'. A saved sketch or any other shape file that represents a profile or an area (a closed polygon) can be loaded into the display by right clicking and selecting 'Load Sketch From Shape File'. The loaded sketch can then be used for extracting data. When loading a sketch, the previous sketch will be erased.

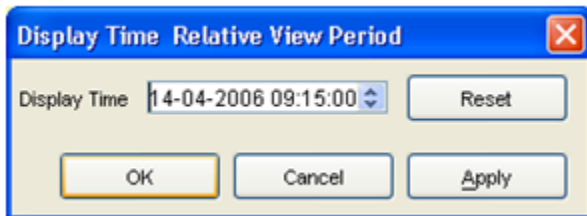
Note:

A shape loaded from file will only be used as an area sketch (a closed polygon) if the first and last points of the shape have exactly the same coordinates. Otherwise the shape will be used as a profile sketch.

Setting the display time

The display time in the spatial display can be changed in the *standalone system only*. The use is similar to the setting the display time in the data display, but with less modification possibilities.

When the display time is modified, the relative start and end times of the data to be shown are reset and the time slider is adjusted accordingly.



06 Manual Forecast Display

05 Spatial Display

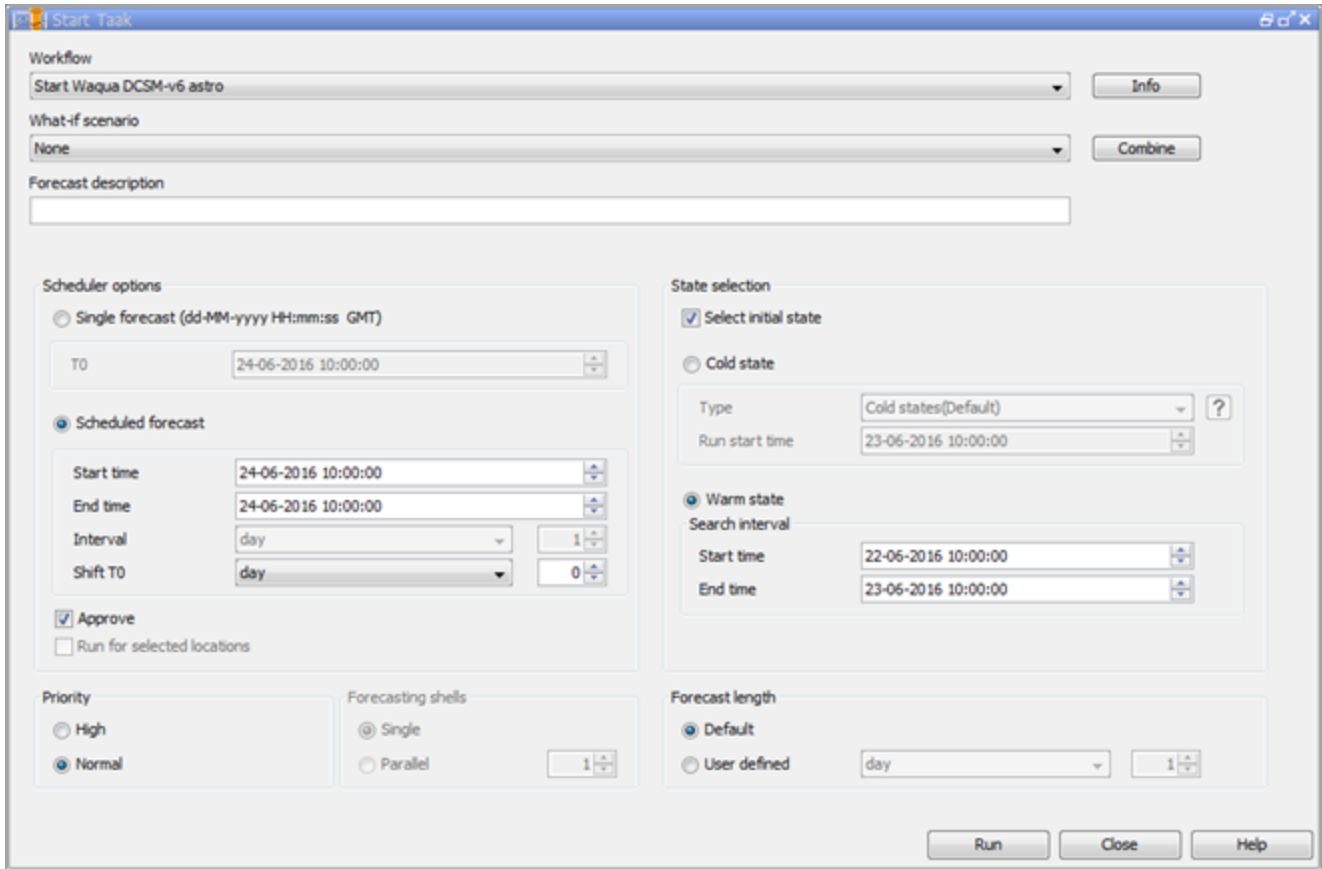
Delft-FEWS User Guide

07 Forecast Manager

- Manual Forecast Display
 - Workflow
 - Notification after completion workflow
 - What-if Scenario
 - Forecast description
 - Batch Forecast options (only in standalone)
 - Automatically approving forecasts
 - Run for selected locations
 - State Selection
 - Priority
 - Forecast length

Manual Forecast Display

The Manual Forecast display (see below) in the *Operator Client* allows for the running of single or a manually scheduled forecast.



The Manual Forecast display (see below) in a *Standalone* system is slightly different from the one in the Operator Client and allows for running of a single forecast or a batch of forecasts.

A single or a series of forecasts can be submitted to the system by pressing [Run]. With [Close], a user can leave the Manual Forecast display. The various items in the Manual Forecast display are described below.

Workflow

A workflow can be selected from a drop-down list with pre-configured workflows. By pressing [INFO], a description of the selected workflow can be displayed.

Notification after completion workflow

An automatic notification pops up after the completion of the workflow.

What-if Scenario

A What-if Scenario can be selected from a drop-down list with predefined What-if Scenarios. By pressing [INFO] a description of the selected What-if Scenario can be displayed. What-if Scenarios are defined via the What-if Scenario display.

Forecast description

A forecast description can be entered in this field. Entering of a description is not obligatory.

Please note that the *forecast name* is generated automatically by the system and consists of the **i** start time of a forecast, (ii) the selected workflow and (iii) the selected What-if Scenario.

Scheduler options (only in Operator Client)

Two types of manual forecasts can be defined:

- single forecast
- scheduled forecast

A single forecast will only run once. For single forecast only the *T0* of the forecast has to be entered in the date & time field (yyyy-MM-dd HH:mm).

A scheduled manual forecast will run for a period of time and with a time interval both defined by the user. In case a manual forecast is scheduled, the following information should be entered by the user:

- Period of time for which a scheduled manual forecast should run is defined by entering the *Start time* and *End time* (yyyy-MM-dd HH:mm). The first forecast run is done at the Start time.
- Via menu item *Interval* , the time interval at which the scheduled manual should run can be defined.
- Entering *Shift T0* allows the user to define a period of time over which the T0 of the forecast itself should be set back in relation to the Start time of the forecast run.

In case for example scheduled manual forecasts should always be made at 8:00 AM but the forecast itself should start at 12:00 PM the previous day, the *Shift T0* should be set at 8 hours while the *Start time* is set at 08:00.

Batch Forecast options (only in standalone)

Two types of manual forecasts can be defined:

- single forecast
- batch forecast

A single forecast will only run once. For single forecast only the *T0* of the forecast has to be entered in the date & time field (yyyy-MM-dd HH:mm).

In batch mode, a scheduled manual forecast will run for a period of time and with a time interval both defined by the user. In case a manual forecast is run in batch mode, the following information should be entered by the user:

- Period of time for which a scheduled manual forecast should run is defined by entering the *Start T0* and *End T0* (yyyy-MM-dd HH:mm). The first forecast run will be made with the Start T0.
- Via menu item *Interval* , the time interval at which the T0 of consecutive forecasts should be increased when submitted.

All runs will be submitted at the same time but will be run with different T0's as defined by the user.

Automatically approving forecasts

Ticking the approve box will set the status of the forecast automatically to *current* after it has been completed. In case you want to cancel this action or suspend it, please use the Scheduled Forecast tab in the System Monitor. When using the default *synchprofiles.xml*, non-approved runs will not be automatically downloaded by the synchronising OC and need to be downloaded manually before they can be opened.

Run for selected locations

The check box is enabled when the selected workflow has an option *allowSelection=true* in *WorkflowDescriptors.xml*. The workflow will be then run only for locations selected in the Explorer Filters. It is not allowed to configure a forecast workflow with the *allowSelection* option set to true

State Selection

Leaving *Select initial state* unchecked, the default state- as has been configured by the system manager- will be used to start the historic run preceding a forecast simulation (see also *Running Modules*). For statefull simulation models- like hydrodynamic models- this means that the state selection for a model will follow the state selection rules as configured in the General Adapter Module Instances.

Checking *Select initial state* allows the user to select a particular state to start the historic run. A selection can be made between a cold and a warm state. A *Cold state* is a fixed module state defined in the system configuration. Normally various cold states will be available representing characteristic catchment conditions (e.g. dry, normal and wet). When a cold state should be used at the start of the historic run, the following information is required:

- *Type:*
Via a drop-down list a typical cold state type can be selected.
- *Relative start time:*
The relative start time defines the length of the historic run.

A *Warm state* is a module state that has been generated in a previous forecasting run and stored in the Central Database. In order to find a suitable warm state to start the historic run, a time interval needs to be defined within which the system will look for a warm state. The time interval is defined relative to the T0 of the forecast by the using the following entry fields:

- *Time unit:*
The time unit that will be applied to defined the *Search interval* .
- *Start & end time:*
The start and end time of the search interval are defined by multiplying the above mentioned *Time interval* with the values respectively entered in the first and second field. The system will look for the warm state with the date/time stamp closest to T0, which means that the multiplier for the Start time should always be set at a lower value than for the End time.

Please note that in case a *Warm state* is selected as the initial state, the date/time stamp of the warm state found within the defined *Search interval* will determine the actual start and therefore length of the historic run.

In case no *Warm state* can be found within the defined *Search interval* , the system will automatically run as if *Select initial state* was unchecked. This means that in that case the default state will be used for starting the historic run.

Priority

The user can give a forecast run either a *High* or a *Normal* priority. The Master Controller will give precedence to high priority tasks above normal priority tasks.

Please note that setting the priority to 'high' does not mean that the task will be directly carried out. In case other high priority tasks are waiting for execution, the new task will be added to the queue. When another task with normal priority is already being executed, it will not be cancelled when a new high priority task is submitted, but will be completed first.

Forecast length

A default forecast length is configured when setting up the forecasting system. Please note that within an area different forecasts lengths may have been configured depending on for example the hydrological (sub-) system and/or the forecasting models used.

07 Forecast Manager

06 Manual Forecast Display

Delft-FEWS User Guide

08 System Monitor

- Forecast Manager
 - Filter visible forecasts (available since build 18784)
 - Forecast Overview tab
 - Adding workflows to forecast list box of FEWS Explorer
 - Rerun a forecast
 - Download a forecast from Central Database (only in OC)
 - Redownload a forecast from Central Database (only in OC)
 - Current Forecast tab
 - Forecast Expiry Time tab (available since build 19708)
 - Deleting a forecast from the Central Database (only in OC)
 - Changing the expiry time of a forecast in the Central Database (only in OC)
 - Display configuration




Forecast Manager

The Forecast Management display offers following functionality:

- management of forecasts
- setting current forecast
- change expiry time of forecasts

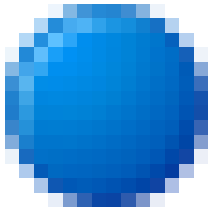
These three basic functions are available via individual tabs in the display.

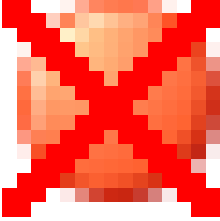
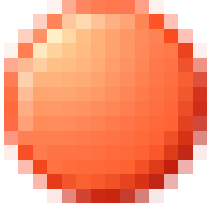
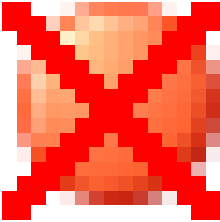
The meaning of the icons in the table is as follows:

- the current forecast is marked with 
- an approved forecast is marked with 
- a partly failed forecast is marked with 




The coloured circle icons indicate which state the system has used for each run:

In fact there are 6 different options (A to F) which can occur. The below mentioned table explains them.

Option	Manual Forecast (Dialog)	Scheduled Forecast Task	Result	Icon	Remarks
A	User selects cold state	-	cold state used		as expected: cold state selected and cold state used

B	User selects warm state	-	cold state used		not as expected: warm state could not be found in selected search period
C	User selects warm state	-	warm state used		as expected: warm state selected and warm state used
D	User selects no specific start state	Forecast runs with configured properties	cold state used	no icon	as expected: cold state configured and cold state used
E	User selects no specific start state	Forecast runs with configured properties	cold state used		not as expected: warm state configured and cold state used
F	User selects no specific start state	Forecast runs with configured properties	warm state used	no icon	as expected: warm state configured and warm state used

The icons with more details:

-  cold state start as selected by user. In this case the cold state id and state start time are shown in the tooltip.
-  warm state start as selected by user. In this case the state search period is shown in the tooltip.
-  cold state start as a warm state in the selected search period could not be found. In this case the module instance id and the state search period are shown in the tooltip.
- no state icon: default state start. No specific state start selected by user.

The tables in the display tabs can be sorted by clicking the headers of the columns.

Filter visible forecasts (available since build 18784)

For each table in the display tabs the list of visible forecasts can be filtered using the buttons next to the table. First select the text to use as a filter. Either click on a table cell to select all text in that cell (the selected cell will be recognisable since it has no gray background, as opposed to the other cells in the selected table row). Or click and drag inside a table cell to select part of the text in that cell (the selected text will be highlighted). Then click the 'Filter By Selection' button to filter the list of visible forecasts on the selected text. After filtering only forecasts that contain the filter text in the corresponding column will be visible. Repeat this process to use multiple filters.

For example, after filtering on the selected text 'Thames' in the 'Workflow' column, only forecasts that have a workflow name that contains 'Thames' will be visible (like e.g. 'Thames_Forecast' and 'Thames_Update').

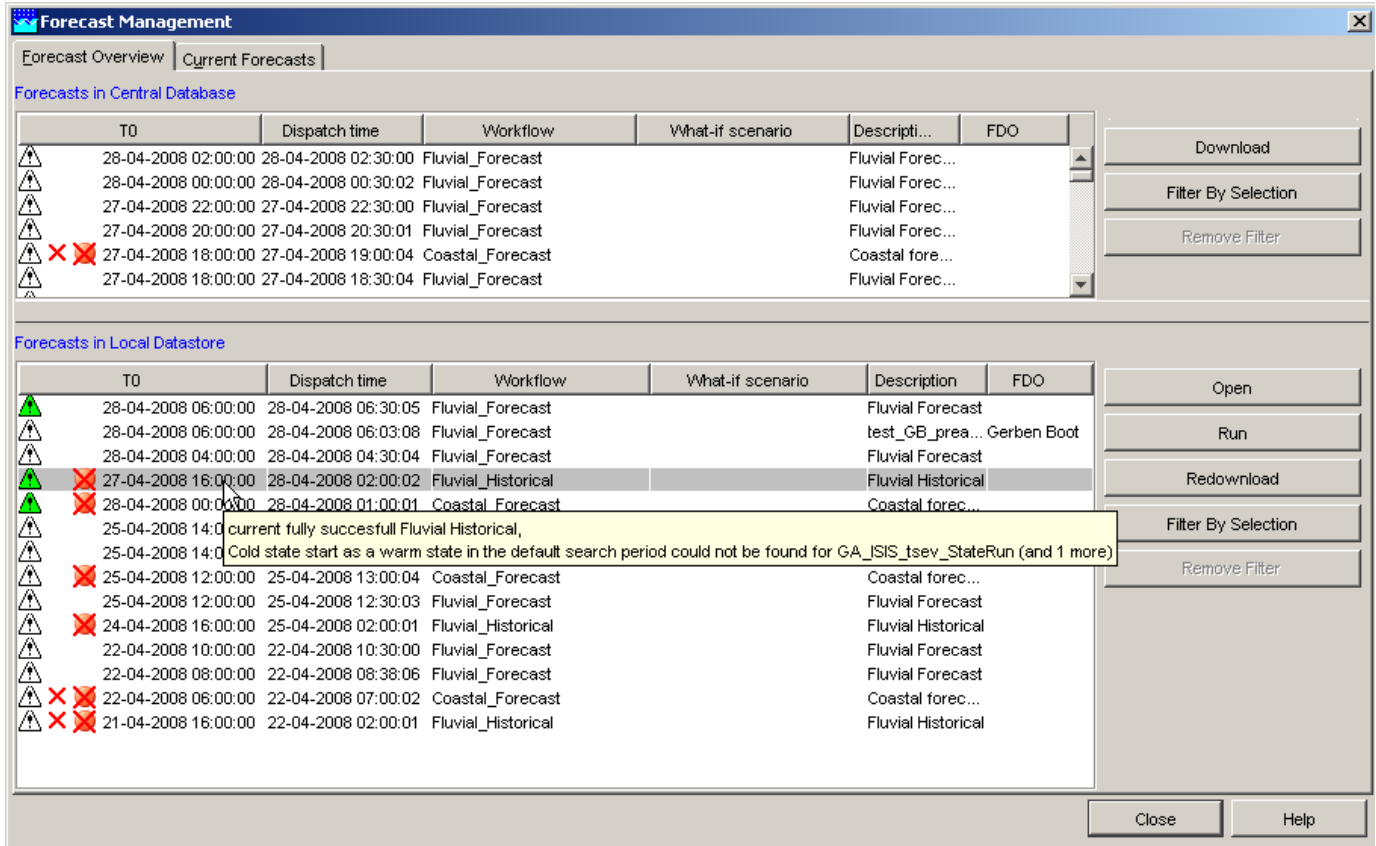
It is also possible to use a displayed icon as a filter. First click on a table cell that contains an icon. Then click the 'Filter By Selection' button to filter the list of visible forecasts on the selected icon. After filtering only forecasts that have the same icon in the corresponding column will be visible. This can be used for instance to filter only approved forecasts.

To remove the filters, click the 'Remove Filter' button. All forecasts in the table will be visible again.

Forecast Overview tab

The Forecast Overview tab allows for:

- Downloading individual forecasts from the Central Database
- Redownloading individual forecasts from the Central Database under another synchronisation profile
- Selecting a forecast and adding it to the forecast filter in FEWS Explorer
- Rerunning a forecast



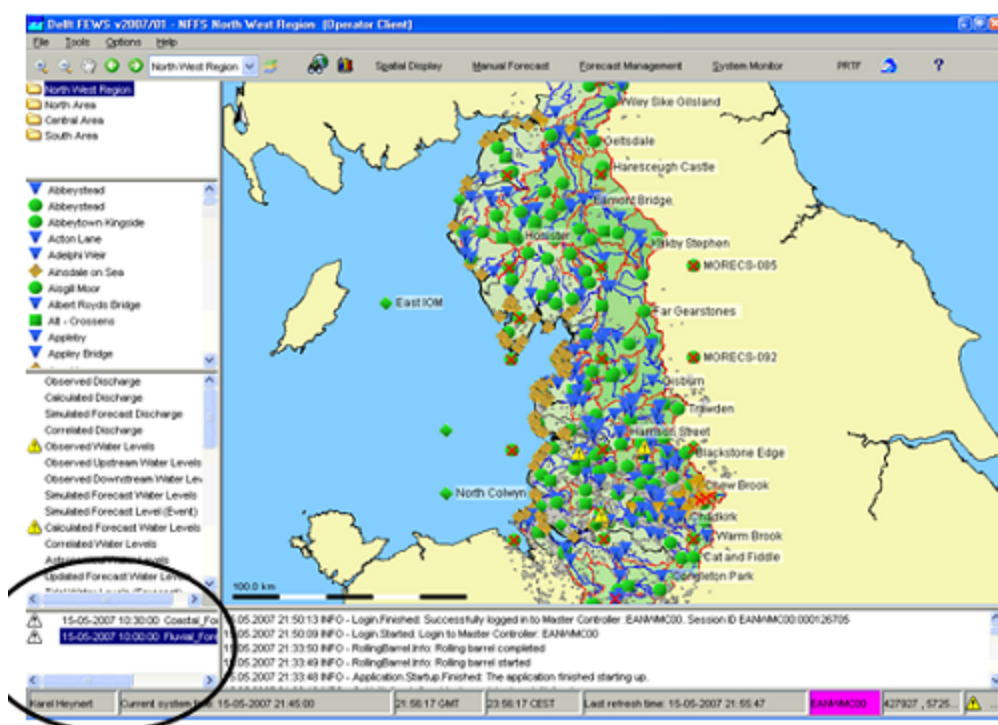
When moving the mouse over the forecast list a tool tip indicates whether the forecast has been fully successful or not.

Adding workflows to forecast list box of FEWS Explorer

When the tab is opened, the forecasts that are available in the Local Data store are displayed in the lower listing. Forecasts can be selected with the mouse and made available in the *Forecast List Box* of FEWS Explorer for review and analysis by pressing **[Open]**.

Please note that only forecasts that are visible in the forecast filter box of the FEWS Explorer can be viewed and edited with the Data Display and Editor. The current forecast is an exception, because it's always shown in the Data Display and -Editor, but not displayed in the forecast filter box.

All forecasts listed in the forecast filter box can be removed from the display (not from the local data store) by clicking the right mouse button with the cursor placed in the list box. A button appears with 'Remove all'. Pressing this button will remove the list of forecasts from the filter box.



Rerun a forecast

A forecast can be rerun by pressing the [Run] button after selecting the forecast from the forecast list. The selected forecast will be completely rerun and saved as a new forecast in the data base. This option can be useful when rerunning an Archived Forecast.

Download a forecast from Central Database (only in OC)

Forecasts that are available in the Central Database, but not in the Local Data store are listed in the top panel. Forecasts can be selected with the mouse and downloaded to an OC by pressing [Download].

Please note that the download may require some time. When downloaded the forecast will be visible in the lower listing.

Redownload a forecast from Central Database (only in OC)

When logged in, the Operator Client (OC) allows for different synchronisation profiles to be used. If an individual forecast has been downloaded in the past under a minimal synchronisation profile, then only part of the data may have been downloaded. To download all data for such a forecast, log in under a full synchronisation profile, select the forecast in the lower listing with the mouse and redownload all data for the forecast to the OC by pressing [Redownload].

Please note that redownloading may require some time. After redownloading the forecast will still be visible in the lower listing.

Current Forecast tab

A few definitions are required at the start of this section:

- **Current Forecast**
The Current Forecast is a combination of forecasts made for the whole region, which together form the current forecast. The current forecast is automatically downloaded to OCs. Location related icons are refreshed on the basis of the current forecast. The current forecast is always displayed in the Data Editor and -Display.
- **Approved Forecast**
Approved Forecasts have been approved by the system or manually by an FDO to become the Current Forecast. The latest Approved Forecast is the Current Forecast.
- **Other Forecasts**
Besides Approved Forecasts, the system may be populated with other forecasts that are the result of manual or scheduled forecasts with or without application of what-if scenarios.

Under normal conditions the Current Forecast will be updated automatically by the system on the basis of the results of a successfully completed scheduled forecasting run. There is always a Current Forecast that covers the whole region: all fluvial and coastal forecasting locations. The forecasts that together form the Current Forecast are listed in the upper table of the tab. These forecast are marked with the icon



A forecaster can amend the Current Forecast by replacing it partly or fully with the results individual forecast runs. These 'other' forecasts can for example be the result of running what-if scenarios. The Current Forecast tab allows for selection of individual forecasts that should become part of the Current Forecast.

To change the Current Forecast, select a forecast run that should become part of the Current Forecast in the *lower* column of the tab. Upon pressing [Approve] the selected forecast will become part of the Current Forecast.

In the list of forecasts that together form the Current Forecast, 'overlapping' forecasts may be displayed. A forecaster may for example run a what-if scenario for *part* of a catchment for which already an automatic forecast has been made that is part of the Current Forecast. When the forecast with the what-if scenario should now become part of the Current Forecast it can be selected in the *lower* table of the Current Forecast tab and with [Approve] moved to the *upper* table. The *upper* table now displays both forecast runs: the original forecast whole catchment and the forecast with the what-if scenario for part of the catchment. The system will override the data of the original workflow for the part of the catchment that has been rerun when presenting the Current Forecast.

Forecast Expiry Time tab (available since build 19708)

The Forecast Expiry Time tab allows for:

- Deleting individual forecasts from the Central Database
- Changing the expiry time of individual forecasts in the Central Database

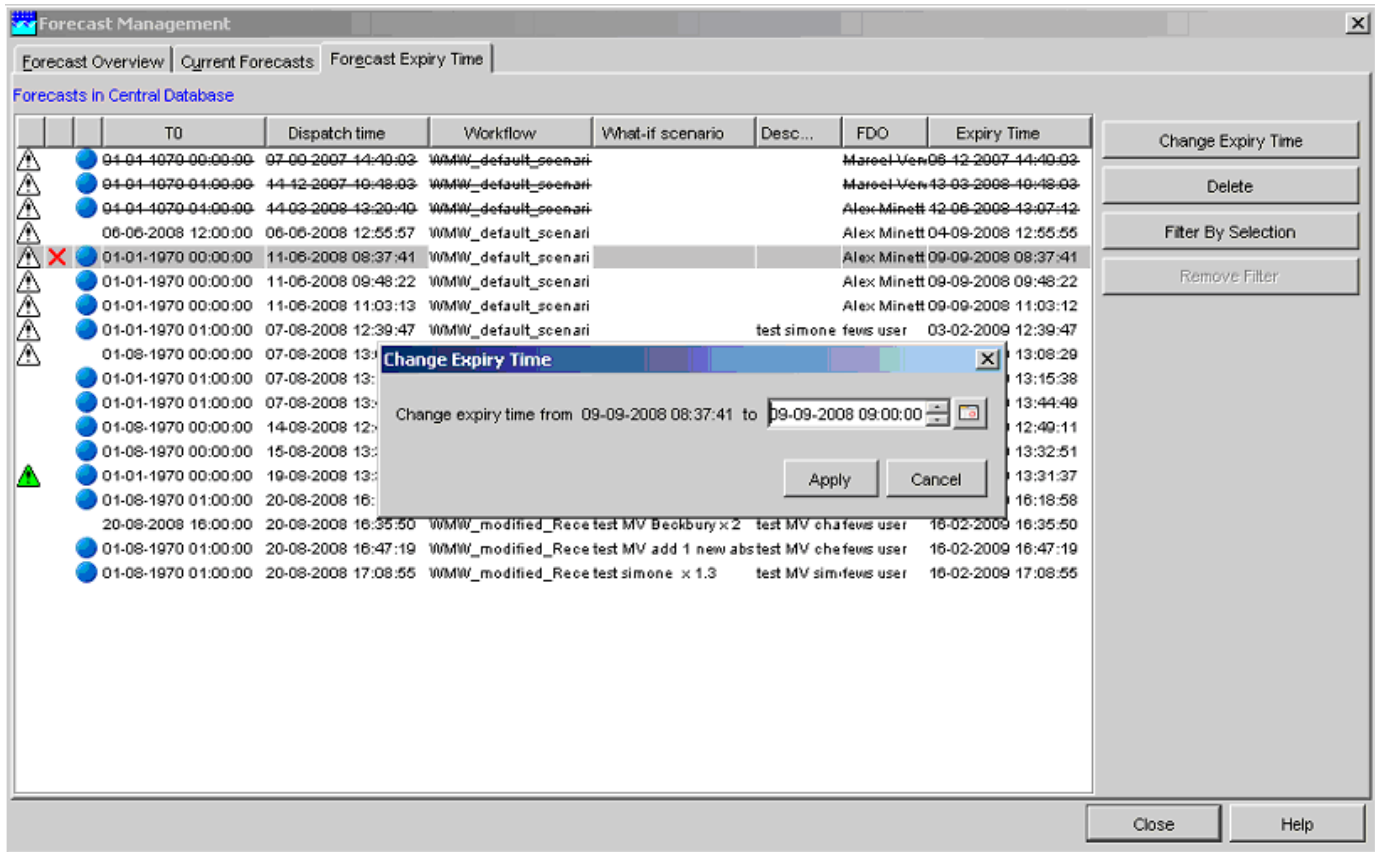
Deleting a forecast from the Central Database (only in OC)

When logged in, forecasts that are available in the Central Database are listed in the table. Please note that only forecasts for which the user has delete permission are visible in the table. Forecasts can be selected with the mouse and marked for deletion by pressing [Delete]. Forecasts marked for deletion will be deleted in the next rolling barrel run. Only forecasts for which the user has delete permission can be deleted.

Changing the expiry time of a forecast in the Central Database (only in OC)

When logged in, forecasts that are available in the Central Database are listed in the table. Please note that only forecasts for which the user has delete permission are visible in the table. The expiry time of each forecast is visible in the Expiry Time column. When the expiry time of a forecast has passed, the forecast will be deleted from the Central Database. Forecasts that will expire within 10 days are displayed in strikethrough text in the table.

To change the expiry time of individual forecasts, select the forecasts in the table with the mouse and press [**Change Expiry Time**]. In the dialog that appears, select a new expiry time and press [**Apply**] to change the expiry time of the selected forecasts. The expiry time can only be changed for forecasts for which the user has delete permission.



Display configuration

It is possible to add display configuration for forecast management, for more information [click here](#).

08 System Monitor

07 Forecast Manager

Delft-FEWS User Guide

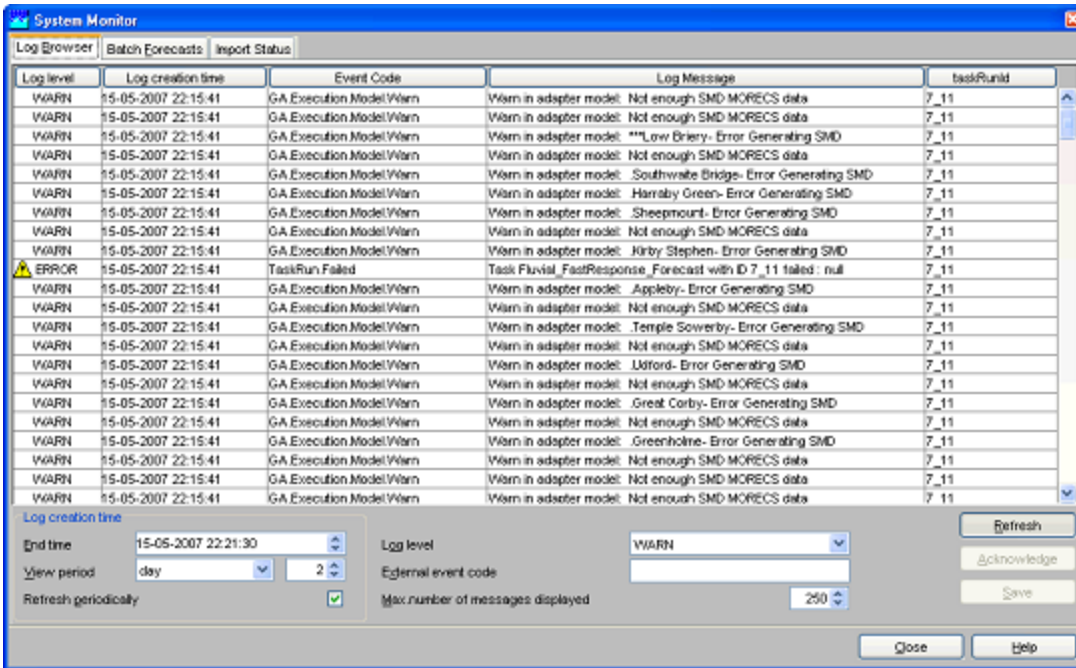
09 What-if Scenario Display

- System Monitor
 - Log Browser
 - Query definition
 - Acknowledging messages
 - Debug messages
 - Live System Status
 - Scheduled Forecasts
 - Running Forecasts
 - Batch Forecasts
 - Synchronisation Status
 - Synchronisation Monitor
 - Import Status

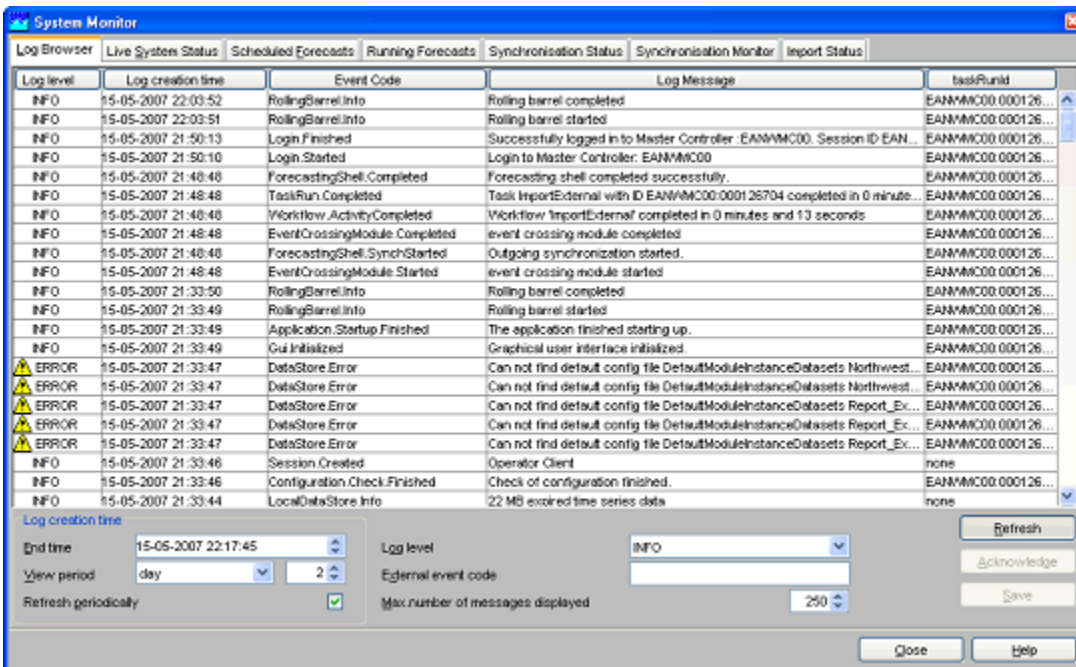
System Monitor

The System Monitor display allows for viewing the status of the system. The behaviour of the System Monitor is different depending on the use of the system, i.e. whether you are using the system in Stand Alone mode or as an Operator Client.

In the *Standalone* mode the System Monitor will display the Log Browser and Batch Forecast tab. An overview of the tabs available in the System Monitor of a Standalone system is illustrated below.



In an *Operator Client* the System Monitor will show a number of tabs for monitoring various aspects of the live system. An overview of the tabs available in an Operator Client when logged into a live system is illustrated below.

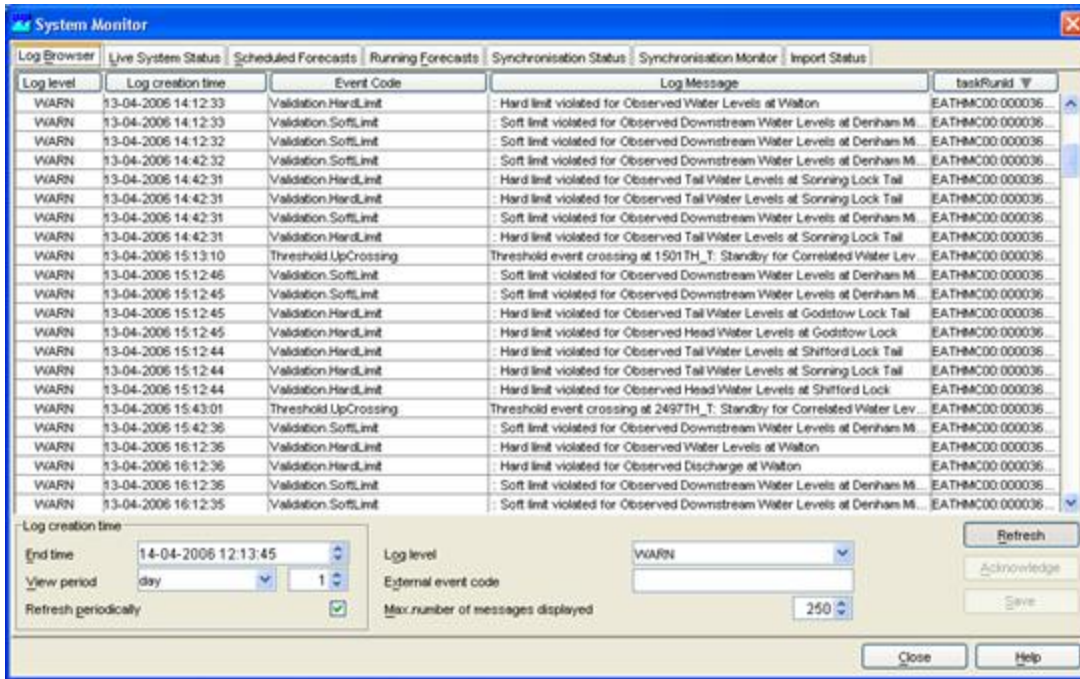


Each of the System Monitor tabs is detailed in the following paragraphs.

Log Browser

The Log Browser contains a spreadsheet like form with a list of system messages. Messages can be sorted based on user defined criteria. Fatal and severe system errors can be acknowledged as being reviewed by the forecaster. If all errors within the past 48 hours are acknowledged the system status icon at the lower right of the FEWS explorer will become green again.

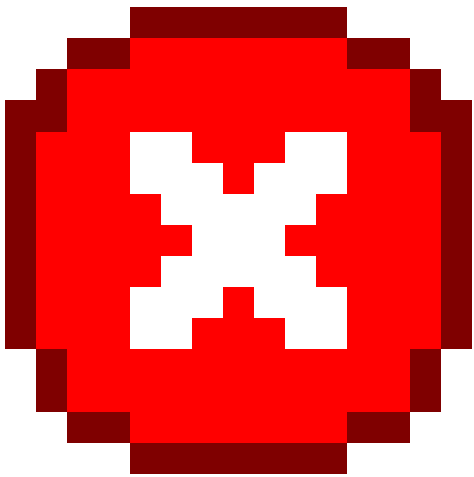
With [Refresh] the browser is updated with new messages in the system. Please note that the query settings (see below) define what messages will be displayed. With [Close], a user can leave the Log Browser.

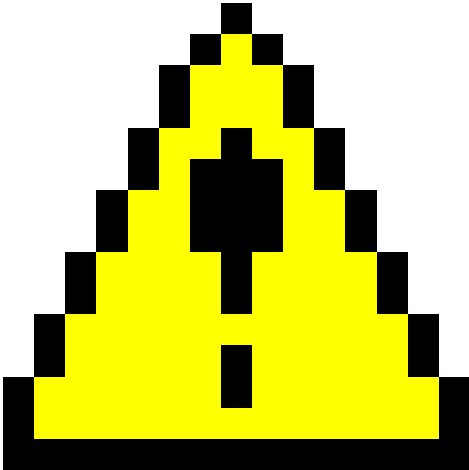
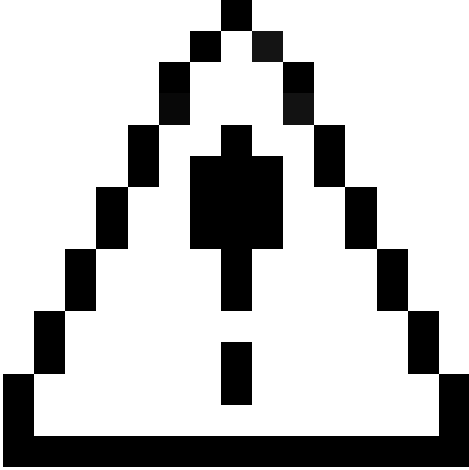


Upon opening, the same information is displayed as in the Log Viewer. Per message, the Log Browser provides the following information:

- Log level (see table above)
- Log creation time
- Event code (see Appendix A for listing)
- Log message (description)
- taskRunId

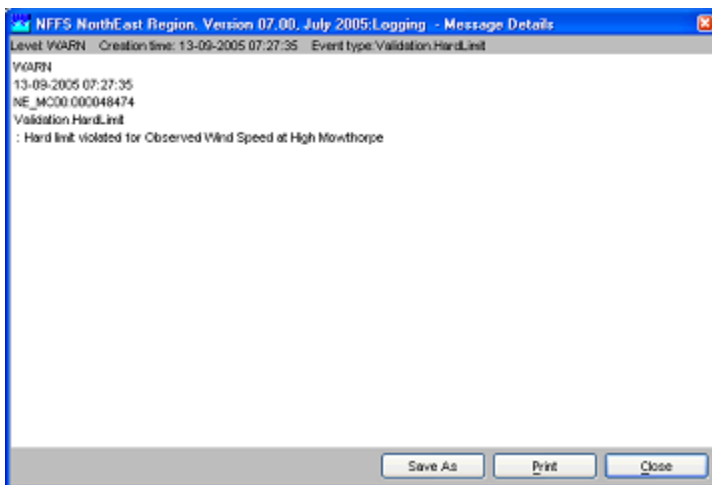
The following type of system messages are identified in the table below.

Log level	Icon	Description
Fatal		Severe errors that cause premature termination

Error		Other runtime errors or unexpected conditions
Warn		Events that are undesirable or unexpected, but not necessarily wrong
Info	no	Runtime events (startup/shutdown) that allow tracking of the progress of the system

The Log Messages can be sorted by clicking on the header of a column.

Double click a message to view the message details (see example below). The message can then be saved to file or printed.



Query definition

A query can be defined to select a subset of the messages to be displayed in the Log Browser. The following options are available:

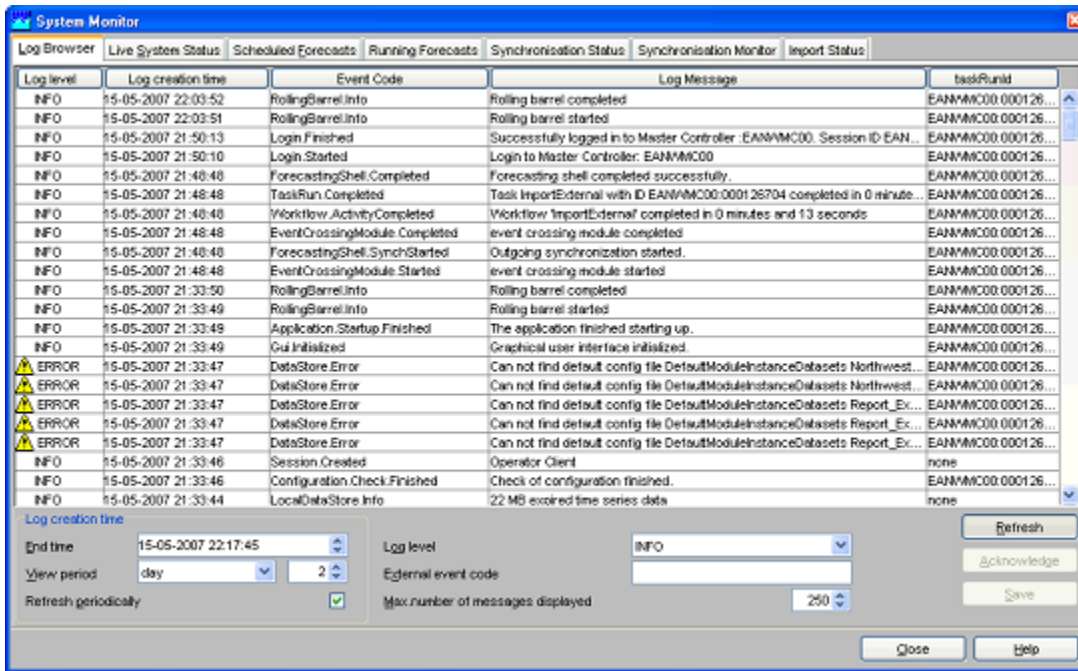
- *Loglevel*
A log level from the dropdown list and all messages with a higher alert level will be displayed This means that for example selection of

INFO shows all messages and selection of FATAL shows only messages with log level FATAL.

- **Log creation time**
Messages can be displayed that have been created within a given period of time. The period is defined by entering an *end time* and the length of a *view period* in hours preceding the *end time*.
- **Event code**
By entering symbols in this field, only messages will be displayed starting with the symbols entered by the user.
- **Token in Message**
By entering symbols in this field, only messages will be displayed that include the symbols entered by the user.

The display will be updated on the basis of the user defined query upon pressing [Refresh].

Acknowledging messages



All messages having a level ERROR or FATAL should be acknowledged to identify that the message has been seen and appropriate action taken.

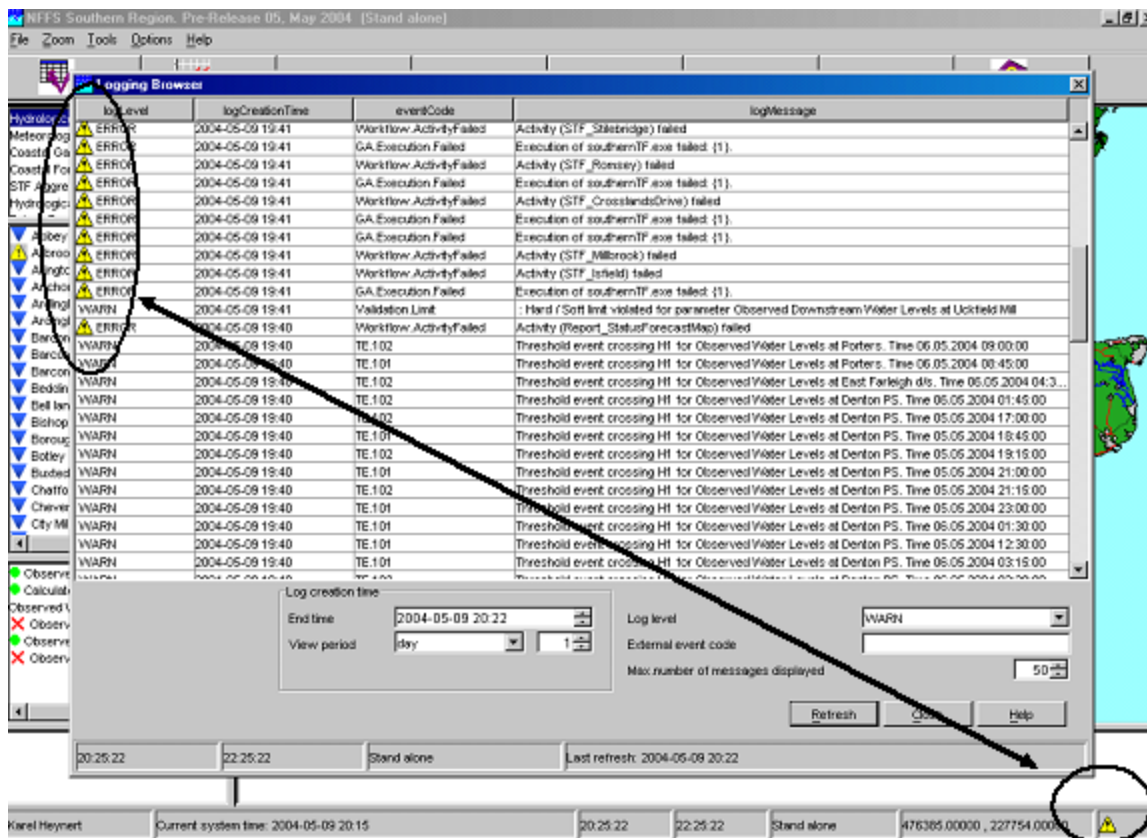
A message having a level WARN can be acknowledged as well but is only needed to remove the opaque warning icon in the status bar if in the explorer.xml `<showIconForUnacknowledgedWarnings>true</showIconForUnacknowledgedWarnings>` is configured which is false by default. See `showIconForUnacknowledgedWarnings`.

Double click the icon to acknowledge a message or click the Acknowledge button. Multiple messages may also be selected and acknowledged in a single action.

To select all messages that have not been acknowledged select the 'not acknowledged' item in the Log Level selection box,, then refresh the log messages.

Tip: to quickly select all messages, click on a single message and hit [ctrl-A]

When all ERROR messages are acknowledged, the status icon in explorer will change to green (or opaque when `showIconForUnacknowledgedWarnings` is true).



Debug messages

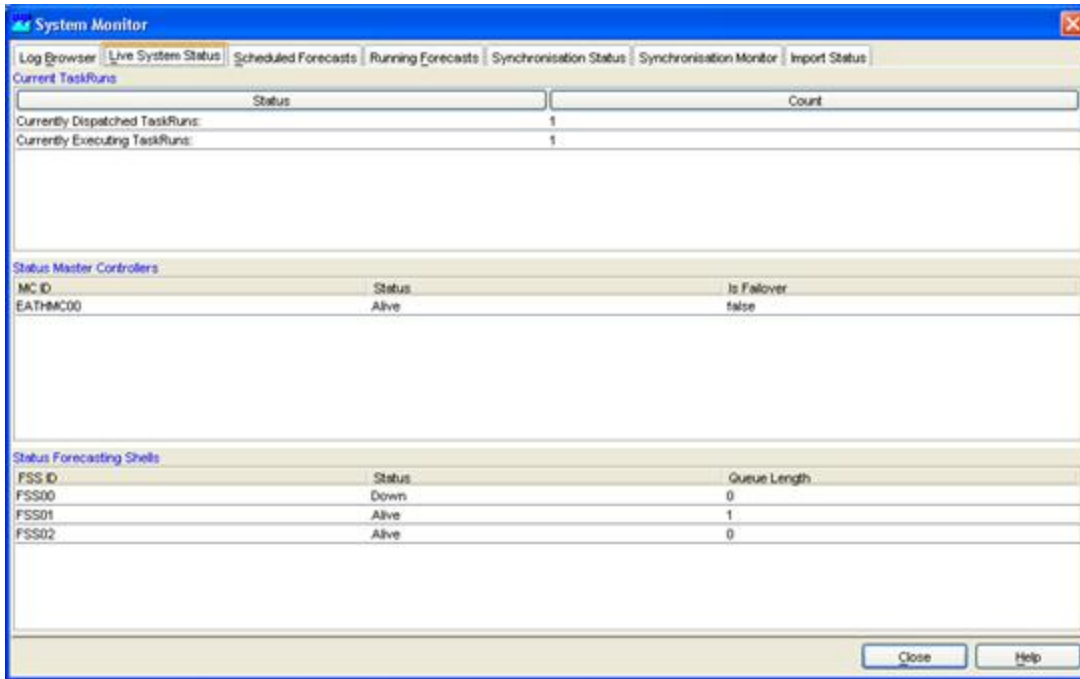
Please note that a System Manager can configure the system to also provide *Debug Messages*. These are used to log application internal events for system development and management. Typical debug events are the creation of a database connection or exceptions that occurred due to programming or configuration errors. Debug messages are not displayed in the Log Viewer but only written to a log file called *log.txt* in the regional configuration folder.

Live System Status

The Live System Status tab is used to show the status of the live system. Three lists show the status of the:

- Currently dispatched forecasts (taskruns)
- Currently executing forecasts (taskruns)
- Status of the Master Controllers
- Status of the Forecasting Shells

The status lists show the currently configured master controllers and forecasting shells. From this list a user can see if the systems are Alive or if they are down.



Scheduled Forecasts

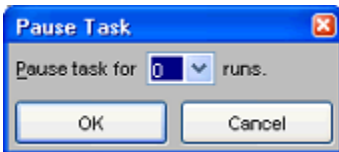
The Scheduled Forecasts tab includes a list with all scheduled forecasts together with some information of these forecasts. The following information is included:

- Task ID: The Task ID is a unique ID generated by the Master Controller
- Description: The description is given by the user that scheduled the forecast
- Workflow ID: The Workflow ID is the id of the workflow that is scheduled. The workflow id's can include Forecasting Shell workflows and Master controller workflows.
- MC ID: ID of the Master Controller where the task is scheduled on
- Priority: This can be a high or normal priority
- Repeat Time: The repeat time of the task in minutes
- Next Due Time: The next time when the task is scheduled to run
- Task Status: The status can be suspended or pending. Suspended tasks normally depend on an action to trigger them, such an action can be a threshold crossing.

Task ID	Description	Workflow ID	MC ID	Priority	Repeat Time	Next Due Time	Task Status
EANVMC00:000...	Daily Archive Run	Archive_Schedul...	EANVMC00	Normal	1440 minutes	14.07.2006 00:15...	Pending
EANVMC00:000...	Scheduled CURR...	Coastal_Forecast	EANVMC00	Normal	360 minutes	13.07.2006 16:30...	Pending
EANVMC00:000...	Daily database m...	Database_Mainte...	EANVMC00	Normal	1440 minutes	13.07.2006 15:45...	Pending
EANVMC00:000...	Export current fo...	Export_Current	EANVMC00	Normal	1 minutes	19.03.2006 08:40...	Suspended
EANVMC00:000...	Enhance Foreca...	Fluvial_FastResp...	EANVMC00	Normal	30 minutes	04.02.2006 12:45...	Suspended
EANVMC00:000...	Enhance Foreca...	Fluvial_FastResp...	EANVMC00	Normal	30 minutes	02.06.2006 16:00...	Suspended
EANVMC00:000...	Schedule CURRE...	Fluvial_Forecast	EANVMC00	Normal	120 minutes	13.07.2006 14:20...	Pending
EANVMC00:000...	Daily State Run	Fluvial_Historical	EANVMC00	Normal	1440 minutes	14.07.2006 08:00...	Pending
EANVMC00:000...	Scheduled Import...	ImportExternal	EANVMC00	Normal	30 minutes	13.07.2006 12:48...	Pending
EANVMC00:000...	Marked Record M...	MarkedRecordMa...	EANVMC00	Normal	60 minutes	03.10.2005 10:59...	Suspended
EANVMC00:000...	Marked Record M...	MarkedRecordMa...	EANVMC00	Normal	60 minutes	03.10.2005 09:38...	Suspended
EANVMC00:000...	Marked Record M...	MC:MarkedRecor...	EANVMC00	Normal	40 minutes	29.09.2005 12:36...	Suspended
EANVMC00:000...	Rolling Barrel MC	MC:RollingBarrel	EANVMC00	Normal	40 minutes	13.07.2006 13:15...	Pending
EANVMC00:000...	Scheduled Perfor	PerformanceMoni...	EANVMC00	Normal	1440 minutes	14.07.2006 12:00...	Pending
EANVMC00:000...	Rolling barrel on ...	RollingBarrel_FS...	EANVMC00	Normal	1440 minutes	13.07.2006 16:45...	Pending
EANVMC00:000...	Rolling barrel on ...	RollingBarrel_FS...	EANVMC00	Normal	1440 minutes	14.07.2006 04:10...	Pending

In the Scheduled Forecast tab a user can...

- Cancel a scheduled task by clicking [Cancel]
- Suspend a scheduled task by clicking [Suspend]
- Resume a suspended task by clicking [Resume]
- Pause a scheduled task for up to 5 of runs by clicking [Pause] and filling in the display that pops up (see below). You can undo the pausing by resetting the number of runs for which a task has been paused to '0'.

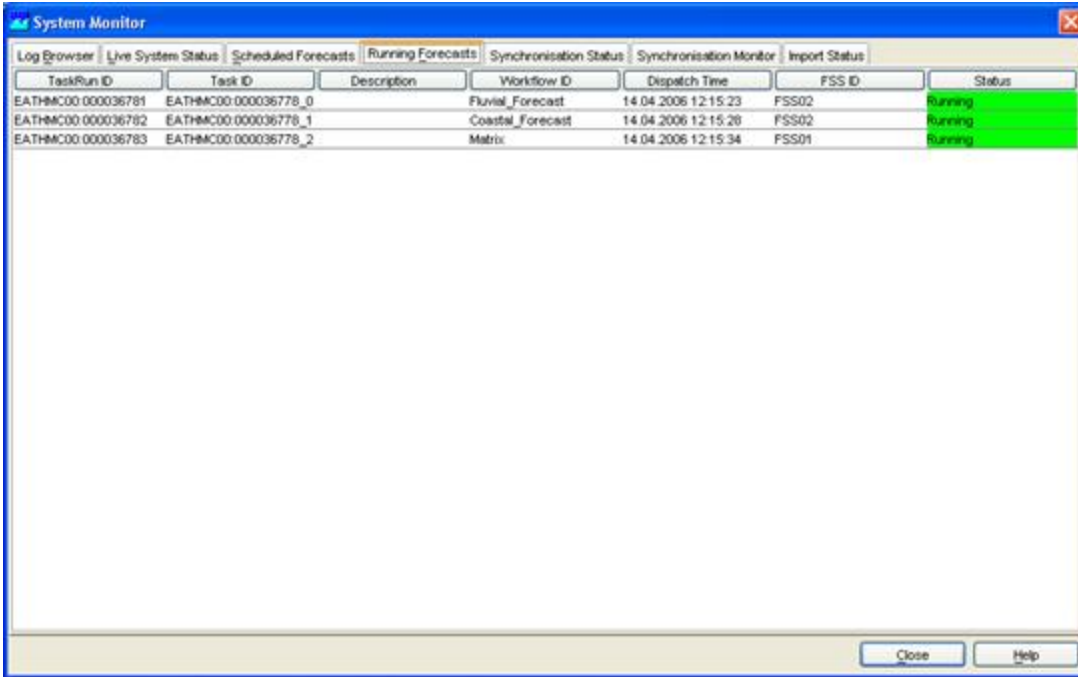


Please note that not all options are available for all workflows. A user can for example normally not cancel the current forecast and import runs runs scheduled by the super user. Also the status of system management workflows can normally not be changed by a user.

Running Forecasts

The Running Forecasts Tab includes a list with all tasks that are currently running on a Forecasting Shell. The list includes information on the task that is running and the Forecasting Shell it is running on.

From the example below can be seen that the first task is a Rolling Barrel task, running on the Master Controller. The second task is a Riverflow Forecast running on forecasting Shell FSS00.

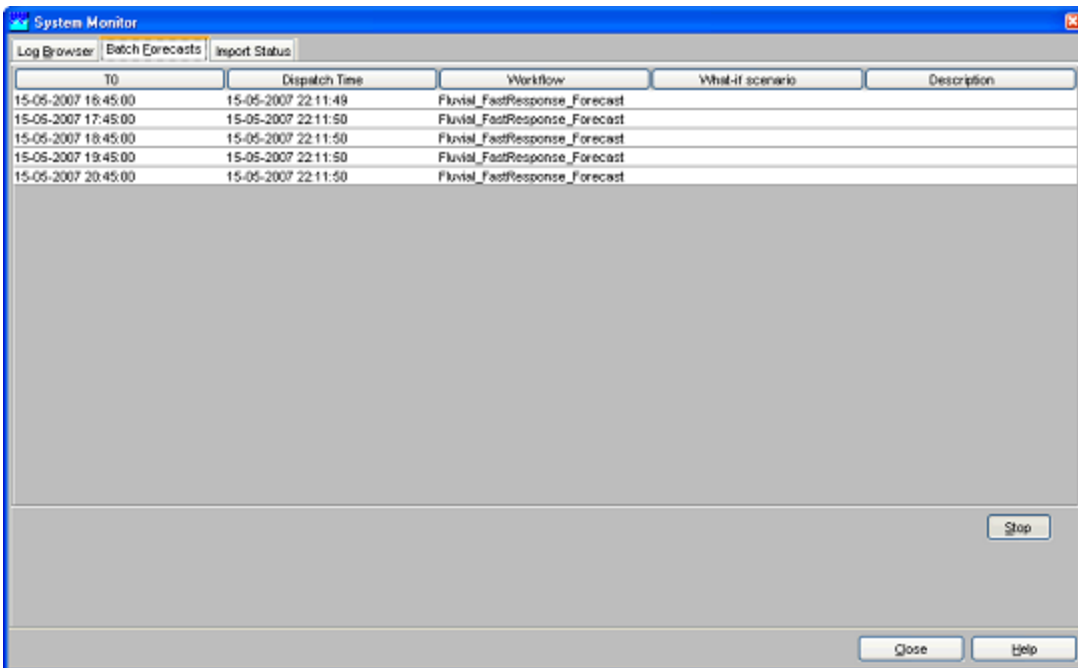


This display is refreshed after each synchronisation of the Operator Client with the Master Controller.

A manually dispatched task can be killed by pressing on the 'Kill Running Task' button. Note that this is a hard process kill which may lead to corruption of the local datastore.

Batch Forecasts

The Batch Forecast tab will list the forecasts that have been submitted in the Manual Forecast display of a standalone system. You stop all submitted forecast runs by clicking [Stop].



Synchronisation Status

The Synchronisation Status tab provides the status of all synchronisation activities. For each synchronisation activity the following information is provided:

- Activity: identifies the synchronisation activity
- Type: single or continuous. A single type activity is only started after certain manual actions
- Frequency: only applicable for continuous synchronisation activities. The frequency is given in minutes.
- Last Synch Time: the date and time the synchronisation activity has last taken place.
- Status: is either empty or shows 'synchronising', meaning that this activity is now synchronising.
- Progress: shows the number of records of the maximum number of records to synchronise. This field is only used for the activity being synchronised.

Activity ID	Type	Frequency	LastSynchTime	Status	Progress
Activity Out.CurrentForecast	single	0	14.04.2006 11:55:13		
Activity In.Tasks	continuous	60	14.04.2006 12:15:38		
Activity In.FloodMaps	single	0	14.04.2006 11:55:06		
Activity Out.TimeSeries	single	0	14.04.2006 11:55:13		
Activity Out.WhatifScenarios	single	0			
Activity In.ThreshokEvents	continuous	180	14.04.2006 12:15:41		
Activity In.ManualData	continuous	180	14.04.2006 12:15:42		
Activity In.Forecasts	single	0	14.04.2006 12:15:40		
Activity In.LogEntries	continuous	60	14.04.2006 12:15:43		
Activity In.ImportGrids	continuous	180	14.04.2006 12:15:42		
Activity In.ForecastData	single	0	14.04.2006 11:54:51		
Activity In.ImportStatus	continuous	180	14.04.2006 12:15:42		
Activity In.Configuration	continuous	3600	14.04.2006 11:55:27		
Activity Out.Tasks	single	0	14.04.2006 12:15:33		
Activity In.CatAvg	continuous	180	14.04.2006 12:15:44		
Activity In.FewerSessions	single	0	14.04.2006 11:54:37		
Activity In.LiveSystemStatus	continuous	30	14.04.2006 12:16:08	Synchronizing	
Activity In.ImportData	continuous	180	14.04.2006 12:15:41		
Activity In.AstronomicalData	continuous	86400	14.04.2006 11:55:32		

Synchronisation Monitor

In the Synchronisation Monitor tab the log messages are shown that are generated by the synchronisation module. These messages will inform the user of synchronisation problems.

```

14.04.2006 12:16:16 INFO - Synchronisation of activity Activity.In.LiveSystemStatus finished.
14.04.2006 12:16:15 DEBUG - Storing last synch time for activity Activity.In.LiveSystemStatus
14.04.2006 12:16:15 DEBUG - Incoming synchronisation event completed at Fri Apr 14 12:16:15 GMT 2006
14.04.2006 12:16:15 DEBUG - Completed synchronisation of table: LiveStatus
14.04.2006 12:16:15 DEBUG - Inserted 4 of 4 records.
14.04.2006 12:16:15 DEBUG - Started synchronisation of table: LiveStatus
14.04.2006 12:16:15 DEBUG - Incoming synchronisation event started. Synch time is: Fri Apr 14 12:16:08 GMT 2006. Synchronisin
14.04.2006 12:16:15 INFO - Synchronisation of activity Activity.In.LiveSystemStatus for taskRunId null and last synch date 14
14.04.2006 12:16:03 INFO - Synchronisation of activity Activity.In.CatAvg finished.
14.04.2006 12:16:02 DEBUG - Storing last synch time for activity Activity.In.CatAvg
14.04.2006 12:16:02 DEBUG - Incoming synchronisation event completed at Fri Apr 14 12:16:02 GMT 2006
14.04.2006 12:16:02 DEBUG - Completed synchronisation of table: TimeSeries
14.04.2006 12:16:02 DEBUG - Inserted 124 of 124 records.
14.04.2006 12:15:51 DEBUG - Started synchronisation of table: TimeSeries
14.04.2006 12:15:51 DEBUG - Incoming synchronisation event started. Synch time is: Fri Apr 14 12:15:43 GMT 2006. Synchronisin
14.04.2006 12:15:51 INFO - Synchronisation of activity Activity.In.CatAvg for taskRunId null and last synch date 14.04.2006 1
14.04.2006 12:15:51 INFO - Synchronisation of activity Activity.In.LogEntries finished.
14.04.2006 12:15:51 DEBUG - Storing last synch time for activity Activity.In.LogEntries
14.04.2006 12:15:51 DEBUG - Incoming synchronisation event completed at Fri Apr 14 12:15:51 GMT 2006
14.04.2006 12:15:51 DEBUG - Completed synchronisation of table: LogEntries
14.04.2006 12:15:51 DEBUG - Started synchronisation of table: LogEntries
14.04.2006 12:15:51 DEBUG - Incoming synchronisation event started. Synch time is: Fri Apr 14 12:15:43 GMT 2006. Synchronisin
14.04.2006 12:15:51 INFO - Synchronisation of activity Activity.In.LogEntries for taskRunId null and last synch date 14.04.20
14.04.2006 12:15:51 INFO - Synchronisation of activity Activity.In.LiveSystemStatus finished.
14.04.2006 12:15:51 DEBUG - Storing last synch time for activity Activity.In.LiveSystemStatus
14.04.2006 12:15:51 DEBUG - Incoming synchronisation event completed at Fri Apr 14 12:15:51 GMT 2006
14.04.2006 12:15:51 DEBUG - Completed synchronisation of table: LiveStatus

```

Import Status

The Import Status tab provides information on the files that were last imported. For each import task the file name of the last imported file is shown including the date and time of the import. Also the number of files that were imported in that task are shown, with the number of failed imports.

Data Feed	Directory	Last Import Time	Last Import File	Files Imported	Files Failed
MOSurgeCS3	\\fewsfilesrv01\Thames\fsstto\Windows\Import\MOSurgeCS3	14.04.2006 09:12:36	M0EAEUSURGE20060...	1	0
MOWindActual	\\fewsfilesrv01\Thames\fsstto\Windows\Import\MOWindActuals	14.04.2006 09:12:31	M0EAWNDASSIM200...	1	0
MOWindForecast	\\fewsfilesrv01\Thames\fsstto\Windows\Import\MOWindForecasts	14.04.2006 09:12:35	M0EAWND20060414...	1	0
Moy&B1	\\fewsfilesrv01\Thames\fsstto\Windows\Import\Moy&B1	14.04.2006 09:12:30	SURGERES2.DAT	1	0
MNPFForecast	\\fewsfilesrv01\Thames\fsstto\Windows\Import\CatAvg&MNP_Rain	14.04.2006 10:42:36	EAHYTHFS20060414...	1	0
RTS	\\fewsfilesrv01\Thames\fsstto\Windows\Import\RTS	14.04.2006 12:13:06	THSTHFS20060414...	12	0
RadarActual	\\fewsfilesrv01\Thames\fsstto\Windows\Import\CatAvgActuals	14.04.2006 12:13:06	EAHYTHFS20060414...	2	0
RadarForecast	\\fewsfilesrv01\Thames\fsstto\Windows\Import\CatAvgForecasts	14.04.2006 12:13:07	EAHYTHFS20060414...	1	0
Surge	\\fewsfilesrv01\Thames\fsstto\Windows\Import\Surge	14.04.2006 03:13:13	WCSURG2006041402...	3	0
TideMonitoring	\\fewsfilesrv01\Thames\fsstto\Windows\Import\TideMonitoring	14.04.2006 12:13:08	COMBINEDBODD1404...	2	0
WindWave	\\fewsfilesrv01\Thames\fsstto\Windows\Import\WindWave	14.04.2006 04:13:46	SOVND20060414032...	2	0

Last import time is updated only if at least one file has been successfully imported. The cell in the column 'Files Failed' gets red color if there is one or more files failed.

An example (see two pictures below) :

First picture shows fully successful imports at 08:03:28. Second picture shows partly successful import (Level measured) and failed import (Discharge measured). The files has been imported at 08:11:24. Last import time of the partly successful import has been updated. Last import time of the failed import is not updated, since no file has been successful imported .

Data Feed	Directory	Last Import Time	Last Import File	Files Imported	Files Failed
Discharge measured	D:\Fews\ConfigExample\Import\external\discharge	09-06-2016 08:03:28	Q_m.xml	1	0
Level measured	D:\Fews\ConfigExample\Import\external\level	09-06-2016 08:03:28	H_m.xml	1	0

Data Feed	Directory	Last Import Time	Last Import File	Files Imported	Files Failed
Discharge measured	D:\Fews\ConfigExample\Import\external\discharge	09-06-2016 08:03:28	Q_m_02.xml	0	2
Level measured	D:\Fews\ConfigExample\Import\external\level	09-06-2016 08:11:24	H_m_02.xml	1	1

Last import time stays red if the time series has been never imported for that data feed. The picture below illustrates this. There is no time series imported from Q_m.xml, because the wanted time series were not available in the file. There is also no time series imported for Level measured, since the import folder was empty.

Data Feed	Directory	Last Import Time	Last Import File	Files Imported	Files Failed
Discharge measured	D:\Fews\ConfigExample\Import\external\discharge	08-03-2017 12:22	Q_m.xml	0	0
Level measured	D:\Fews\ConfigExample\Import\external\level	08-03-2017 12:22	none	0	0

09 What-if Scenario Display

08 System Monitor

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10 Archiving Display

- What-if Scenario Display
 - Transformation
 - User Defined Profile
 - Module Data Sets and Module Parameters
 - Buttons
 - Edit Visibility button
 - Import All
 - Export All

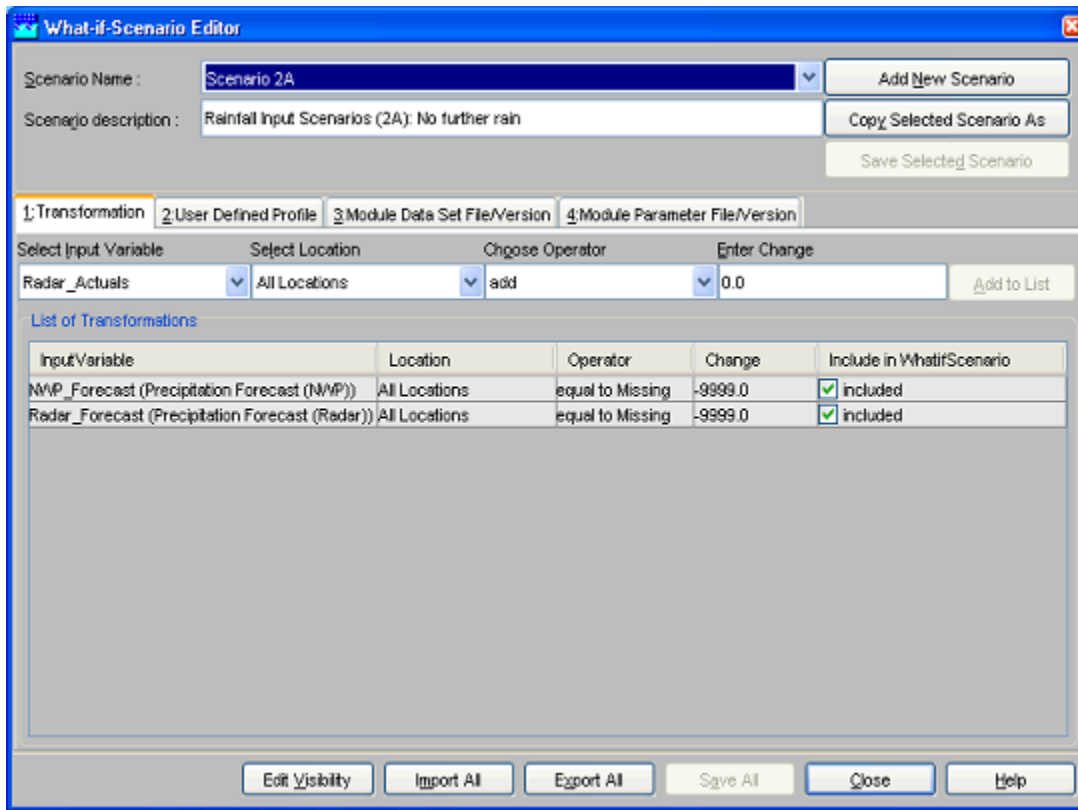
What-if Scenario Display

The What-if Scenario display allows for the definition of What-if Scenarios. The What-if Scenarios can be used, when running forecasts via the Manual Forecast display. The latter allows for selection of What-if Scenarios defined in the What-if Scenario display.

In order to define a What-if Scenario, the button [Add New Scenario] should be pressed. Next a name or ID for the new what-if scenario must be entered in the "Scenario Name" field; it is advised to use a short name. When running a What-if Scenario, the name of this scenario will be added to the forecast name. The scenario can also have a description, this can be used to enter more information on the newly added scenario.

Four types of What-if Scenarios can be defined:

- a transformation of an input time series
- the use of a user defined typical profile
- the use of a complete alternative module dataset
- the use of an alternative subset of module parameters



Transformation

In the field *Select Input Variable* , an input time series can be selected from a drop-down list for transformation.

In the next step, the user has to choose whether to apply the transformation to a single location or all locations for which the selected transformation variable is available.

Finally, the transformation itself is defined by selecting a mathematical operator and a value in the *Choose Operator* and *Enter Change* fields. The following operators can be entered: add, subtract, divide, multiply. Also a constant value can be entered and a time shift.

By pressing [Add to list], the transformation is added to the What-if Scenario and appears in the table at the bottom of the tab. A number of transformations can be defined within a single What-if Scenario by repeating the sequence described above.

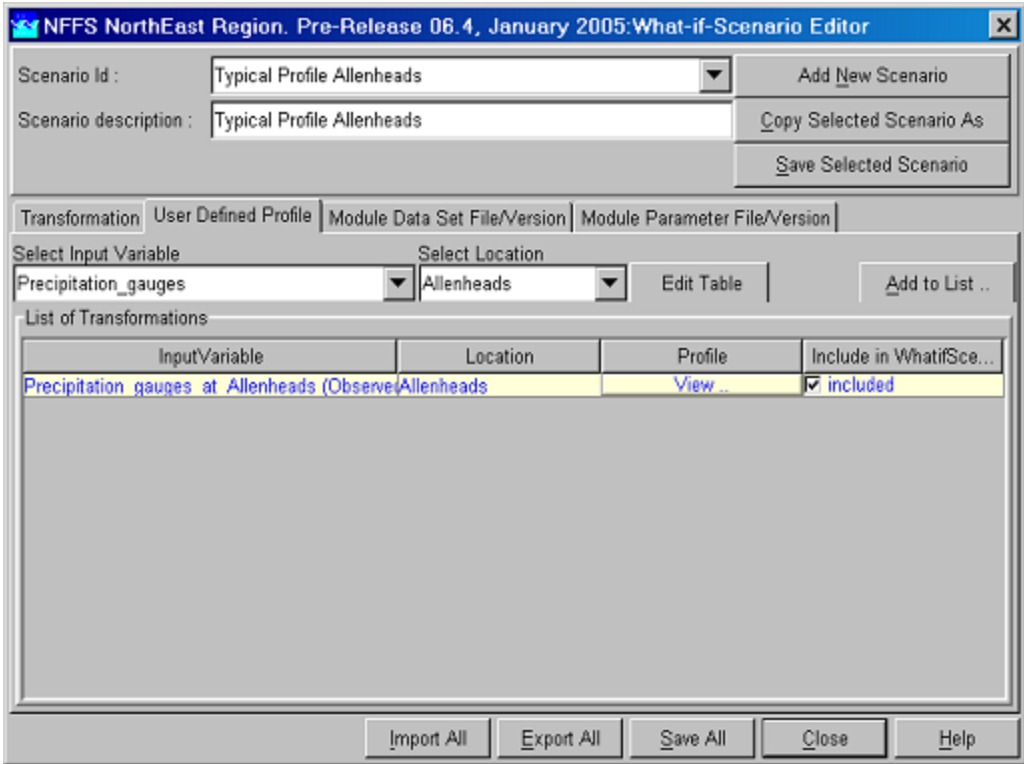
With [Save All], What-if Scenarios are stored in the database. In the Live System, What-if Scenarios are stored in the Central Database and may be used by others. After saving therefore, a What-if Scenario can not be edited or deleted by a regular user.

The buttons [Import All] and [Export All] allow saving and retrieving of sets of what-if scenarios when the local data store is renewed. The display can be left with [Close].

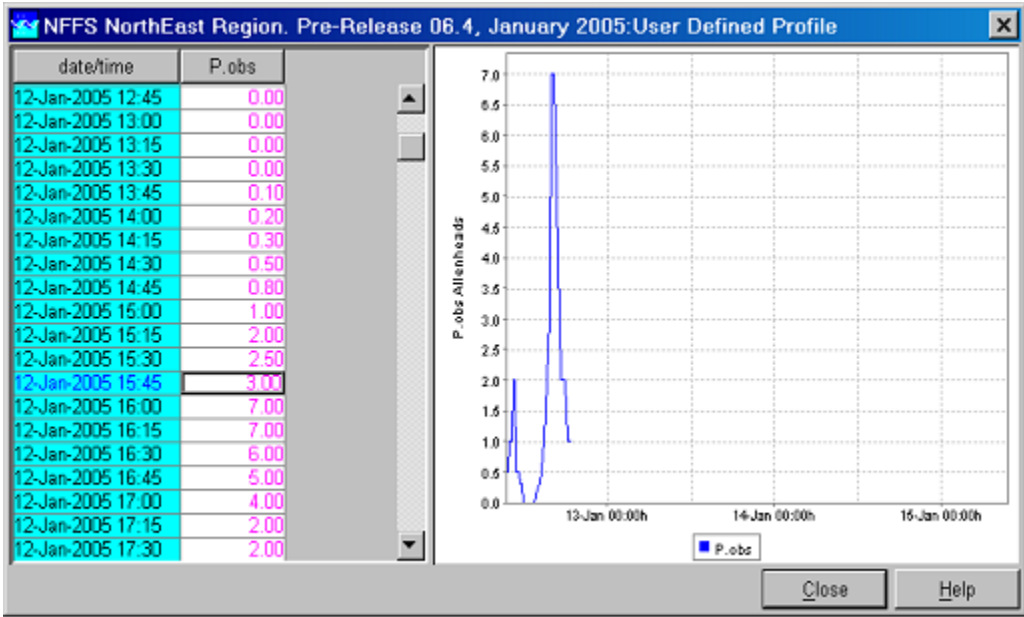
What-if Scenarios can be run via the Manual Forecast Display.

User Defined Profile

In the User Defined Profile Tab, the user can define a user defined profile that may be used that as an input time series for a workflow. To add a user defined profile the data should be entered in a table. First press the [Add New Scenario] button to start a new What-if scenario.



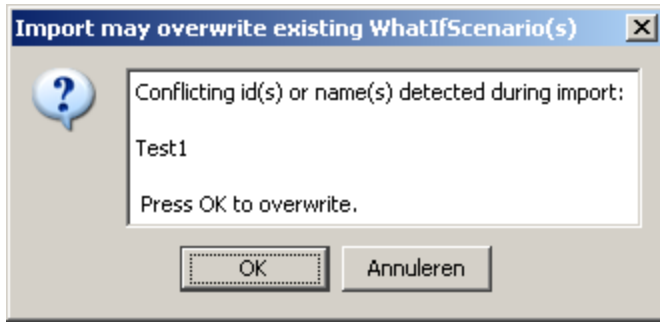
Select the "User Defined Profile" and select the input variable and location where the typical profile will be defined for. Now the values of the user defined profile must be entered in the data store through the special table editor, press the [Edit Table] button.



The table includes a spreadsheet and a graph showing the entered values. Values can also be copied from other programs like Microsoft Excel by using the [CTRL+C] keys. When all data is entered, press the [Close] button.

By pressing [Add to list], the user defined profile is added to the What-if Scenario and appears in the table at the bottom of the tab. A number of profiles can be defined within a single What-if Scenario by repeating the sequence described above.

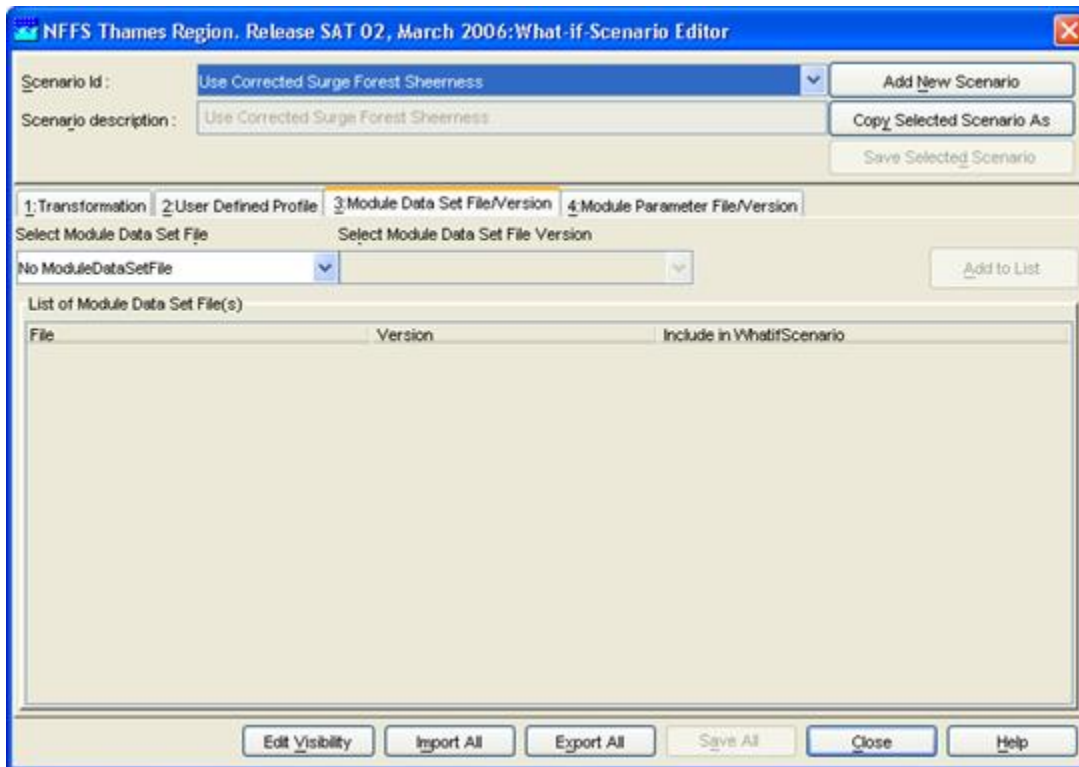
The buttons [Import All], [Export All], [Save All] and [Close] function similar as described in the section above. The import button is only enabled when all new scenarios have been saved. In case during the import a conflicting whatif scenario is encountered that has different settings a confirmation screen may be prompted to deal with this situation.



Module Data Sets and Module Parameters

This tab allows the user to select alternative module datasets. The general usage of this type of What-if scenario is similar to the previous types.

Via the fields *Select Module Data Set File* and *Select Module Data Set File Version*, an alternative module data set can be selected. When an Operator Client is used an alternative module data set should first be loaded in the FEWS data base through the Configuration Management. When a Stand Alone system is used an alternative module data set can also be located in the "config\ModuleDataSetFiles" directory. The selected alternative module Data Set is actually added to the What-if Scenario by pressing [Add to List...]. This action can be repeated when required to add an additional alternative Module Data sets to the list.



Similarly, alternative Module Parameters can be selected via the Module Parameter tab. In this case the fields *Select Module Parameter File* and *Select Module Parameter File Version* must be used.

Buttons

The buttons [Import All], [Export All], [Save All] and [Close] apply in the same way as described above.

Edit Visibility button

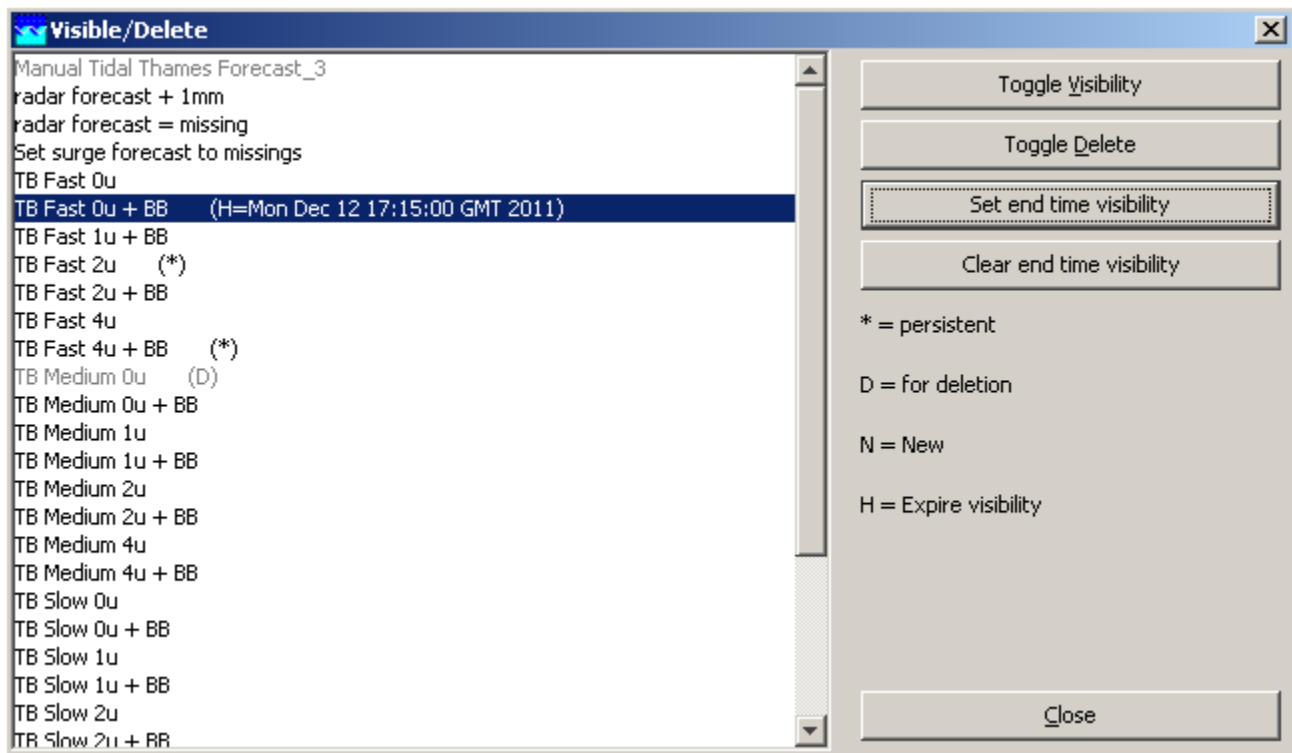
The number of What-if Scenarios in the system can become quite large. To limit the number of visible What-if Scenarios each scenario may either be deleted or made invisible to all users.

Click the [Edit Visibility] button to edit the visibility of the What-if Scenarios in the system or delete them.

- [Toggle Visible] make the selected what-if scenario invisible to users and as it can not be used when running forecasts. Note that a what-if scenario, which has been made invisible, is invisible to *all* users. When made invisible, the what-if scenario name is greyed out.

- [Toggle Delete] permanent deletes what-if scenarios from the system. These scenario are marked with (D) when the display is still open.

What-if Scenarios marked with an asterix (*) are persistent, indicating that they both can not be deleted or made invisible. The visibility can be set to expiry by selecting a number of items and then selecting an expiry time.



Import All

With [Import All] you can import what-if scenarios from file.

Export All

With [Export All] you can export what-if scenarios to file.

10 Archiving Display

09 What-if Scenario Display

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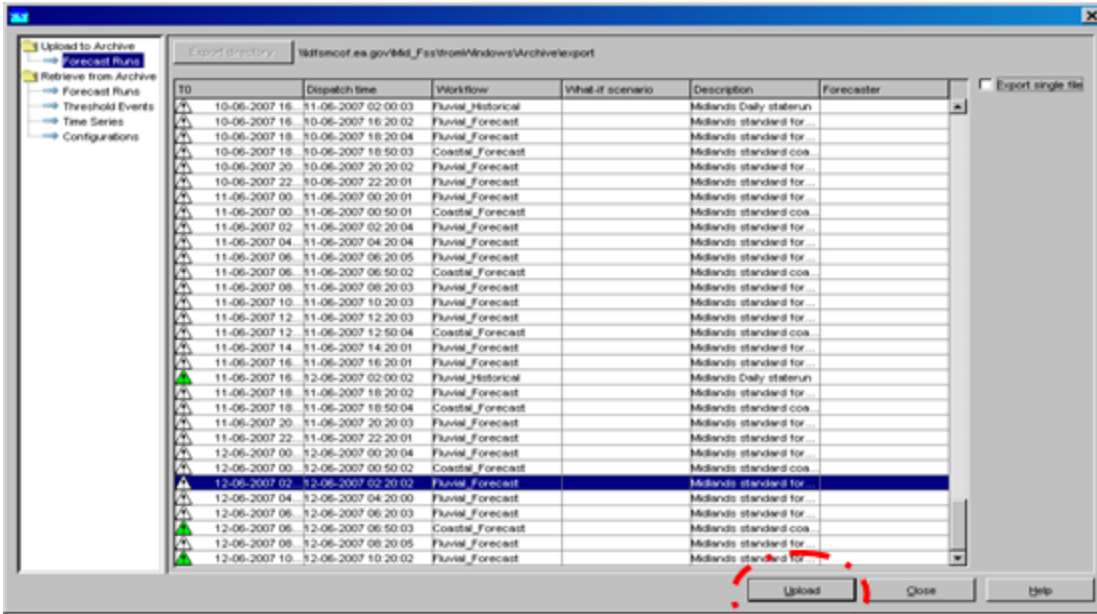
- Archiving Display
 - Manual Archiving
 - Importing Archives into the Standalone
 - a) Importing Forecast Run Archives
 - b) Importing Threshold Event Archives
 - c) Importing Time Series Archives
 - Configuring RegionId

Archiving Display

The archiving display is used to archive forecasts and to retrieve previously archived forecasts from a central server. The concept is that all the individual pieces of data used to create the forecast (only from the forecast workflow) are saved so that the forecast can be rerun at any point in the future with exactly the same result. This is useful for post event analysis of forecasting and model performance.

Manual Archiving

To manually archive a single forecast, open the Operator Client where the forecast was run. Select Archiving from the Tools Menu, Select Forecast Runs filter under Upload to Archive. Select the forecast that you want to archive and click on Upload.

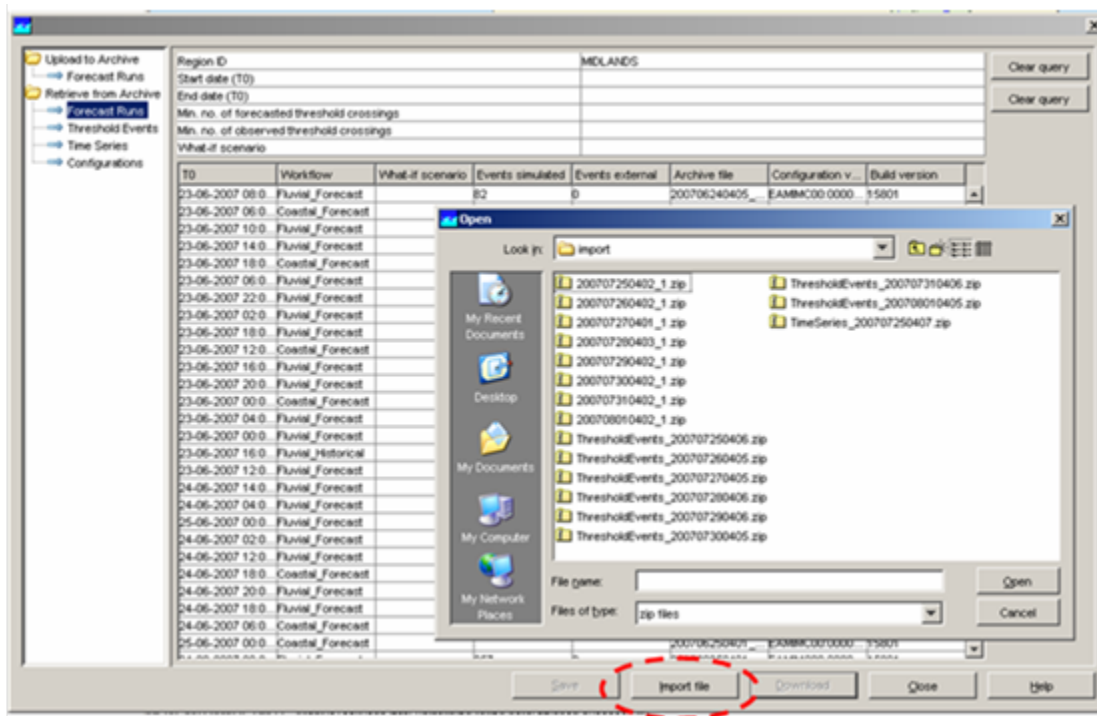


This forecast is then written to a zip file and stored in the file shares. If configured (deployed) an archiver process can pick up these zip files and process them.

Users can also archive several forecasts to one archive file by checking the Export Single File box in the top right hand corner of the archive window.

Importing Archives into the Standalone

The Standalone System is the only system that archives can be imported to. In order to import archives, you should use a Standalone that only contains the latest configuration. You can do this by copying the config folder of an Operator Client to the Standalone or by deleting the local datastore of an Operator Client and downloading the configuration using the Configuration Management Tool, then copying the local datastore from the Operator Client to the Standalone.



a) Importing Forecast Run Archives

In the Standalone System, select Archiving from the Tools Menu. Select the Forecast Runs filter under Retrieve from Archive. Then press the

Import file button. This enables you to select zip files of any type. Navigate to the correct location (anywhere on your network or local pc) and select one or more Forecast Run Archives.

You can then view these forecasts by opening the Forecast Management Display and they will be listed under forecasts in local datastore. To view the results of the required forecast- select it in the list and then click Open and it will appear in the bottom left hand corner of the screen. Double click on this to set the system time to the TO of the open forecast. You can then view the results in the pre-configured displays.

b) Importing Threshold Event Archives

As in a) except you need to select Threshold Events under Retrieve from Archive. To view Threshold Events you need to open the Skill Scores Display.

c) Importing Time Series Archives

As in a) except you need to select Time Series under Retrieve from Archive. To view Time Series you need to open the pre-configured displays for Performance.

Please note: You cannot import archived configurations directly into your standalone system.

Configuring RegionId

In the case that the REGION_HOME variable of the FSS or OC creating the archives does not match the requested regionId for the archive, it is possible to explicitly configure a regionId in the **explorer.xml** configuration file:

```
<systemInformation>
  <systemCaption>KRW-VSS Analyse Tool (versie Release 1)</systemCaption>
  <systemHelpFile>%REGION_HOME%\help.pdf</systemHelpFile>
  <regionId>KRW_VSS</regionId>
</systemInformation>
```

11 Skill Scores Display

10 Archiving Display

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12 Thresholds Display and TRITON Display

- Skill Scores Display
 - Background
 - Setting Criteria for Analyses
 - Matching Events
 - Forecast Available for Events
 - Thresholds List
 - Archiving Events
 - Excluding Events and TaskRuns

Skill Scores Display

This display provides an overview of all threshold crossings in the observed and forecast time series. By matching observed and forecast thresholds, various skill scores can be computed.

Background

The first step is to set up a contingency table. Given criteria on time intervals to consider when matching threshold crossing events, the values of **a** , **b** , **c** and **d** in the table below can be filled in (where e.g. **a** is the number of matched observed and forecast threshold crossing events).

	Threshold Observed	
Threshold Forecast	Yes	No
Yes	a	b
No	c	d
Forecast Available	Yes	No
Yes	e	
No	f	

Once the contingency table has been filled, different skill scores can be established:

$$FAR = \frac{b}{a+b}$$

False Alarm Rate

$$POD = \frac{a}{a+c}$$

Probability of Detection

$$CSI = \frac{a}{a+b+c}$$

Critical Success Index

$$CR = \frac{e}{e+f}$$

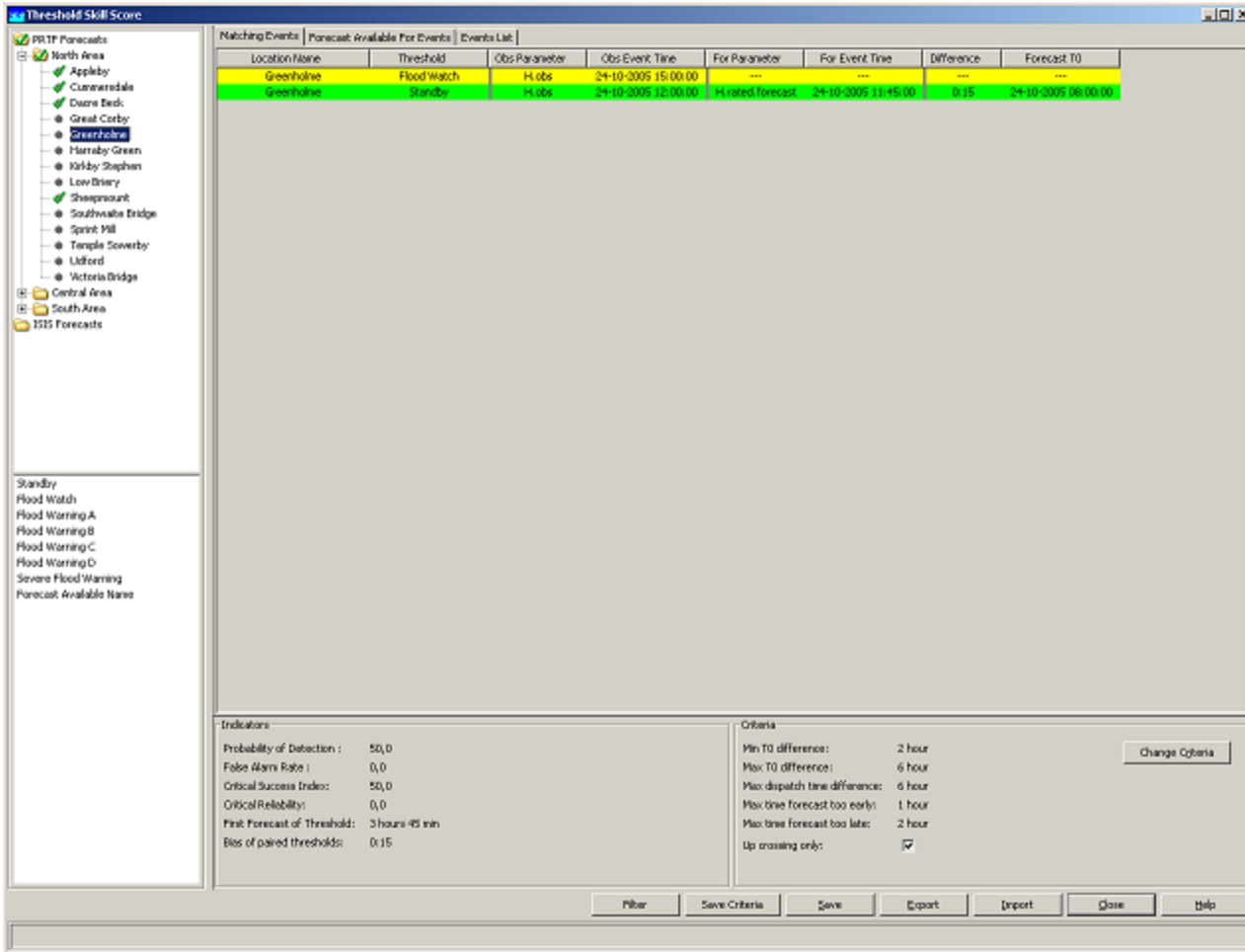
Critical Reliability (checks if a forecast is available at least some time (but not too late) before the observed threshold crossing)

The First Forecast of Threshold (FFOT) is determined as the average time between the T-0~ of the forecast run in which a threshold crossing was detected and the time of the observed threshold crossing (i.e. the average lead time of the category **a** threshold crossing events in the contingency table).

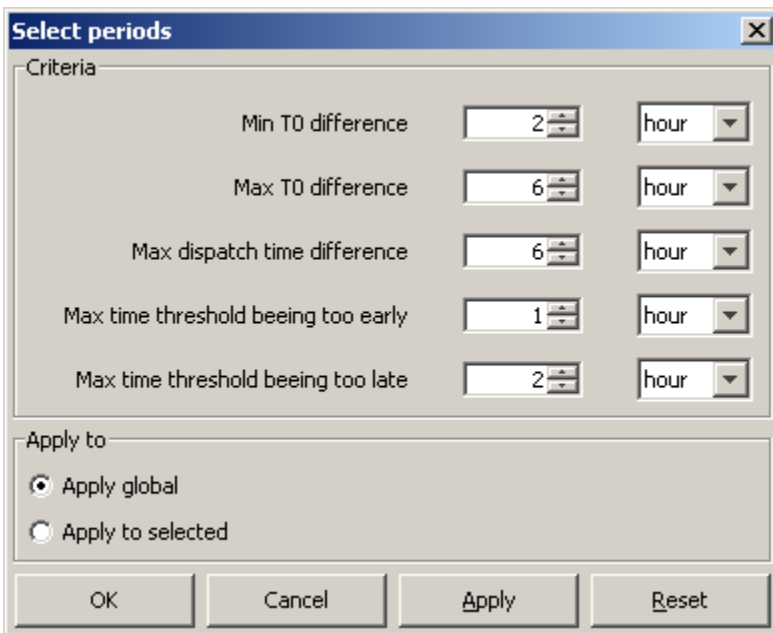
The Bias of paired threshold crossings is the average time between paired *observed* and *forecast* events.

Setting Criteria for Analyses

To specify when two threshold crossing events are considered as matching or not, a number of event matching criteria can be used. In the configuration file for the skill scores display it is possible to define default event matching criteria, which can be different for different locations and/or groups of locations. When the skill score display is opened, then the global criteria and the criteria settings for each location and group of locations are read from the configuration file. If for a given location/group individual criteria have been defined, then these are used and the location/group gets a green tickmark in the filterbox at the left hand side of the skill scores display. If for a given location/group no criteria have been defined, then the global criteria are used for that location/group. See the image below of the skill scores display with different criteria set for different locations.



To change the matching criteria of certain location(s) and/or group(s), first select the location(s) and/or group(s) in the filterbox at the left hand side of the display. Then click the **[Change Criteria]** button. When clicking the **[Change Criteria]** button the following display appears.



The criteria in the display have the following meaning.

- *Min/Max T~0~ difference* . These criteria define in what time interval the T0 of a forecast should fall that has predicted a threshold crossing in order for this threshold crossing event to be included in the analysis.

- *Max dispatch time difference* . This criterion is used to compute the Critical Reliability (CR) which determines whether a forecast was available at the time of an observed crossing irrespective of its quality. By setting this criterion the maximum time difference can be defined between the dispatch time of a forecast and the time of an observed crossing.
- *Max time threshold being too early/late* . These criteria define what the maximum difference between a forecasted threshold crossing and an observed threshold crossing are allowed to be in order to consider them as matching.

In the lower section of the display it is possible to choose between two options:

- Apply global: if this is selected, then the changes will be applied to all locations and all groups.
- Apply to selected: if this is selected, then all changes only apply to the groups and/or locations that have been selected in the skill scores display.

In this display it is also possible to set the criteria in the display to the default global criteria from configuration by pressing the **[Reset]** button.

This way it is possible to change the criteria settings for individual locations/groups. If a location/group has no individual criteria settings, then the global criteria are used for that location/group. If multiple locations/groups with different criteria are selected, then the global criteria are used.

To store the current criteria settings of individual locations and groups, click the **[Save Criteria]** button. This will create a txt file with the current settings, which can be used for future reference.

Matching Events

In the Matching Events tab different background colours are used to indicate in which sector of the Contingency Table events fall.

- green: observed and forecast threshold crossing event match (sector a of contingency table)
- yellow: a threshold crossing has been observed but not forecasted (sector c)
- orange: a threshold crossing has been forecasted but not observed (sector b)

The screenshot shows the 'Threshold Skill Score' application window. It features a tree view on the left for selecting locations and thresholds. The main area displays a table of 'Matching Events' with columns for Location Name, Threshold, Obs Parameter, Obs Event Time, For Parameter, For Event Time, Difference, and Forecast T3. Below the table are sections for 'Indicators' and 'Criteria' with various numerical values and checkboxes. At the bottom, there are buttons for 'Save', 'Export', 'Input', 'Close', and 'Help'.

Location Name	Threshold	Obs Parameter	Obs Event Time	For Parameter	For Event Time	Difference	Forecast T3
Greenmore	Flood Watch	Info	24-10-2005 15:00:00	---	---	---	---
Greenmore	Standby	Info	24-10-2005 12:00:00	Unrated forecast	24-10-2005 11:45:00	0:15	24-10-2005 10:00:00
Greenmore	Flood Watch	---	---	Unrated forecast	24-10-2005 13:15:00	---	24-10-2005 10:00:00
Greenmore	Standby	---	---	Unrated forecast	24-10-2005 13:30:00	---	24-10-2005 10:00:00

Indicators

- Probability of Detection: 58.0
- False Alarm Rate: 66.7
- Critical Success Index: 25.0
- Critical Reliability: 0.0
- First Forecast of Threshold: 3 hours 45 min
- Bias of paired thresholds: 0.15

Criteria

- Min TD difference: 2 hour
- Max TD difference: 6 hour
- Max dispatch time difference: 6 hour
- Max time forecast too early: 1 hour
- Max time forecast too late: 2 hour
- Up crossing only:

In general, skill scores are determined for all forecast locations being at a gauging station and having level thresholds. Typically these are determined separately, but the structure of the display allows skill scores to be established for different models. This way the skill scores of the different models can be compared.

The performance indicators that are computed on the basis of the selection in this tab are:

- probability of detection
- false alarm rate
- critical success factor

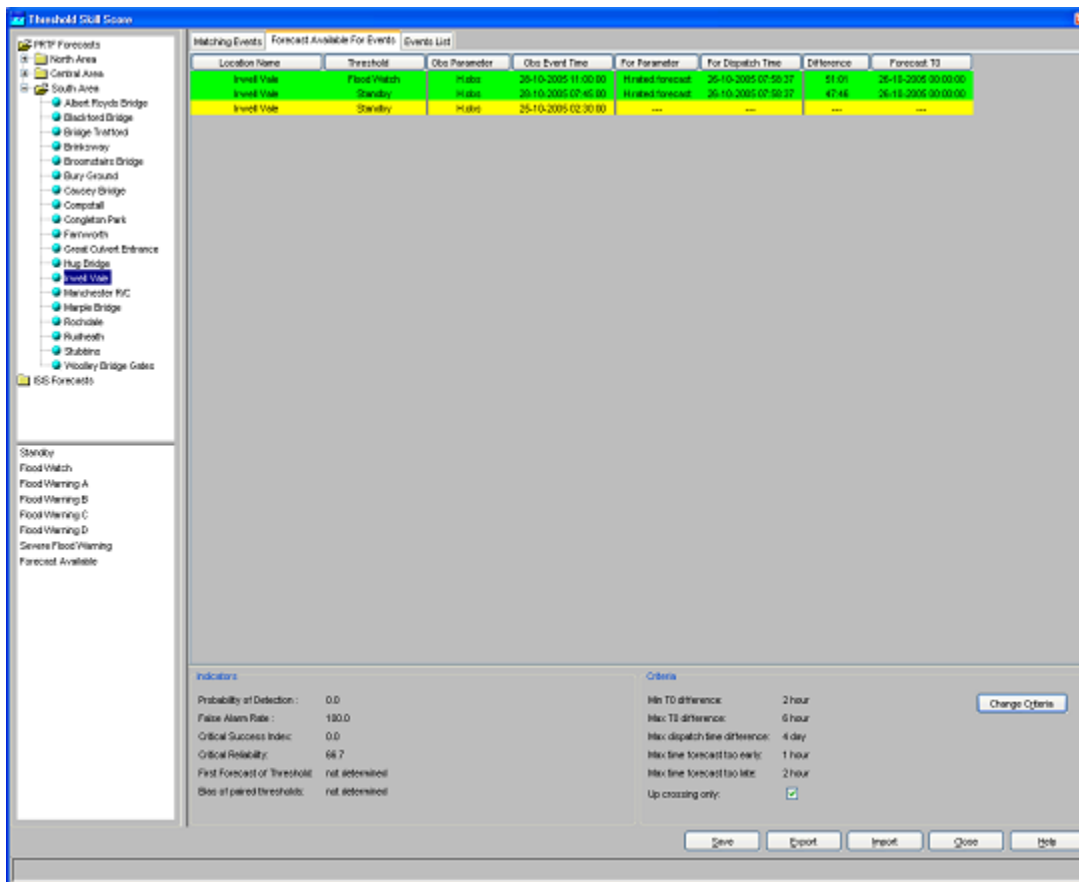
- first forecast of threshold
- bias of paired thresholds

The filter boxes at the left hand side of the skill scores display enable the selection of certain locations or certain thresholds levels to be shown alone. By activating the check box below the criteria, it's possible to display Up crossings of thresholds only.

Forecast Available for Events

In the Forecast Available for Events tab different background colours are used to indicate in which sector of the Contingency Table events fall.

- green: a forecast is available for an observed threshold crossing event (sector e of contingency table)
- yellow: no forecast available for an observed threshold crossing event (sector f)



The performance indicator that is computed on the basis of the selection in this tab is *critical reliability*.

Thresholds List

The Threshold List provides an overview of all threshold crossing events available for the selected locations. In the analyses subsets can be made by setting the criteria discussed in the earlier part of this section.

Location	Parameter	Threshold	Up/Down	Type	Event Time	TimeZers
Greenhalme	H obs	FloodWatch	3	external historical	24-10-2005 15:00:00	25-10-2005 00:00:00
Greenhalme	H obs	Standby	1	external historical	24-10-2005 12:00:00	25-10-2005 00:00:00
Greenhalme	Inflated forecast	FloodWatch	3	simulated forecasting	24-10-2005 12:15:00	24-10-2005 18:00:00
Greenhalme	Inflated forecast	FloodWatch	3	simulated forecasting	24-10-2005 13:15:00	25-10-2005 06:00:00
Greenhalme	Inflated forecast	FloodWatch	3	simulated forecasting	24-10-2005 13:15:00	25-10-2005 12:00:00
Greenhalme	Inflated forecast	Standby	1	simulated forecasting	24-10-2005 13:30:00	24-10-2005 14:00:00
Greenhalme	Inflated forecast	Standby	1	simulated forecasting	24-10-2005 13:30:00	24-10-2005 22:00:00
Greenhalme	Inflated forecast	Standby	1	simulated forecasting	24-10-2005 13:30:00	25-10-2005 04:00:00
Greenhalme	Inflated forecast	FloodWatch	3	simulated forecasting	24-10-2005 13:15:00	25-10-2005 08:00:00
Greenhalme	Inflated forecast	Standby	1	simulated forecasting	24-10-2005 13:30:00	25-10-2005 06:00:00
Greenhalme	Inflated forecast	FloodWatch	3	simulated forecasting	24-10-2005 13:15:00	24-10-2005 12:00:00
Greenhalme	Inflated forecast	Standby	1	simulated forecasting	24-10-2005 13:30:00	24-10-2005 12:00:00
Greenhalme	Inflated forecast	Standby	1	simulated forecasting	24-10-2005 13:30:00	25-10-2005 02:00:00
Greenhalme	Inflated forecast	Standby	1	simulated forecasting	24-10-2005 13:30:00	25-10-2005 02:00:00
Greenhalme	Inflated forecast	Standby	1	simulated forecasting	24-10-2005 13:30:00	25-10-2005 08:00:00
Greenhalme	Inflated forecast	Standby	1	simulated forecasting	24-10-2005 13:30:00	24-10-2005 10:00:00
Greenhalme	Inflated forecast	Standby	1	simulated forecasting	24-10-2005 13:30:00	24-10-2005 08:00:00
Greenhalme	Inflated forecast	Standby	1	simulated forecasting	24-10-2005 13:30:00	24-10-2005 10:00:00
Greenhalme	Inflated forecast	Standby	1	simulated forecasting	24-10-2005 13:30:00	24-10-2005 10:00:00
Greenhalme	Inflated forecast	FloodWatch	3	simulated forecasting	24-10-2005 12:15:00	24-10-2005 14:00:00
Greenhalme	Inflated forecast	FloodWatch	3	simulated forecasting	24-10-2005 13:15:00	25-10-2005 02:00:00
Greenhalme	Inflated forecast	Standby	1	simulated forecasting	24-10-2005 13:30:00	24-10-2005 16:00:00
Greenhalme	Inflated forecast	FloodWatch	3	simulated forecasting	24-10-2005 13:15:00	24-10-2005 04:00:00
Greenhalme	Inflated forecast	FloodWatch	3	simulated forecasting	24-10-2005 13:15:00	24-10-2005 16:00:00
Greenhalme	Inflated forecast	Standby	1	simulated forecasting	24-10-2005 13:30:00	24-10-2005 20:00:00
Greenhalme	Inflated forecast	FloodWatch	3	simulated forecasting	24-10-2005 13:15:00	24-10-2005 20:00:00
Greenhalme	Inflated forecast	FloodWatch	3	simulated forecasting	24-10-2005 12:15:00	24-10-2005 22:00:00
Greenhalme	Inflated forecast	FloodWatch	3	simulated forecasting	24-10-2005 13:15:00	25-10-2005 10:00:00
Greenhalme	Inflated forecast	Standby	1	simulated forecasting	24-10-2005 14:15:00	24-10-2005 06:00:00

Indicators: Probability of Detection: 58.0, False Alarm Rate: 66.7, Critical Success Index: 25.0, Critical Reliability: 0.0, First Forecast of Threshold: 3 hours 45 min, Bias of paired thresholds: 0.15

Criteria: Min TD difference: 2 hour, Max TD difference: 6 hour, Max dispatch time difference: 6 hour, Max time forecast too early: 1 hour, Max time forecast too late: 2 hour, Up crossing only:

Buttons: Save, Export, Import, Close, Help

Archiving Events

As the threshold crossing events are stored in the operational database for only some days (according to the length of the Rolling Barrel), it's possible to manually export the list of threshold crossing events by pressing the **[Export]** button in the skill scores display. This list can later be imported in a Stand Alone system by pressing the **[Import]** button. In this way, longer records can be established for analysis in an off-line modus.

Instead of exporting the whole list of threshold crossing events, as described above, it's also possible to select some of them and export only the selected ones by using the **[Save]** button.

All threshold crossing events can also be archived automatically by the system. See also Archive Display.

Excluding Events and TaskRuns

To exclude individual events from the event matching analysis, click the **[Filter]** button in the skill scores display. Then the following display appears.

Include	Task Run Id	T0	Workflow	What-if scenario	Description	FDO
<input checked="" type="checkbox"/>	1_0	20-10-2005 00:00:00	ImportExternal			Marc van Dijk
<input checked="" type="checkbox"/>	1_1	21-10-2005 00:00:00	ImportExternal			Marc van Dijk
<input type="checkbox"/>	1_2	22-10-2005 00:00:00	ImportExternal			Marc van Dijk
<input checked="" type="checkbox"/>	1_3	23-10-2005 00:00:00	ImportExternal			Marc van Dijk
<input checked="" type="checkbox"/>	1_4	24-10-2005 00:00:00	ImportExternal			Marc van Dijk
<input checked="" type="checkbox"/>	1_5	25-10-2005 00:00:00	ImportExternal			Marc van Dijk
<input checked="" type="checkbox"/>	1_6	26-10-2005 00:00:00	ImportExternal			Marc van Dijk
<input type="checkbox"/>	3_0	24-10-2005 00:00:00	Fluvial_Forecast		Performance test	Marc van Dijk
<input checked="" type="checkbox"/>	3_1	24-10-2005 02:00:00	Fluvial_Forecast		Performance test	Marc van Dijk
<input checked="" type="checkbox"/>	3_10	24-10-2005 20:00:00	Fluvial_Forecast		Performance test	Marc van Dijk
<input checked="" type="checkbox"/>	3_11	24-10-2005 22:00:00	Fluvial_Forecast		Performance test	Marc van Dijk

Include	Location	Parameter	Threshold	UpDown	Type	Event Time	T0
<input checked="" type="checkbox"/>	Kirkby Stephen	H.rated.forecast	Standby	1	simulated forecasting	24-10-2005 08:30:00	24-10-2005 02:00:00
<input checked="" type="checkbox"/>	Kirkby Stephen	H.rated.forecast	Standby	2	simulated forecasting	24-10-2005 09:15:00	24-10-2005 02:00:00
<input checked="" type="checkbox"/>	Greenholme	H.rated.forecast	Standby	1	simulated forecasting	24-10-2005 10:45:00	24-10-2005 02:00:00
<input checked="" type="checkbox"/>	Greenholme	H.rated.forecast	Standby	2	simulated forecasting	24-10-2005 17:00:00	24-10-2005 02:00:00
<input type="checkbox"/>	Brock A6	H.rated.forecast	Standby	1	simulated forecasting	24-10-2005 06:45:00	24-10-2005 02:00:00
<input type="checkbox"/>	Brock A6	H.rated.forecast	Standby	2	simulated forecasting	24-10-2005 10:00:00	24-10-2005 02:00:00
<input checked="" type="checkbox"/>	Garstang FCS	H.rated.forecast	Standby	1	simulated forecasting	24-10-2005 08:30:00	24-10-2005 02:00:00
<input checked="" type="checkbox"/>	Garstang FCS	H.rated.forecast	Standby	2	simulated forecasting	24-10-2005 10:45:00	24-10-2005 02:00:00
<input checked="" type="checkbox"/>	Kirkby	H.rated.forecast	Standby	1	simulated forecasting	23-10-2005 04:30:00	24-10-2005 02:00:00
<input checked="" type="checkbox"/>	Kirkby	H.rated.forecast	Standby	2	simulated forecasting	23-10-2005 13:15:00	24-10-2005 02:00:00
<input type="checkbox"/>	Kirkby	H.rated.forecast	Standby	1	simulated forecasting	24-10-2005 03:30:00	24-10-2005 02:00:00
<input checked="" type="checkbox"/>	Kirkby	H.rated.forecast	Standby	2	simulated forecasting	24-10-2005 13:15:00	24-10-2005 02:00:00
<input checked="" type="checkbox"/>	Croston	H.rated.forecast	Standby	1	simulated forecasting	23-10-2005 14:30:00	24-10-2005 02:00:00
<input checked="" type="checkbox"/>	Croston	H.rated.forecast	Standby	2	simulated forecasting	23-10-2005 21:15:00	24-10-2005 02:00:00
<input checked="" type="checkbox"/>	Croston	H.rated.forecast	Standby	1	simulated forecasting	24-10-2005 05:45:00	24-10-2005 02:00:00
<input type="checkbox"/>	Croston	H.rated.forecast	FloodWatch	3	simulated forecasting	24-10-2005 11:45:00	24-10-2005 02:00:00
<input type="checkbox"/>	Croston	H.rated.forecast	FloodWatch	4	simulated forecasting	24-10-2005 13:00:00	24-10-2005 02:00:00
<input type="checkbox"/>	Croston	H.rated.forecast	Standby	2	simulated forecasting	24-10-2005 21:45:00	24-10-2005 02:00:00
<input checked="" type="checkbox"/>	Reedyford	H.rated.forecast	Standby	1	simulated forecasting	24-10-2005 06:30:00	24-10-2005 02:00:00
<input checked="" type="checkbox"/>	Reedyford	H.rated.forecast	Standby	2	simulated forecasting	24-10-2005 10:30:00	24-10-2005 02:00:00
<input checked="" type="checkbox"/>	Wigan (Central Park)	H.rated.forecast	Standby	1	simulated forecasting	24-10-2005 10:00:00	24-10-2005 02:00:00
<input checked="" type="checkbox"/>	Wigan (Central Park)	H.rated.forecast	Standby	2	simulated forecasting	24-10-2005 14:45:00	24-10-2005 02:00:00

When one or more taskruns in the upper table are selected, then the lower table displays all events that correspond to the selected taskruns. To exclude an event/taskrun from the analysis, deselect the checkbox for that event/taskrun. To apply all changes click the [OK] or the [Apply] button. When a taskrun is excluded, then all events corresponding to that taskrun are also automatically excluded. If a taskrun is excluded, then it is not possible to include the events within that taskrun, because the taskrun setting overrules when a taskrun is excluded.

Click the [Save Filters] button to save the current filter settings to a csv file. It is also possible to use previously saved filter settings by clicking the [Load Filters] button and selecting a csv file to load. When filter settings are loaded, then all events and taskruns that are present in the loaded file will be excluded. If an event or taskrun is not present in the file, then it will be included by default.

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13 PRTF Display

- Thresholds Display & TRITON Display
 - Selecting a Workflow for Display
 - Threshold Status View
 - Alarm Summary View
 - Site Data View

Thresholds Display & TRITON Display

Information about thresholds crossings is of prime importance in a forecasting system. If and when a threshold crossing occurs, a log message is generated and the location icon is updated in the FEWS Explorer. The log message can be viewed in the system monitor and in reports.

The Thresholds display provides an additional means to view and analyse threshold crossings. The module provides a number of different ways to obtain an overview of all threshold crossings. The TRITON display is a specific version of the Threshold display.

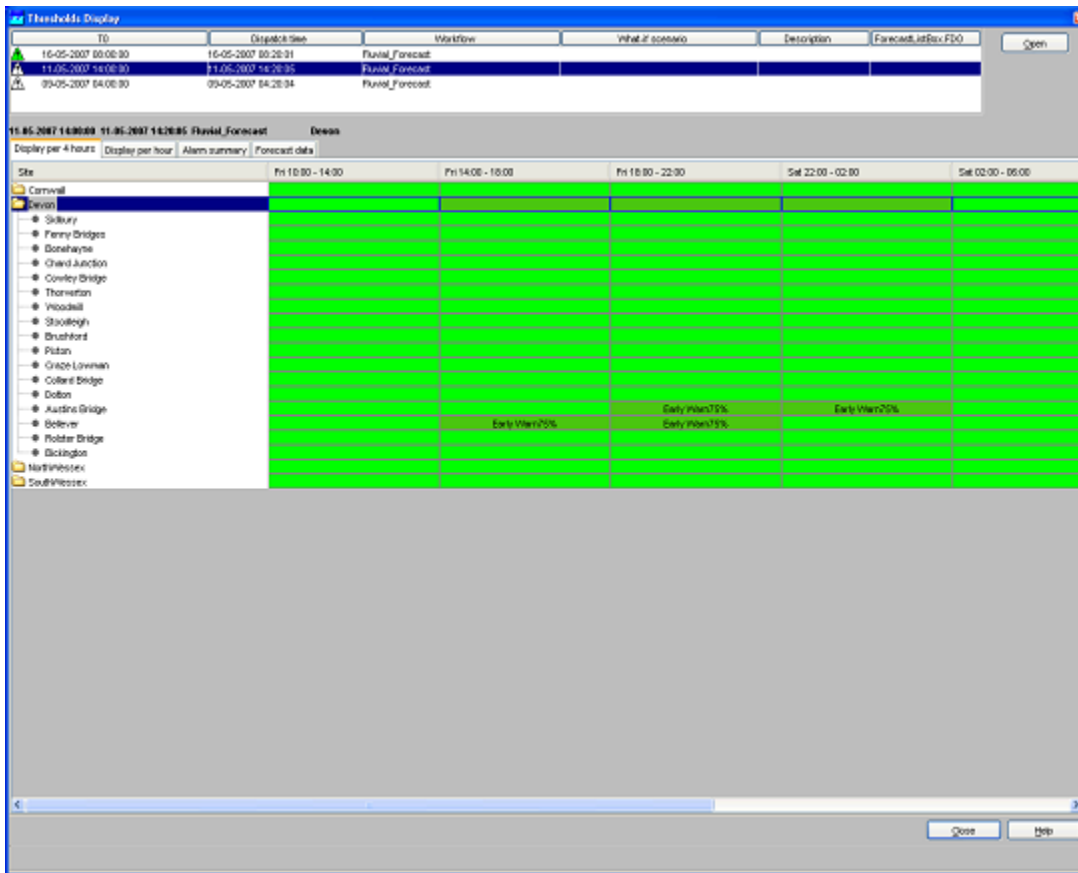
For a selected forecast, the Thresholds display presents information in three different views:

- *Threshold status view*
A general overview of thresholds, for a group of location and individual locations. Multiple threshold status views may be configured, for example to view the threshold status over a certain length of time, at precise times or per hour.
- *Alarm summary view*
The Alarm summary view presents a table of all threshold crossings.
- *Site data view*

For a selected time series the Site data view will present any number of time series that may be of importance

Selecting a Workflow for Display

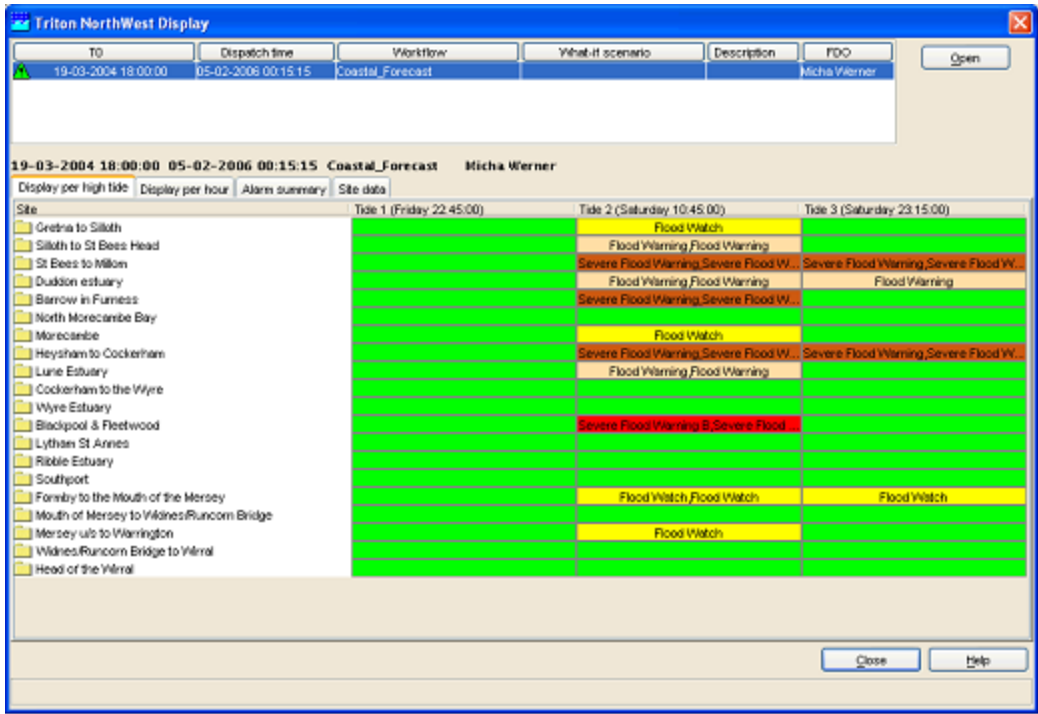
The workflow for which data should be displayed in the Threshold display can be selected at the top of the screen. Place your cursor on the workflow you would like to display and click [Open]. The selected workflow is shown in bold above the tabs.



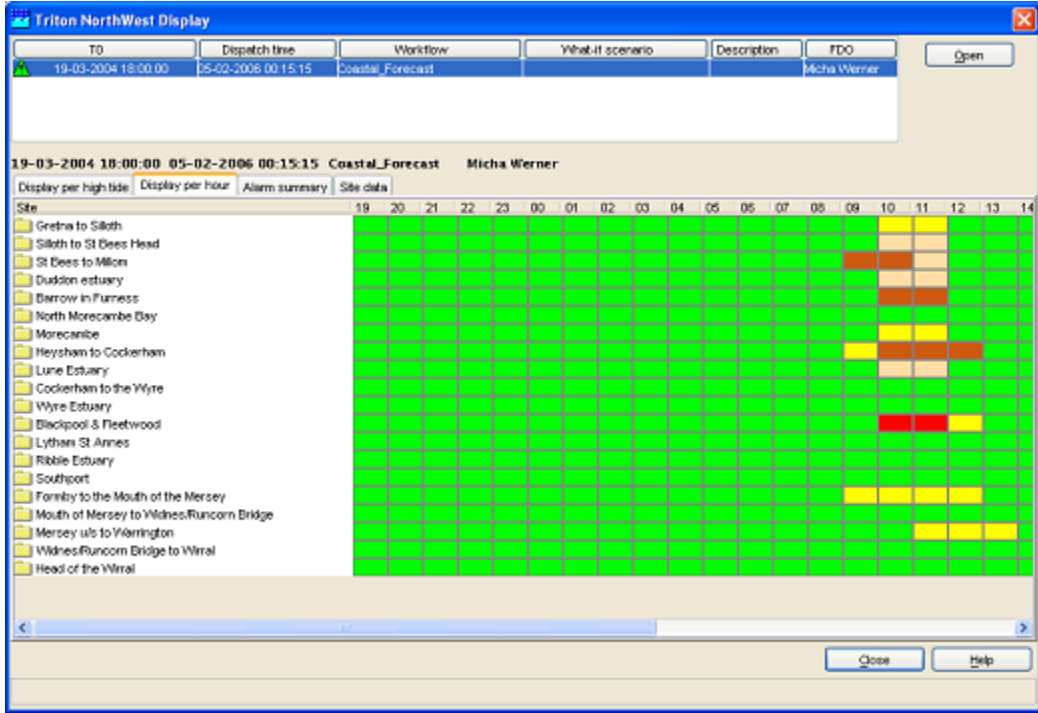
Threshold Status View

The threshold status view can be configured to display the threshold status of any number of time series over a period of time. Examples of frequently used settings are:

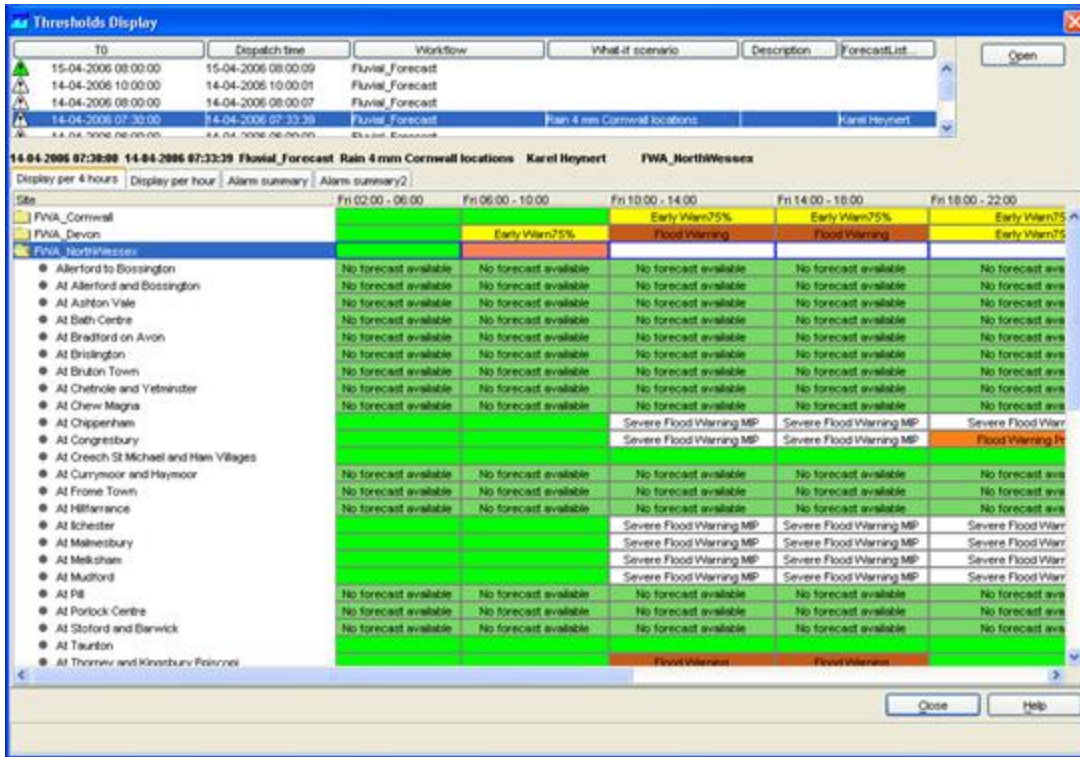
- For coastal forecasting the threshold status at high tide. The input data is non-equidistant and all values are shown. See the example below, where Triton results are shown at high tide.
- For coastal forecasting the threshold status per hour. This shows how the threshold status develops in a 24 hour period over successive high tides.
- For fluvial forecasting over any duration. The example given provides an overview over 4 hour durations.



Coastal forecasting example: thresholds at high tides



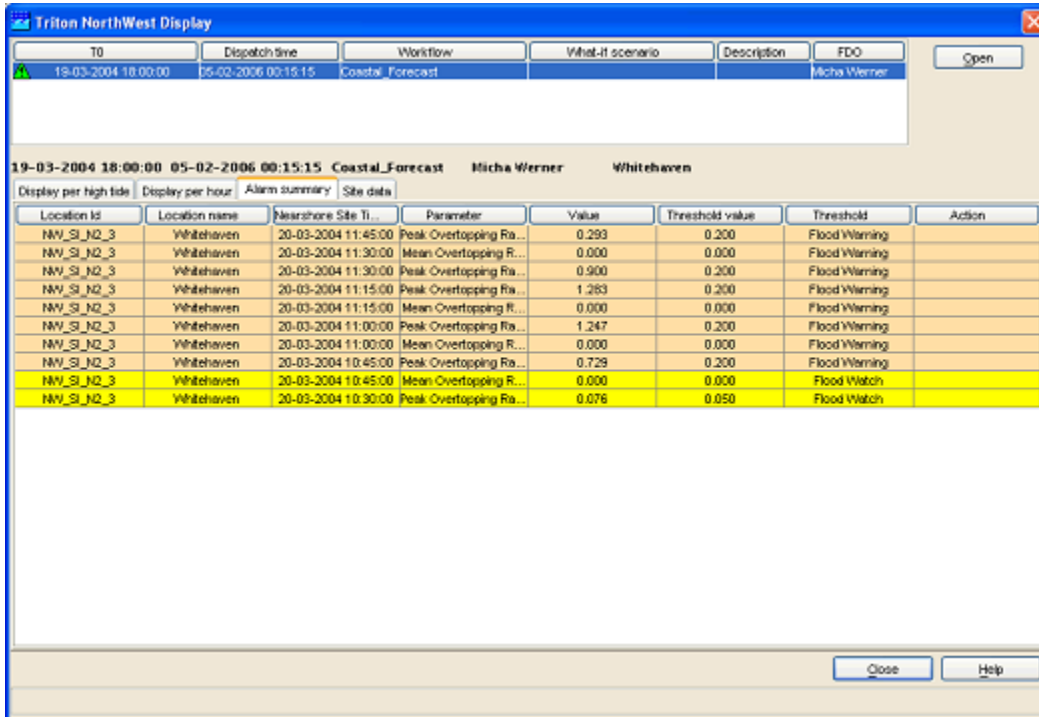
Coastal forecasting example: thresholds per hour. High tide as in the previous example is at 10:45.



Fluvial forecasting example: threshold status over a 4 hour period

Alarm Summary View

The alarm summary view will present a table of all alarms for the selection of location(s) made in the Threshold Status View.



Site Data View

The site data view will present a table of data for the selected location.

TO	Dispatch time	Workflow	What-if scenario	Description	FDO
19-03-2004 18:00:00	05-02-2006 00:15:15	Coastal_Forecast			Micha Werner

Nearshore Site Time	Calculated Tide Level (m)	Overtop Mean Forecast (m2/h)	Overtop Peak Forecast (m2/h)	Overtop Volume Forecast (m3)	Nearshore Wave Height (m)	Nearshore Wave Period (s)	Nearshore Wave Direction (degrees)	Offshore Site Used	Offshore Wind Speed (m/s)	Offshore Wind Direction (degrees)
20-03-2004 09:45:00	3.681	0.000	0.000	0.000	1.691	4.764	240.836	BIOM	35.269	241.000
20-03-2004 10:00:00	4.026	0.000	0.000	0.000	1.697	4.772	240.682	BIOM	35.269	241.000
20-03-2004 10:15:00	4.305	0.000	0.000	0.000	1.702	4.778	240.559	BIOM	35.269	241.000
20-03-2004 10:15:00	4.305	0.000	0.000	0.000	2.508	5.509	245.855	BIOM	37.974	238.000
20-03-2004 10:30:00	4.526	0.000	0.076	0.000	2.516	5.512	245.751	BIOM	37.974	238.000
20-03-2004 10:45:00	4.681	0.000	0.729	0.000	2.521	5.514	245.678	BIOM	37.974	238.000
20-03-2004 11:00:00	4.769	0.000	1.247	0.000	2.525	5.515	245.623	BIOM	37.974	238.000
20-03-2004 11:15:00	4.775	0.000	1.293	0.000	2.525	5.515	245.616	BIOM	37.974	238.000
20-03-2004 11:30:00	4.713	0.000	0.900	0.000	2.522	5.515	245.663	BIOM	37.974	238.000
20-03-2004 11:45:00	4.586	0.000	0.293	0.000	2.518	5.513	245.722	BIOM	37.974	238.000
20-03-2004 12:00:00	4.402	0.000	0.000	0.000	2.512	5.510	245.808	BIOM	37.974	238.000
20-03-2004 12:15:00	4.204	0.000	0.000	0.000	2.505	5.507	245.803	BIOM	37.974	238.000
20-03-2004 12:30:00	3.951	0.000	0.000	0.000	2.496	5.504	246.017	BIOM	37.974	238.000
20-03-2004 12:45:00	3.682	0.000	0.000	0.000	2.486	5.500	246.154	BIOM	37.974	238.000
20-03-2004 13:00:00	3.374	0.000	0.000	0.000	2.475	5.493	246.323	BIOM	37.974	238.000
20-03-2004 13:15:00	3.037	0.000	0.000	0.000	2.110	5.422	243.822	BIOM	37.273	246.000
20-03-2004 13:30:00	2.684	0.000	0.000	0.000	2.099	5.416	244.020	BIOM	37.273	246.000
20-03-2004 13:45:00	2.318	0.000	0.000	0.000	2.083	5.421	244.240	BIOM	37.273	246.000
20-03-2004 14:00:00	1.944	0.000	0.000	0.000	2.068	5.417	244.485	BIOM	37.273	246.000

13 PRTF Display

12 Thresholds Display and TRITON Display

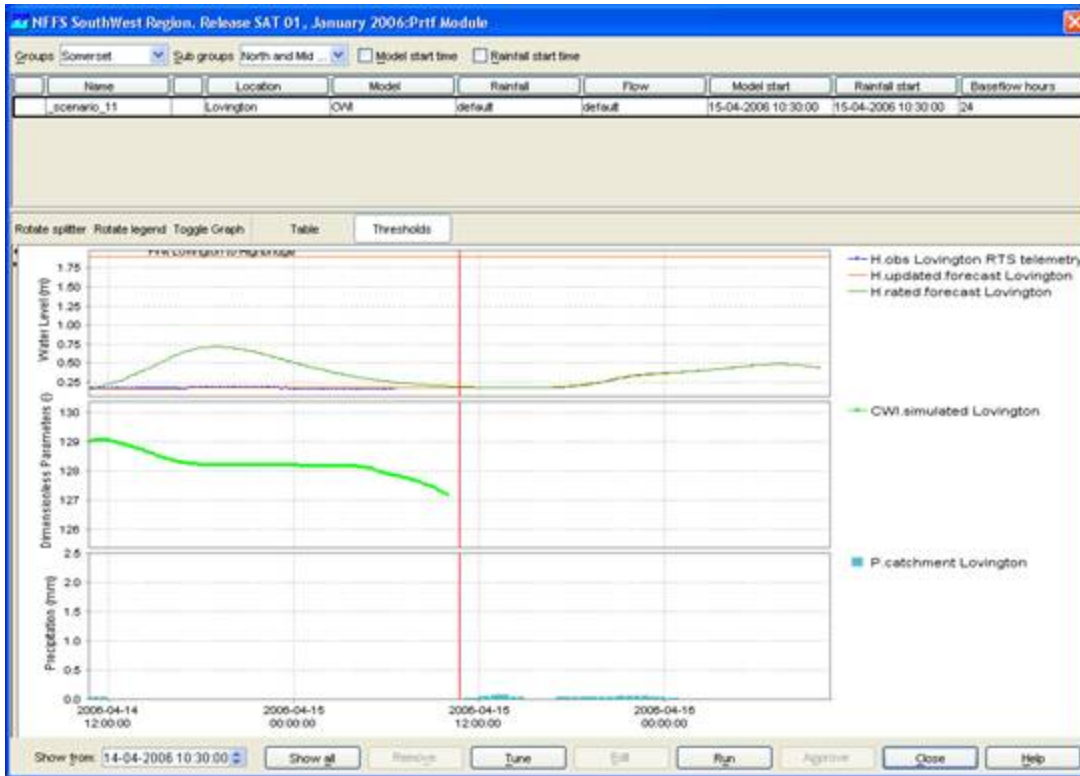
Delft-FEWS User Guide

14 Correlation Display

- PRTF Display
 - Create Scenarios
 - Change settings
 - Change Model type or Tune Models
 - Create or select a Rainfall Profile
 - Edit Flow Profile
 - Change Model Start Time
 - Change Rainfall Start Time
 - Change Base flow search Hours
 - Approve a scenario

PRTF Display

The PRTF display is the front end (user interface) for the PRTF module. PRTF takes a transfer function approach (using the Physically Realisable Transfer Function model algorithm, available also in the WRIP forecasting system). The PRTF forecasting module is an external module. The PRTF module (provided by PlanB, UK) is linked to NFFS using the same method as any external forecasting module.

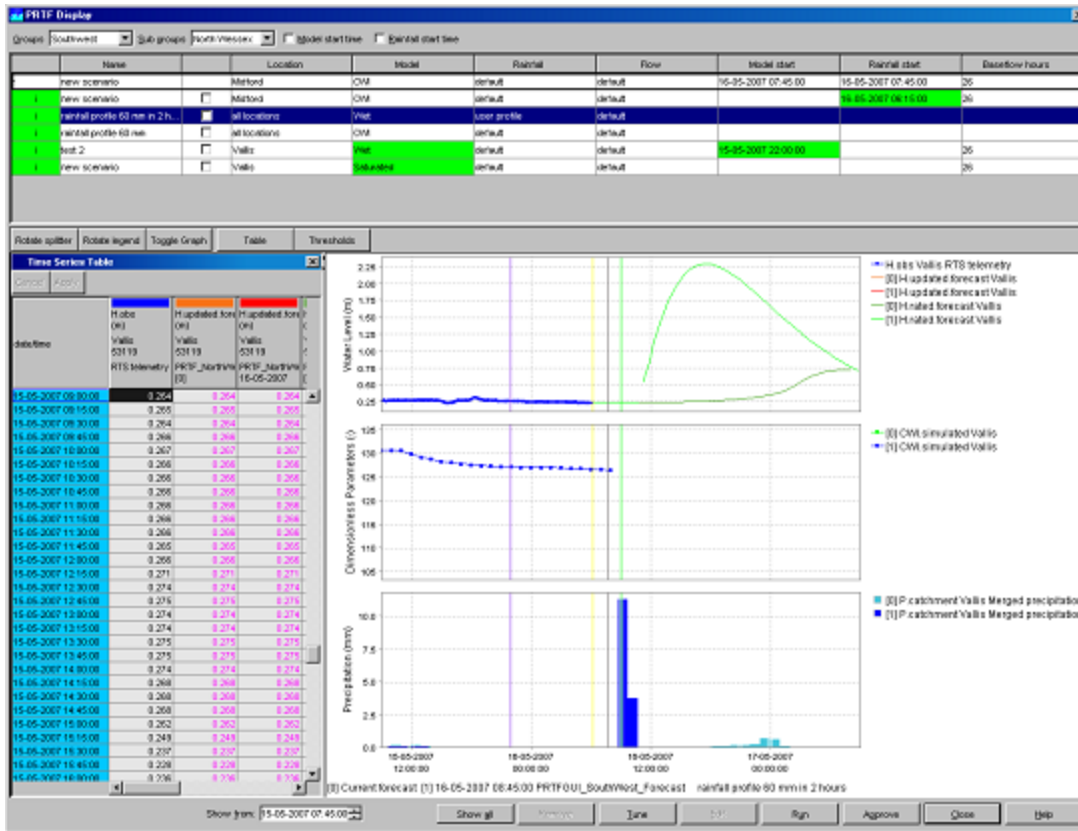


The PRTF display provides an interface to the configurable settings of the PRTF module. The settings entered by the user are stored in the form of a what-if scenario, that can then be run. Scenarios created with the PRTF display run locally on your own PC. The forecast result of each scenario can then be viewed in the same display. A scenario created in the PRTF Display is at first not visible to any other user than the user on the computer it's running on.

Within the PRTF Display it is possible to approve a scenario or a selection of scenarios to create a new forecast, which is then sent of to the Master Controller to run on one of the Forecasting Shells. When this forecast is ready it is automatically visible to all other users, because it has been approved.

Create Scenarios

The PRTF Display makes it possible to interactively change module settings and view the results of these changes. Changes in model settings, rainfall profiles and changing initial conditions will be stored in a scenario. Each scenario consists of a row in the top part of the Display (see example below). If you select a scenario (and one site) then the results of this scenario will be shown in the graphs in the lower part of the display.



To create a new scenario you have to select a group of sites in the top part of the display and optionally you also have to select a subgroup (Southwest only). Then you select a site or the option 'all locations' in the top row of the scenarios list and change the settings you want. If you change one the settings in a scenario, the cell will become green (apart from the cells in the columns 'Name', 'Location' and 'Baseflow hours'). You can make the name of a scenario editable by clicking in the cell with 'new scenario'. After changing the settings and the name of the scenario you need to click on 'Run' to run this scenario. A new row will be added to the top of the list. The scenario you have just created will move on record down and the top row will be the new scenario to edit.

The colour of the first cell in each row gives an indication of the status of that scenario (see picture below this paragraph). The following table explains the colours and their meaning.

colour	status
green	scenario ran successfully
purple	scenario is running
red	scenario failed

The first cell also contains an 'i' indicating that more background information (log messages) on this run is available. Double clicking will reveal this information.



The buttons 'Show All' and 'Remove' in the button bar in the lower part of the display, will respectively show all previously created scenarios for the selected group or subgroup of locations and remove the scenario which is currently selected.

Change settings

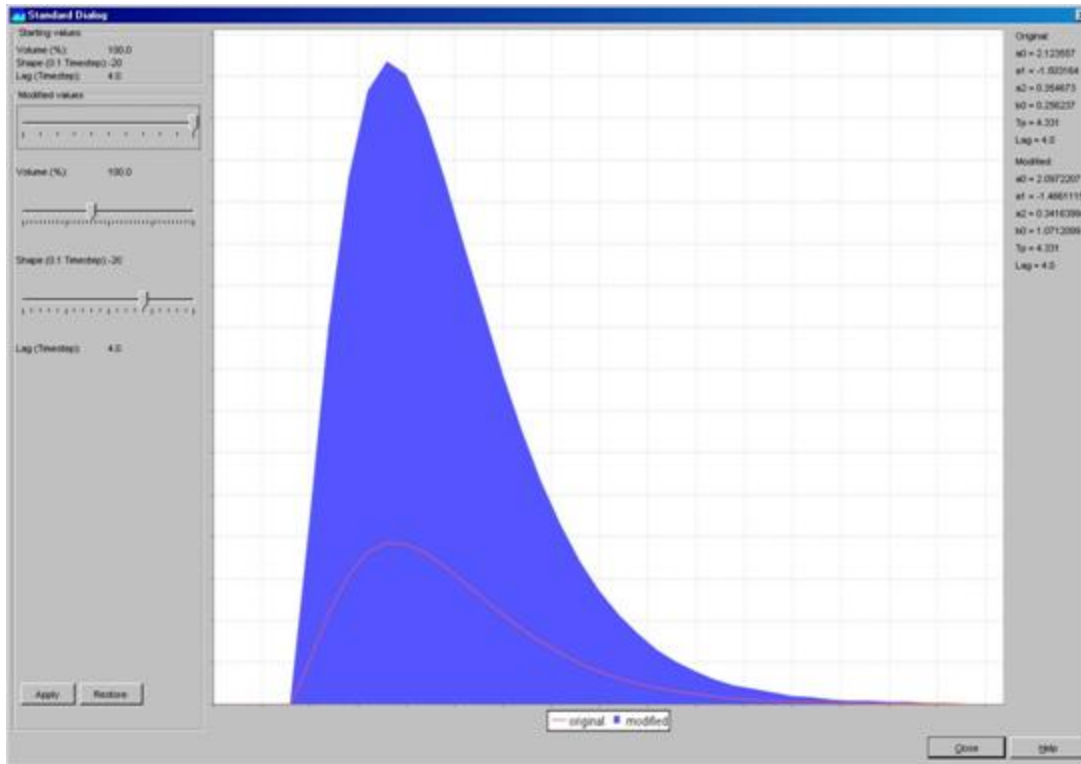
Within the PRTF Display it is possible to change the following settings:

1. change model type or tune an existing model
2. create or select a rainfall profile
3. edit the flow profile
4. change model start time
5. change rainfall start time
6. change base flow search hours

Each of these options will be discussed briefly in the next section.

Change Model type or Tune Models

By clicking on the cell in the column 'Model' you get a dropdown box with additional model types to chose from. By default the default model type is displayed. You can select one of the available model types and run a scenario. It is also possible to tune the model you have selected by clicking on the 'Tune' button in the button bar in the lower part of the display. A new window will appear showing the current settings of the selected model (see example below). The graph reflects the response of a catchment to a rainfall event.

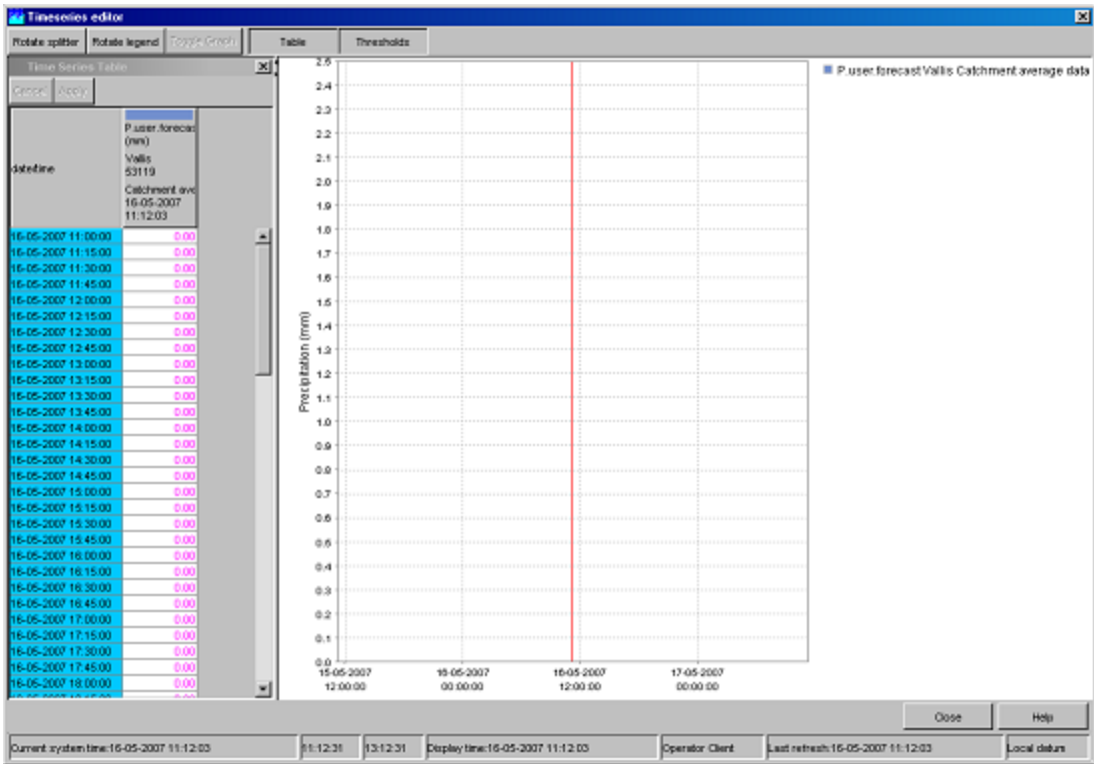


The red line shows the original settings and the blue graph shows the changed settings. The values for Volume, Shape and Lag can be modified by moving the slider bars. This results in a change in shape of the blue graph. After changing the Model parameters you should click on 'Apply' to add the modified settings to your new scenario. With the 'Restore' button you can go back to the settings that were applicable when you opened the Model Tune window.

The starting values for Volume, Shape and Lag are given in the upper left part of the display and the original and modified parameters for the Transfer Function are given in the upper right part of the Display.

Create or select a Rainfall Profile

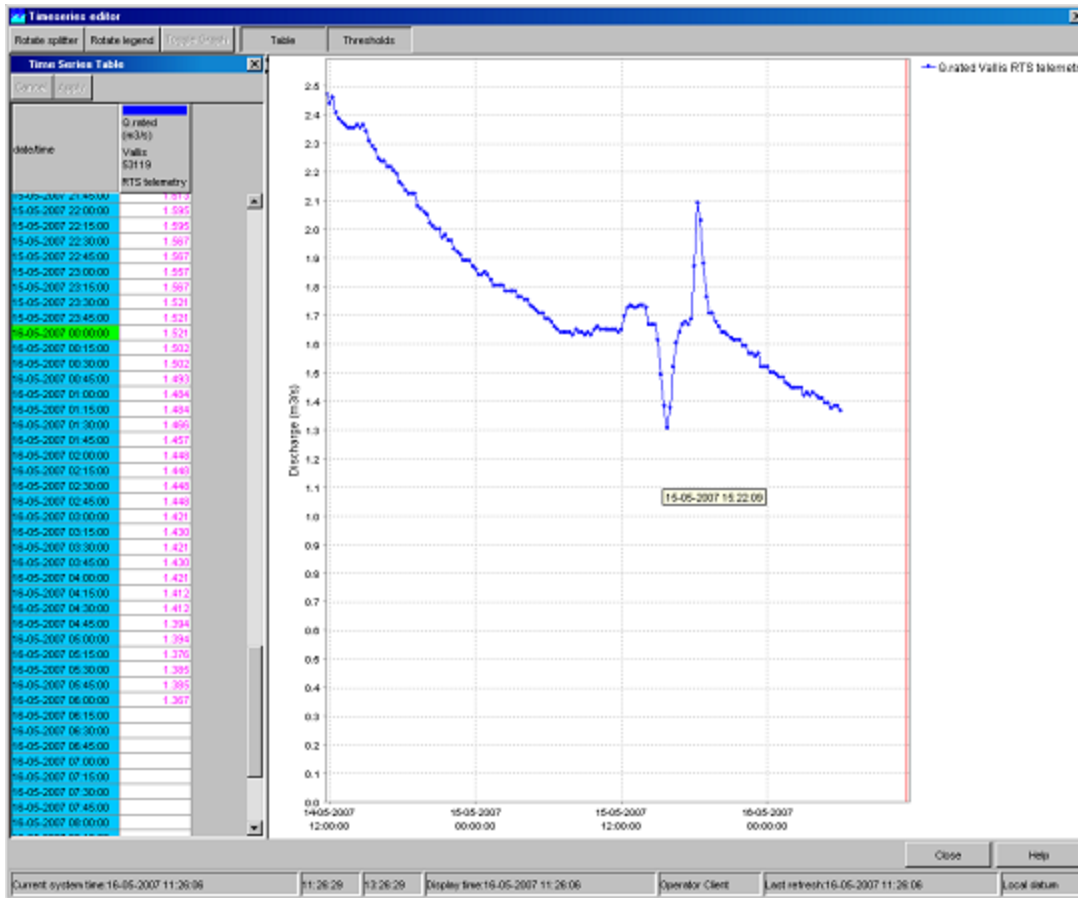
To create or select a rainfall profile you need to click on the cell in the column Rainfall. A dropdown box will appear with some predefined rainfall scenarios. You can select one of those predefined scenarios or you can select the option 'user profile' to create a new profile. When the option user profile is selected you need to click on the 'Edit' button in the button bar in the lower part of the display. This button opens a window with a Time series Editor (see picture below).



You can type in or copy in the rainfall profile you want. The values inserted are interpreted as mm per time step (15 min). Before closing this window you should click on 'Apply'.

Edit Flow Profile

To edit a flow profile you need to click on the cell in the column Flow. A dropdown box will appear with two options, 'default' and 'user profile'. The default option will leave the flow time series as it is. You can select the option 'user profile' to create a new profile. When the option user profile is selected you need to click on the 'Edit' button in the button bar in the lower part of the display. This button opens a window with a Time series Editor (see picture below).



You can type in or copy in the flow profile you want. Before closing this window you should click on 'Apply'.

Change Model Start Time

You can specify a model start which overrules the model start time PRTF derives itself. There are two ways to edit the model start time:

1. Edit the date in the column 'Model start' by clicking in the cell.
2. Click with the left mouse button some where in the graph (a black dashed line appears) and then use the right mouse button to select 'Set model start time'. The new model start time will appear in the 'Model start' column of this new scenario and the dashed black line will become blue.

Change Rainfall Start Time

You can specify a rainfall start which determines the start of the rainfall event. There are two ways to edit the rainfall start time:

1. Edit the date in the column 'Rainfall start' by clicking in the cell.
2. Click with the left mouse button some where in the graph (a black dashed line appears) and then use the right mouse button to select 'Set Rainfall start time'. The new rainfall start time will appear in the 'Rainfall start' column of this new scenario and the dashed black line will become yellow.

Change Base flow search Hours

Another option in the PRTF display is to edit the Base flow search hours. This parameter automatically determines the start time of a PRTF model run by selecting the lowest level in the base flow search period (a tolerance around this level is used to make it less sensitive). To edit this value you need to type in a new value in this cell and press enter.

Approve a scenario

If you want to approve a forecast you need to select the scenarios you want to approve by checking the checkbox in each row you want approve. Then you need to click on 'Approve' in the button bar in the lower part of the display. A window will pop up with the options to run a single forecast based on your selected scenarios or a scheduled forecast over a period of time and with a certain time interval.

14 Correlation Display

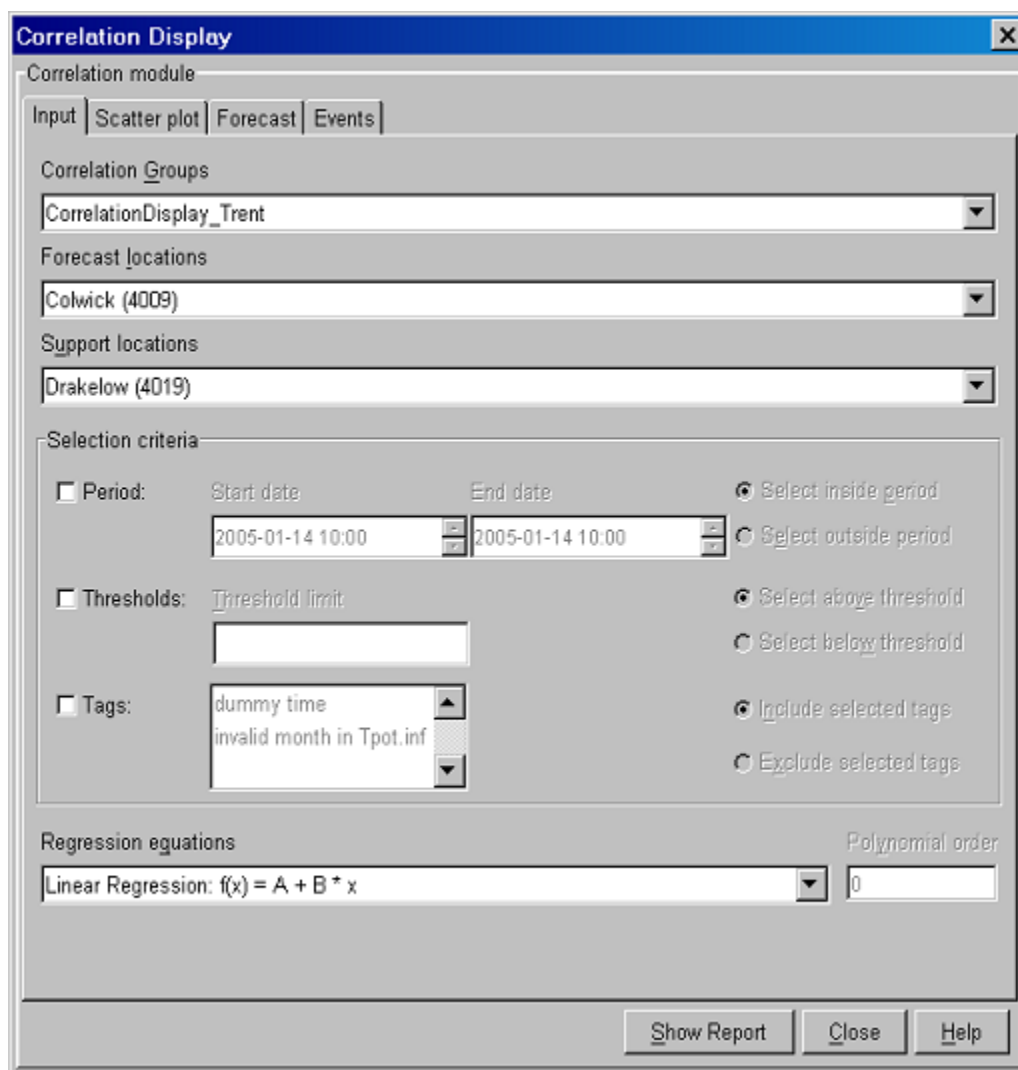
- Correlation Display
 - Input
 - Scatter Plot
 - Forecast
 - Events
 - Show Report and Close

Correlation Display

The Correlation display allows application of the Correlation Utility in an interactive manner. Correlations can be evaluated and derived between datasets using various criteria. The derived correlation can for example be applied to monitored time series data or manually entered data points.

Input

At first, a *correlation group* should be selected from which a dataset will be used for making a correlation. Next, a *forecast location* needs to be selected and a *support location* or a number of support locations. With these steps a dataset is selected from a configuration file with pre-defined correlation input values for making a correlation.



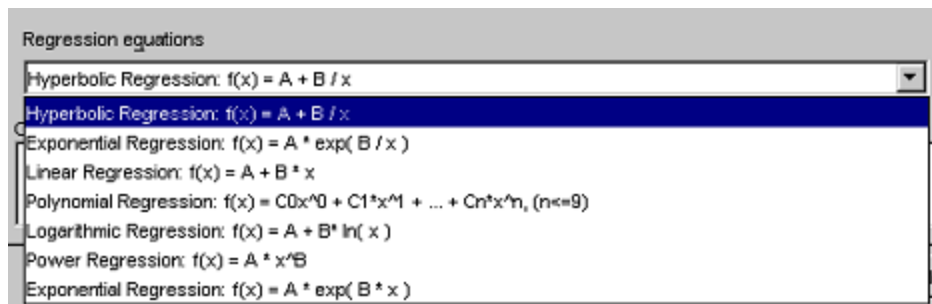
When required, the above mentioned dataset can be restricted on the basis of a number criteria...

- *Period*
A period can be defined inside or outside which data points should be included in the analysis.
- *Thresholds*
A threshold can be defined below or above which data points should be included in the analysis.

- *Tags*

One or more tags of data points can be selected. Data points that have a corresponding tag are or are not included in the analysis. Please note that these tags should be available in the datasets. Typical tags could be winter or summer event.

After having selected a dataset for which a function should be fitted, a regression equation can be selected. The available equations are shown below. For the polynomial regression, an order can be entered.



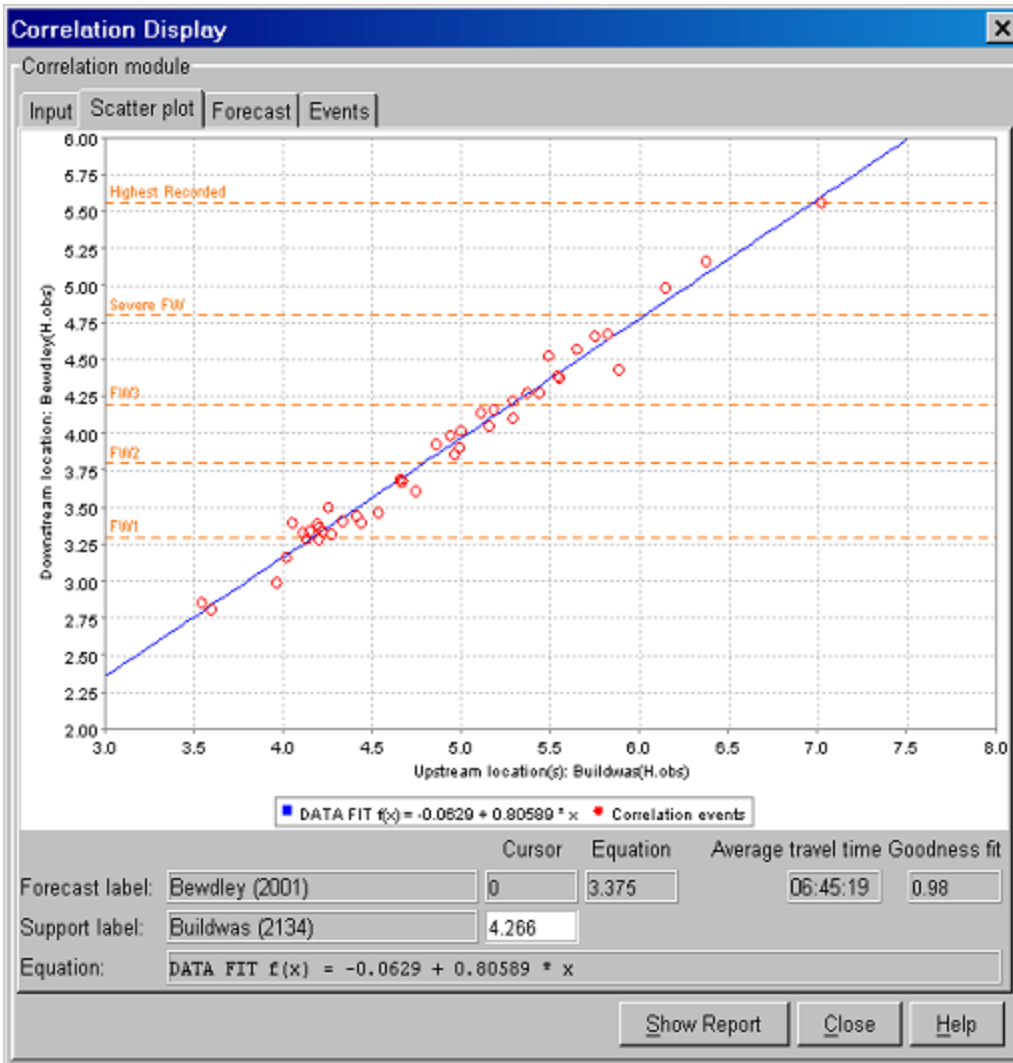
Scatter Plot

When selecting the *Scatter Plot* tab, a scatter plot is displayed. Defining the criteria for the restriction of the dataset- if any- and the best regression equation, requires probably a number of iterations where the scatter plot will prove to be helpful.

Moving the cursor in the scatter plot displays a cross hair that helps to look at data values. Tool tips with event information are displayed when the cursor is placed on an event.

Below the scatter plot, the discharge or water level at the support location (X) and at the forecast location are displayed (Y). The Cursor column indicates the values for the support location and the forecast location at the location of the cursor on the graph. The forecast computed with the regression relation is displayed in the equation column; this computed value assumes an X-value as indicated by the cursor. The regression formula used to compute the forecast value is also given.

In addition, the travel time computed from the selected events is presented in the field *Travel time* .



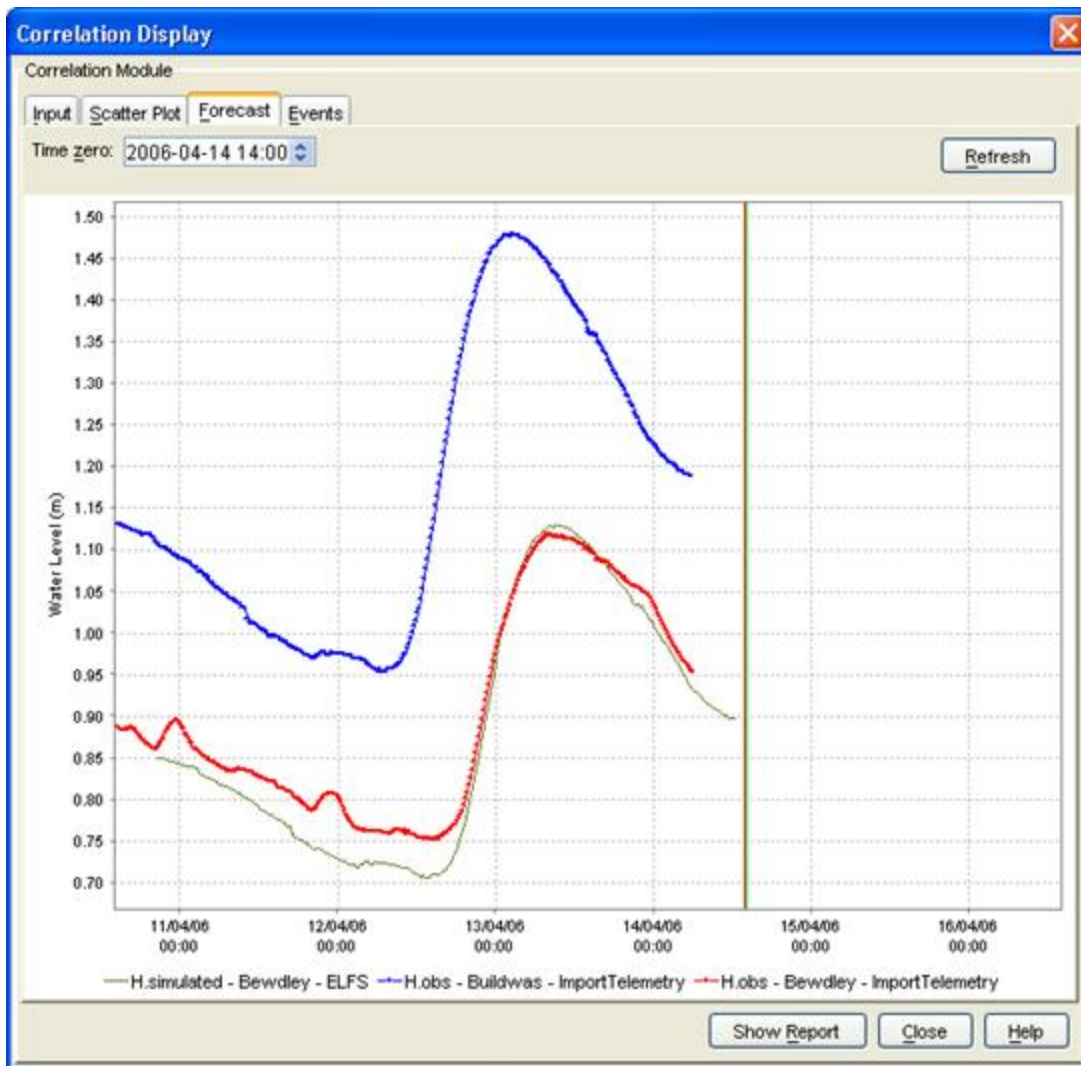
A forecaster can also enter a value in the cursor column for the support location. By pressing [ENTER] the correlation display computes the forecast with the equation and shows the result in the equation column.

Forecast

On the Forecast tab of the Correlation display, the derived regression equation can be applied to a monitored data series for the support location or a manually entered value.

By entering the *Time zero* (T0), the FDO can review the result of the application of the derived regression equation in time. After T0 is changed, pressing [Refresh] will update the graph.

In the displayed graph, the observed water levels at the support and forecasting locations are respectively given in blue and red. The thin line is the time series that results from applying the regression equation to the observed time series at the support location.



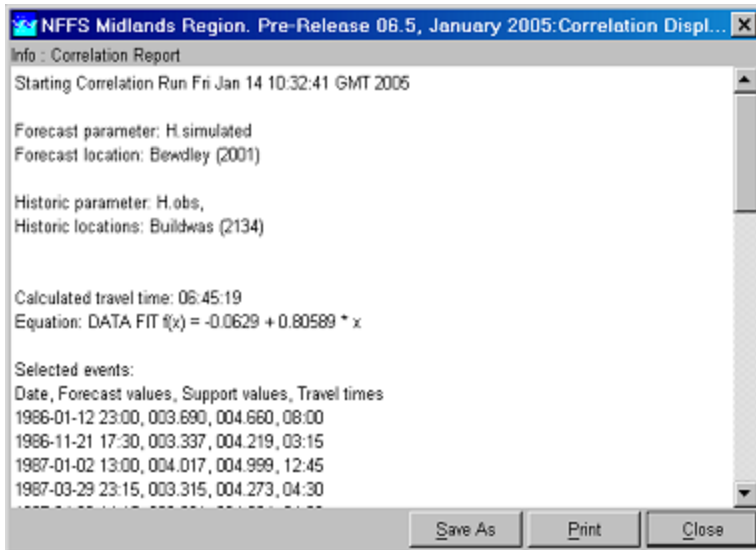
Events

The events tab shows a list of all events used in the correlation function. The list includes the dates, forecast level, support level, travel time of the selected events, comments and tags (user configured in CorrelationEventSets file). These can be sorted by clicking on the header of each column.

Show Report and Close

The forecasts generated by applying the regression relation can be presented in a report with [Show Report] when required. With [Close], a user can leave the Correlation display.

The generated report includes the selected events and the computed correlation function. This report can be printed or saved to a text file.



15 Lookup Table Display

14 Correlation Display

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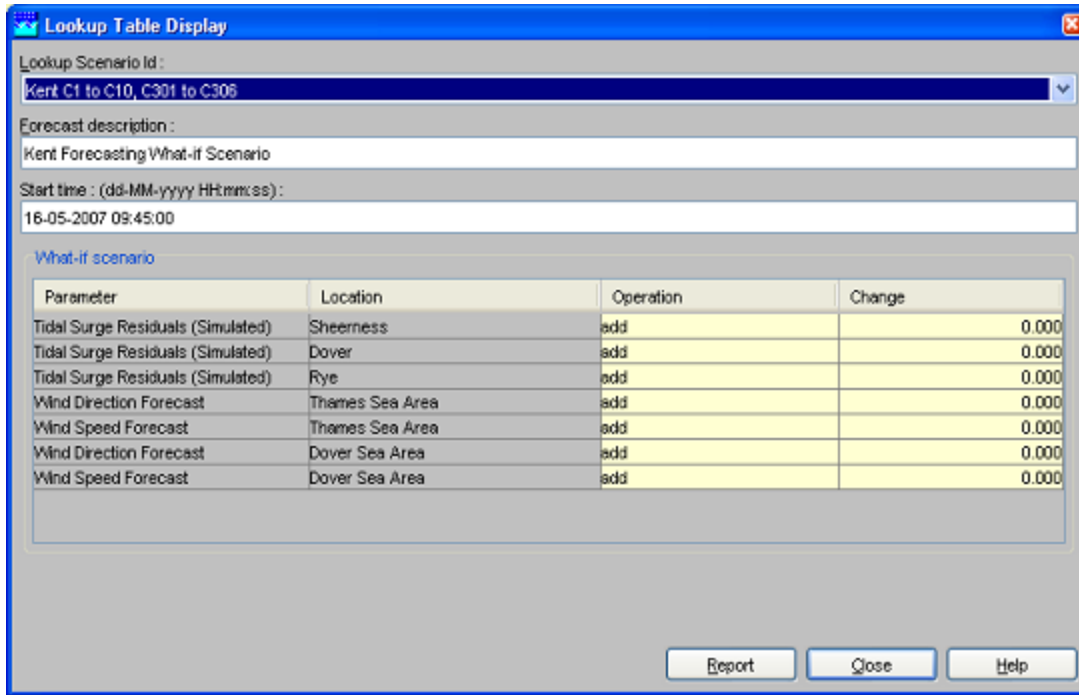
16 KFlows Display

- Lookup Table Display
 - Lookup Scenario Id
 - Forecast Description
 - Start time
 - What-if Scenario
 - Report
 - Close

Lookup Table Display

The Lookup Table display allows for interactive use of lookup tables. In the present configurations lookup tables are only used for tidal forecasting. The display allows the user to view the input data for lookup tables and run what-if scenarios on them. Forecast results of these what-if scenarios can be shown in a report.

The results of running the interactive Lookup Table Display will only be available in the display and *not* be saved as a forecast in the Local Data store and Central Database. In case this is required, the what-if scenario should be defined with the What-if Scenario Display and run as a manual forecast.



Lookup Scenario Id

A workflow can be selected from a drop-down list with pre-configured workflows. Only workflows are available that run lookup tables. The workflows that can be selected are described in the Regional Configuration Documentation.

Forecast Description

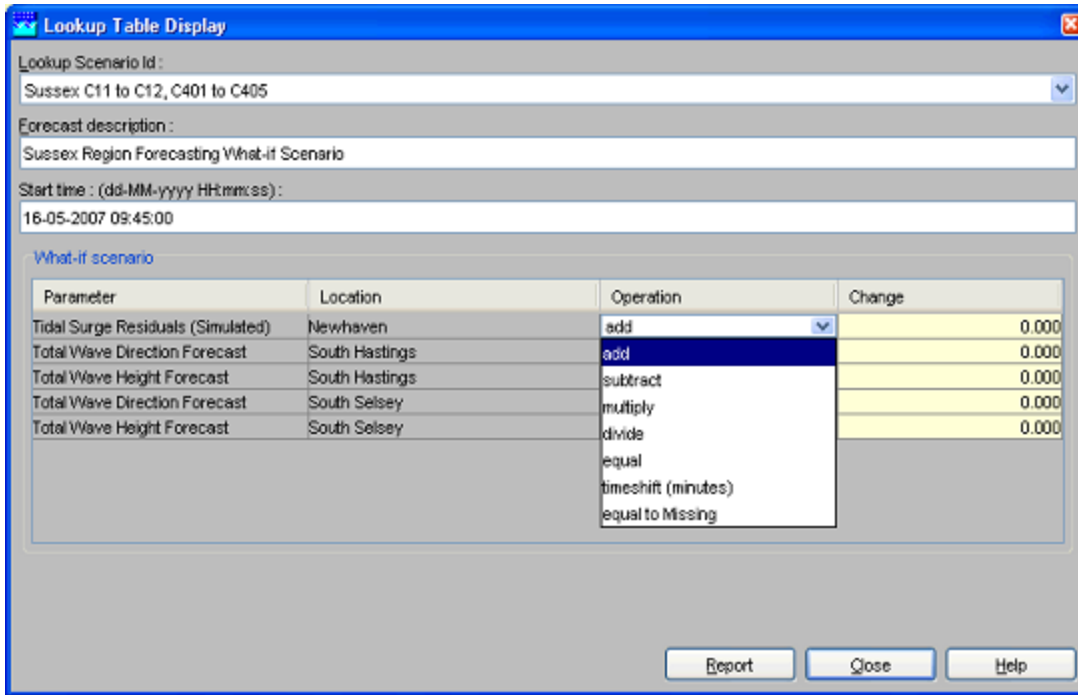
A description can be entered to identify the workflow run in the Lookup Table display.

Start time

A start time for the forecast can be entered in the date & time field (yyyy-MM-dd HH:mm). Please note that the length of the forecast is defined in the forecast workflow and can not be set here.

What-if Scenario

The what-if scenario frame displays the *input* series and corresponding locations for the selected workflow. A what-if scenario can be defined by selecting a mathematical operator and a value to be applied to the corresponding input time series for the selected lookup table. The mathematical operator can be selected via a drop-down list in the column *Operator*. The value can be entered in the table *Change*.



Report

By pressing [Report] the workflow is run and the result of a what-if scenario is displayed in an HTML report. The results of the above mentioned example is presented below.

Location	06/05/2004 01:00	06/05/2004 13:30	07/05/2004 01:45	07/05/2004 14:15	08/05/2004 02:30	08/05/2004 15:00
C1	Flood Warning	Flood Warning	Flood Warning	No Warning Issued	No Warning Issued	No Warning Issued
C2	Severe Flood Warning	Severe Flood Warning	Severe Flood Warning	No Warning Issued	No Warning Issued	No Warning Issued
C3	Flood Warning	Flood Warning	Flood Warning	No Warning Issued	No Warning Issued	No Warning Issued
C4	Flood Warning	Flood Warning	Flood Warning	No Warning Issued	No Warning Issued	No Warning Issued
C5	Flood Warning	Flood Warning	Flood Warning	No Warning Issued	No Warning Issued	No Warning Issued
C6	Severe Flood Warning	Severe Flood Warning	Severe Flood Warning	No Warning Issued	No Warning Issued	No Warning Issued
C7	Flood Warning	Flood Warning	Flood Warning	No Warning Issued	No Warning Issued	No Warning Issued

Close

With [Close] the display is closed. Please be aware that no results of the analysis are stored in the database.

16 KFlows Display

15 Lookup Table Display

Delft-FEWS User Guide

17 Trends Display

- KFlows Display
 - KFlows Calculations
 - Current day mode
 - Historical mode

KFlows Display

KFlows is a very specific module that is applied to monitor target flows over a water day at a specified site. In NFFS the model is applied only for Thames region. The KFlows display is the front end (user interface) of the KFlows module. The KFlows module may be run without an active connection to the network or even a Master Controller.

In principle the KFlows module in NFFS replicates the behaviour of the KFlows module set up in CASCADE (Thames region) with the following minor differences:

- the running mean excluding tidal influence has not been implemented in the NFFS version.
- the NFFS version will perform the calculations if less than two hours worth of data is available. A warning message will be issued if this happens

KFlows can be used in two working modes:

- *Current day mode*
This is the 'forecasting mode'
- *Historical mode*
This mode allows the user to view flows and trends of previous water days

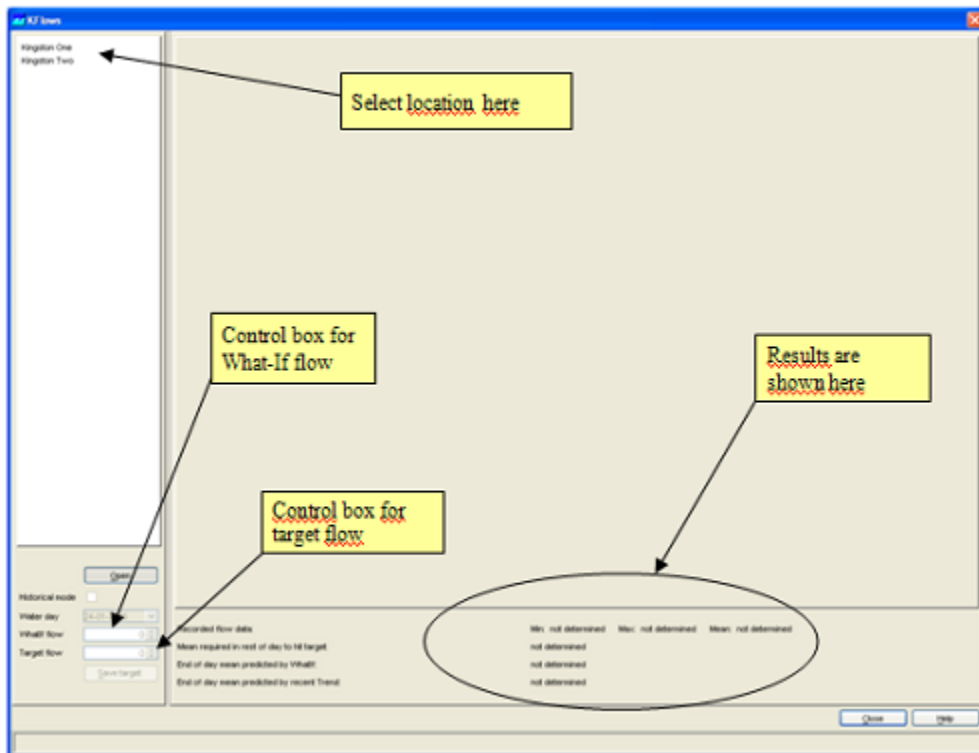
KFlows Calculations

The KFlows module performs the following calculations:

- First the average of the last 8 observed values (last 2 hours) is determined.
- This average (the current trend) is used to extrapolate the observed timeseries for the whole water day
- From this time series a running mean is determined that is displayed in the graph
- The end of day mean is determined and (in case of the workflow) stored in a daily timestep series
- The display can also use a what-if scenario for the rest of day flow. It then determines the amount of water needed to reach the target flow

Current day mode

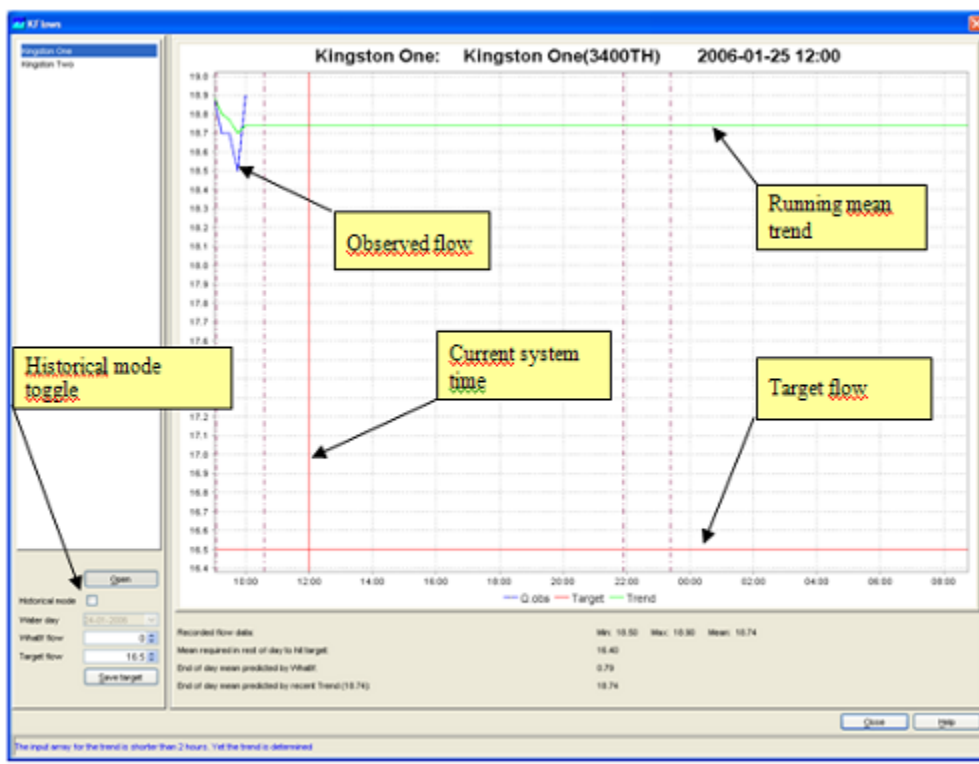
After opening the selected gauge the module will get the data and perform the calculations. If not enough data points (the number of points used is presently fixed at 8) are present between the current time and the configured start of the water day the calculation will use less points and a warning message will be printed in the status bar.



Using the controls on the bottom left part the target flow and the what-if flow for the rest of the day may be adjusted. After adjusting any of these, the calculations will be updated immediately.

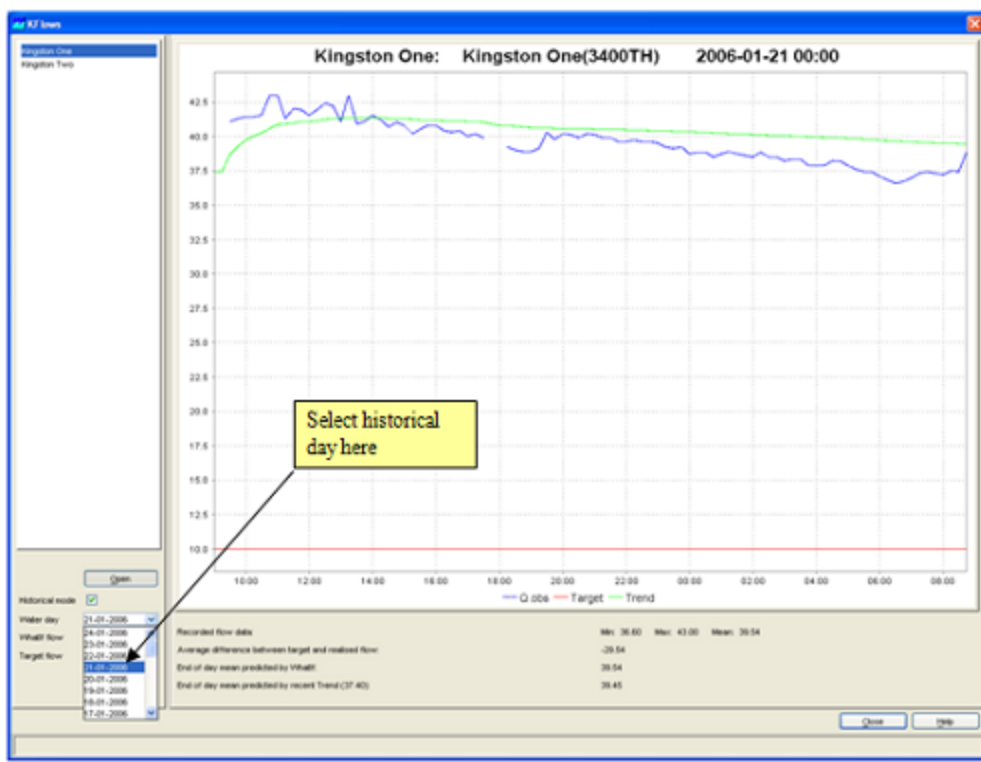
The periods with tidal influence (these are based on the Astronomical Highs and Lows) are shown as fine dashed vertical lines.

The save target button allows the user to save the target flow for that day. Saved target flows are used in the historical mode of the display.



Historical mode

The historical mode can be selected using the historical model toggle. After selecting this toggle the drop down box can be used to select a specific water day. The display will show recorded flow, target flow and the running mean trend for that day.



17 Trends Display

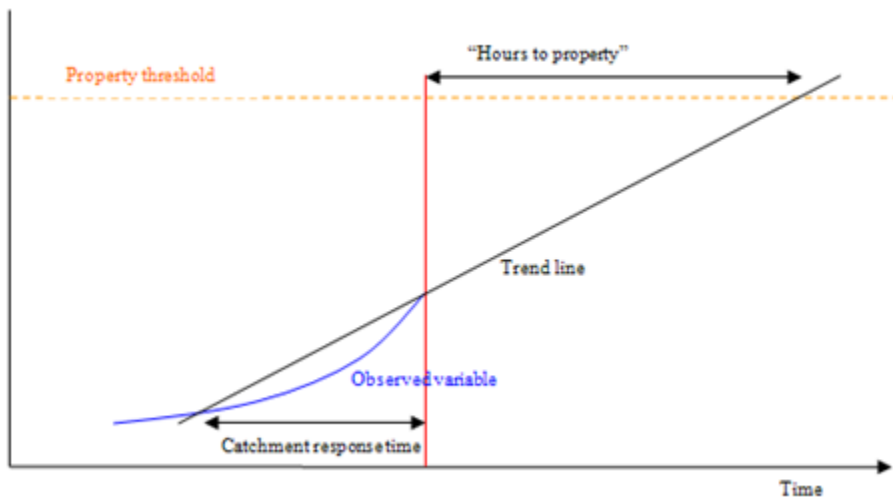
16 KFlows Display

Delft-FEWS User Guide

18 Longitudinal Profile Display

Trends Display

The Trends display is an interactive display that determines the difference between the last observation and a value some time ago, determined by the catchment response time. After that the average rate of change between these points is determined and extrapolated into the future. The display then indicates the remaining hours before the so-called "Property threshold" will be crossed (up to a maximum of 99 hours), as illustrated in the figure below.



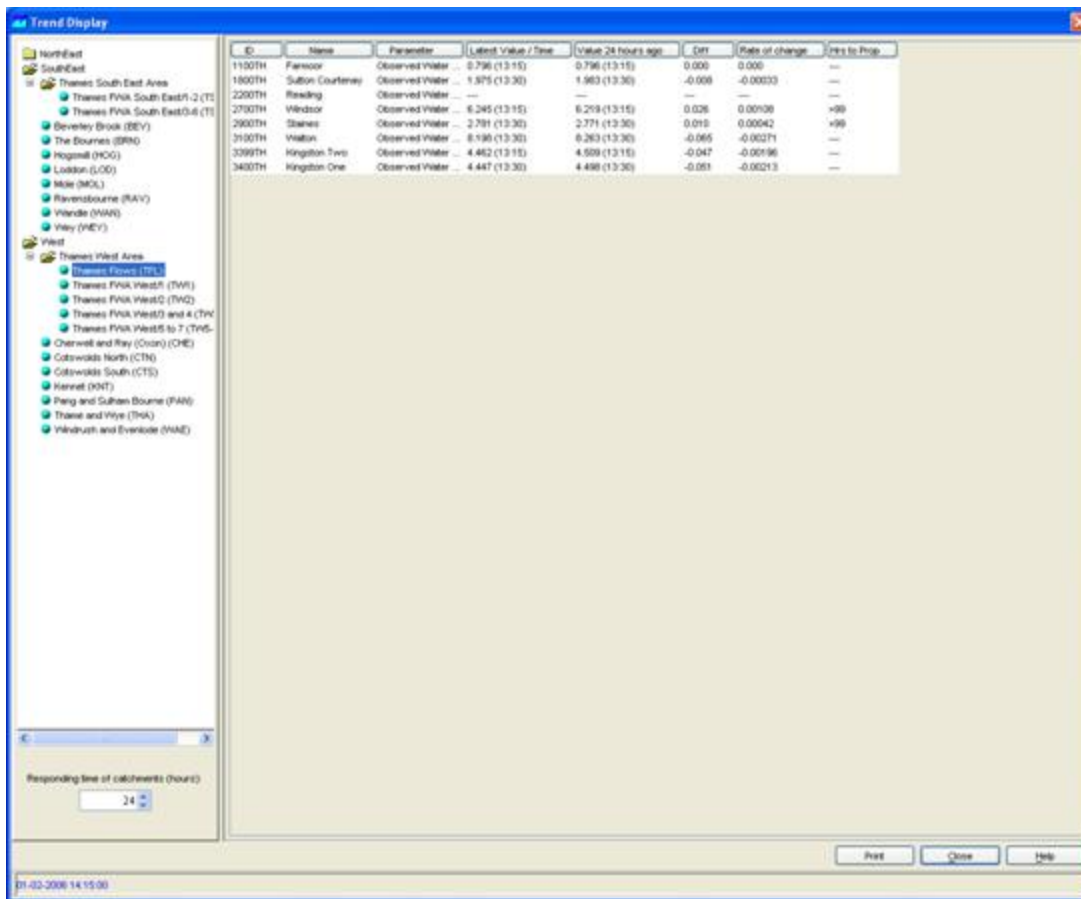
Note that when no data is available for the last hour up to the current system time, for that location the trend will not be determined.

The display shows the results for selectable groups of locations and may be printed to the default windows printer.

For each location in the display the following information is shown:

- Location ID and Name
- Parameter

- Latest Value / Time: the date and time of the latest value
- Value XX hours ago: where XX identifies the selected catchment response time
- Diff: the difference between the two values
- Rate of change: the difference per hour. This is the slope of the trend line.
- Hours to Prop: the amount of time from "Now" to the trend line crossing with the property threshold



18 Longitudinal Profile Display

17 Trends Display

Delft-FEWS User Guide

19 Calibration Display

Longitudinal Profile Display

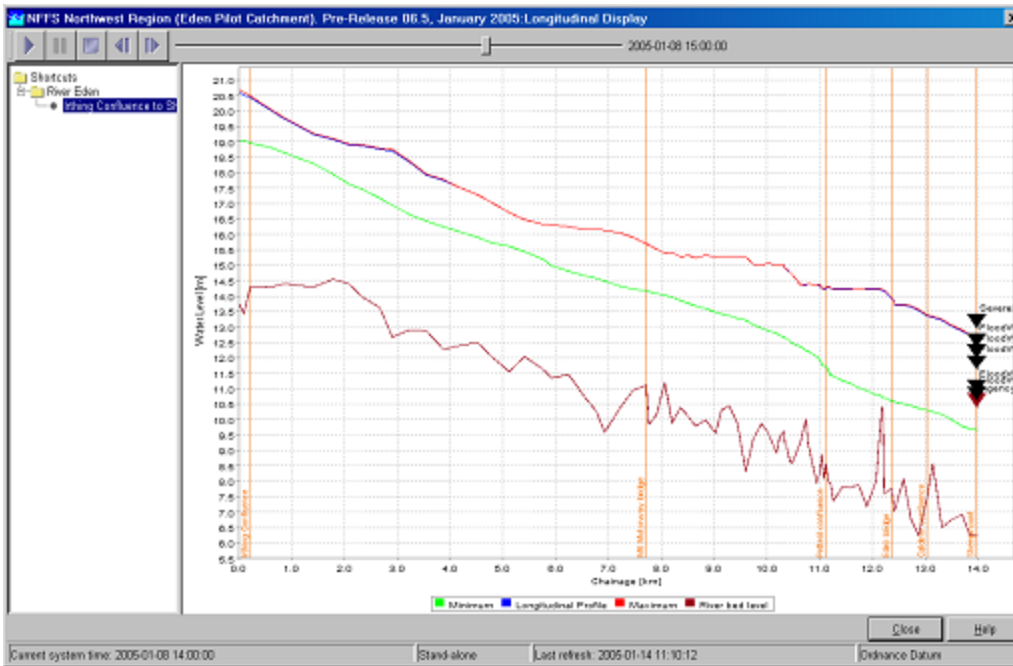
Since release 2015.02 the Longitudinal Profile Display is not supported anymore.

Since release 2007.02, the Data/TimeSeries Display can display longitudinal profiles in graph and table format. It therefore has become the preferred way to show longitudinal profiles and overtakes the functionality of the Display discussed below.

The FEWS Longitudinal display can be used to show time series, generated by hydraulic models for a longitudinal river profile, stored in the FEWS data store. Another option is to generate a longitudinal profile in the time series display.

To show longitudinal profile data press the **[Longitudinal Display]** button from the FEWS toolbar. When the Longitudinal Display is active you can see the following components on the Display:

- A list box with time series that can be displayed
- A graph component
- A Toolbar with the following options:
 - Buttons to start a movie of the longitudinal time series, pause or stop the movie
 - A slide bar that can be used to go forwards or backwards in time
 - A time caption showing the exact time of the time step that is shown
 - Two buttons to close the display or show the FEWS help file



When a longitudinal profile is selected from the list the graph component is loaded with data for the selected profile:

- Brown line with the elevation of the river bed
- Green line with the minimum water levels of the selected profile time series
- Red line with the maximum water levels of the selected profile time series
- Blue line with the water levels of the time step shown in the slider.

When the play button is pressed the time series will be shown in the graph as a kind of movie.

When configured other information than the time series can be shown in the graph. From the above example can be seen that also information on the location of motorways or bridges is added as well as thresholds for a location located on the selected branch.

19 Calibration Display

18 Longitudinal Profile Display

Delft-FEWS User Guide

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 - Results
 - Working efficiently with calibration

Calibration Display

The calibration display forms a special part of the forecasting systems that allow automatic calibration of any model connected to FEWS through the General Adapter. The model to calibrate must have a correctly configured General Adapter module Instance and included in a workflow. The calibration display (or utility) will be available only in the stand alone system, as it is not considered a functional part of an on-line system.

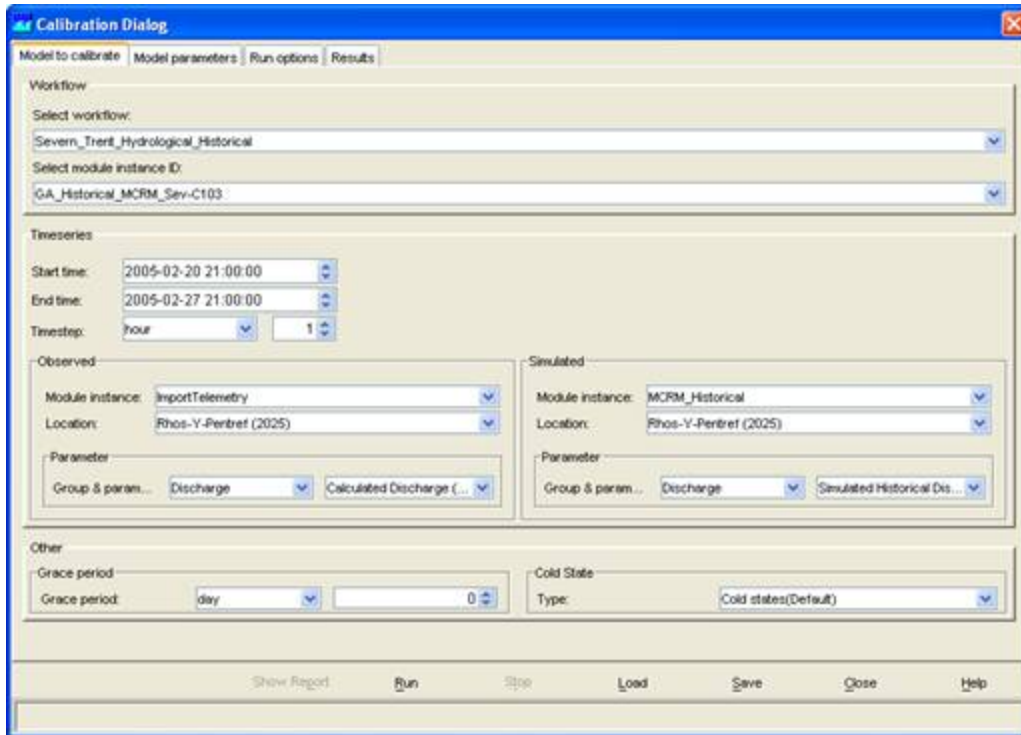
The calibration display will provide simple automatic calibration methods using either a non-derivative based local optimisation method or a more global optimisation approach (SCE-UA). While it is accepted that many alternative calibration approaches and algorithms are available, the functional scope of the module within FEWS is to provide a general purpose utility only, not necessarily encompassing all different optimisation methods. The algorithms applied are subject to research and development and the functional availability of the calibration environment may be subject to future expansion.

It is noted that for forecasting module development, the calibration utility is not seen as the primary tool with which to calibrate modules. These should first be calibrated outside FEWS in the native environments. The module within FEWS can then assess how the module perform in the linked environment. Alternatively, for modules where no native calibration environment is available, this module can be used, but it is a generic tool and therefore contains no module specific optimisation strategies.

The calibration utility will make use of performance indicators provided by the performance indicator utility, allowing comparison of calculated and observed data series.

Because of its interactive nature, the module is provided solely through a user interface plug-in that allows:

- Selection of the workflow to run during calibration. This workflow should obviously contain modules that allow calibration, though the system will not explicitly check on this.
- Selection of parameter and/or parameter sets to be calibrated.
- Selection of how module performance is to be assessed. The performance indicator module will be used to establish the performance.
- Selection of various calibration criteria, including termination criteria.



The Calibration display includes 4 tabs:

- Model to Calibrate
- Model Parameters
- Run Options
- Results

Model to Calibrate

In the first tab the user must enter all information concerning the model to calibrate. Not all models can be selected, the requirements for a calibration model run are:

- The model must allow module parameters to be exchanged through the Published Interface Exchange XML format.
- For each model the Parameter Files must be added to the ModuleParFiles configuration directory.

Currently only the Model Adapters for the MCRM & DODO models fulfil these requirements.

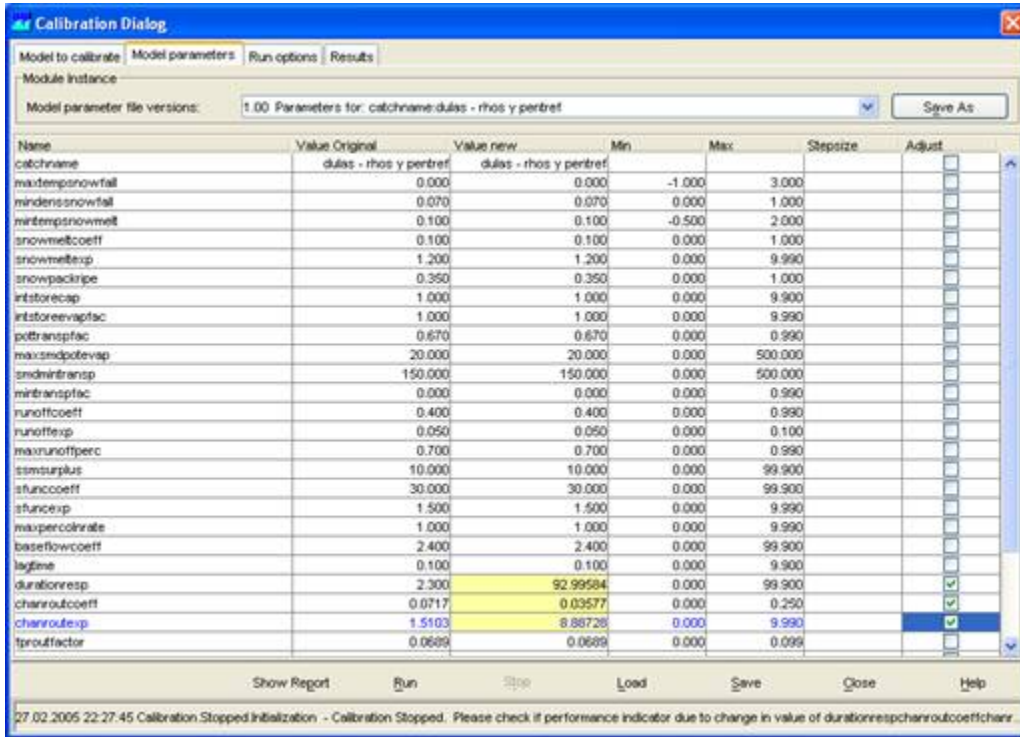
The required steps in the Model to Calibrate tab are:

1. Select the workflow that includes the model to calibrate from the list of available workflows.
2. When the workflow is selected the General Adapter Module Instance of the external module should be selected from the list. This General Adapter Module Instance must include configured elements that export model parameter files, adapted by the Calibration utility.
3. Select the time period to calibrate for by entering a start date and an end date
4. Select the observed time series; this is the time series that will be used to compare the model results with. It is important to select the correct module instance id that generated the observed time series (most often an import module instance) and the correct location id and parameter id.
5. Select the simulated time series that should be compared with the observed time series. The module instance id of this time series will be the module instance of the module to calibrate.
6. Enter a period for the Grace period. The model results produced in the grace period will not be included in the calibration optimisation.
7. Select the cold state group that will be used in the workflow.

Once the selection has been entered in the Model Calibration tab it can be stored to a file by pressing the [Save] button. Next time the calibration utility is used the [Load] button can be used to load the selection.

Model Parameters

The Model Parameters tab includes a spreadsheet with all model parameters that can be adjusted by the calibration utility.

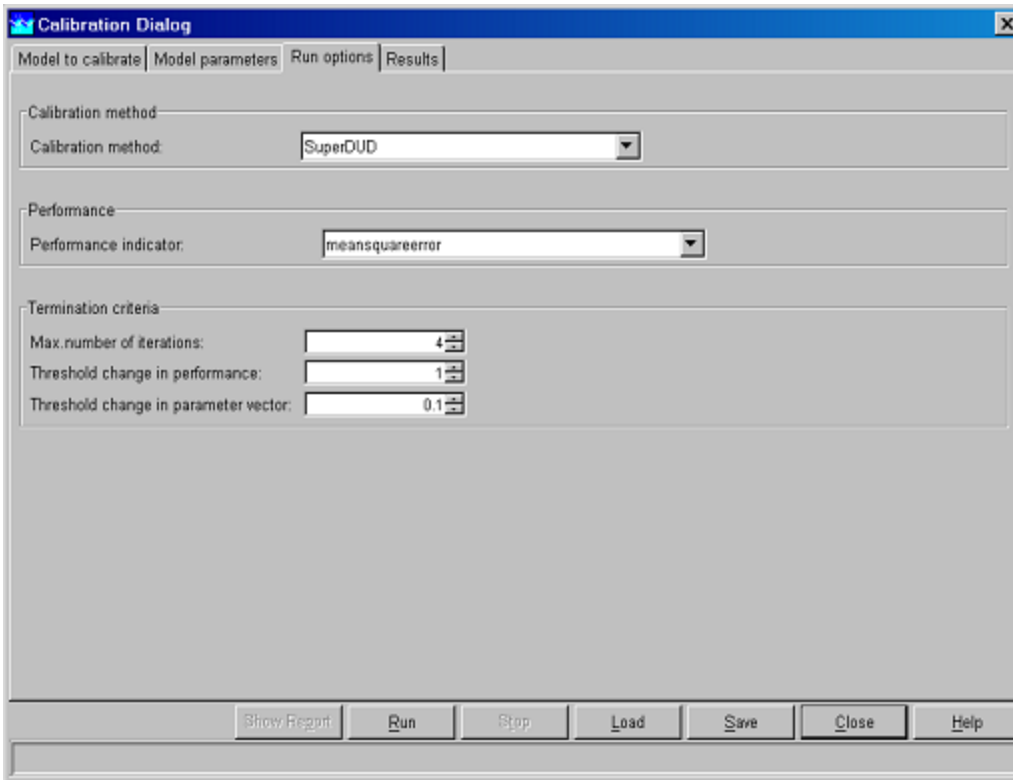


The parameters shown in the spreadsheet are the model parameters of the parameter file that is selected in the upper drop down list. Once the spreadsheet has been filled with parameter values the model parameters can be selected that need to be optimised through the calibration utility. A model parameter can be selected by checking the "Adjust" column in the spreadsheet. Make sure that the original, minimum and maximum values for the selected parameter have realistic values.

Run Options tab

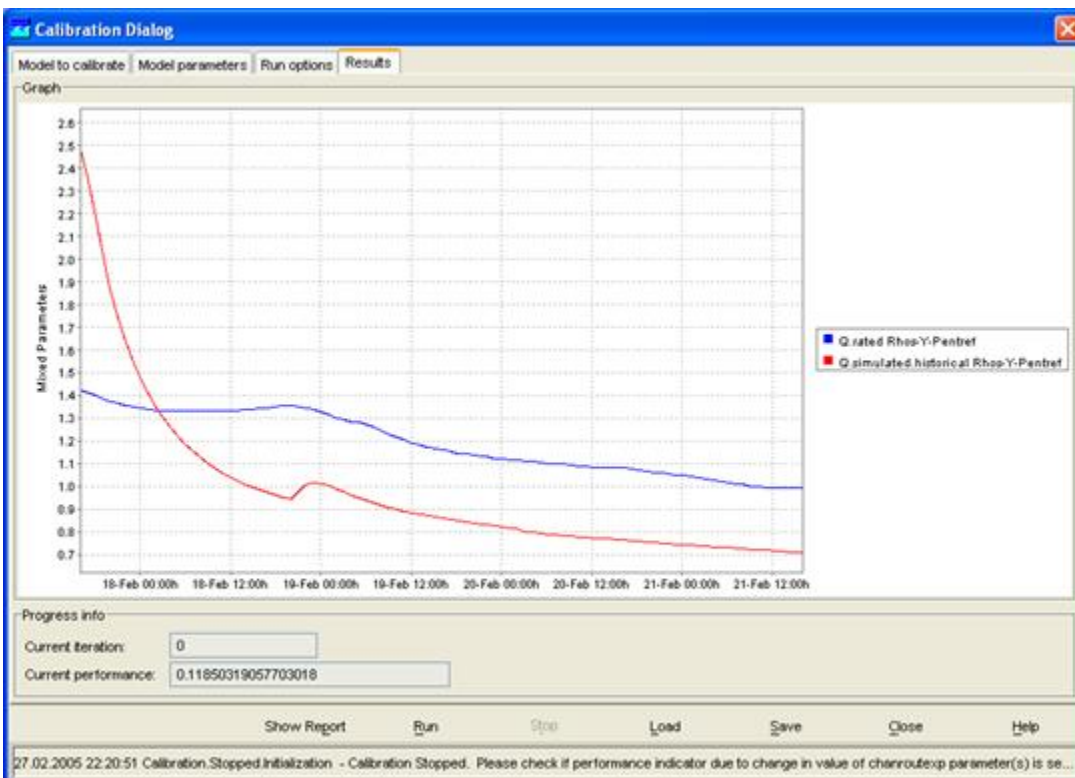
In the Run Options tab the final set of definitions must be set that allows the method and constraints of calibration to be defined. These include:

1. The calibration method to be used- thus may either be the Local gradient method "SuperDUD" or the global "SCE-UA" method. At the moment only the SuperDUD method is implemented.
2. The performance indicator to be used in calibration. The enumeration of this is "BIAS", "MAE", "MSE", "NS", "PEAK_MSE" and "PERCENT_VOLUME".
3. A number of termination criteria. All are available and may be selected for application or not considered:
 - a) Maximum number of runs.
 - b) Threshold change in performance
 - c) Threshold change in parameter vector



Results

The results tab shows the calibration results in a graph. To start the calibration utility the [Run] button must be pressed. The workflow will be started and the model parameters adjusted by the calibration utility. The user can follow the calibration progress by analysing the graph and the current iteration and current performance values located in the progress info frame.



After the calibration run is completed you can select to see a report by pressing the [Report] button. The report of the calibration run contains information on the model parameters that have been optimised in each iteration step.

By pressing [Close] the Calibration display can be closed.

Working efficiently with calibration

When working with the calibration utility a complete workflow must be run in order to optimise one of the modules in that workflow. In the calibration process this workflow will be run for multiple iterations. When the module is included in a fluvial workflow for the complete region each iteration will require a long time to complete. It is therefore recommended to create specific "calibration" workflows that only include one or several modules; the number of modules not contributing to the calibration module must be minimised. This will bring down the calculation time considerably. Especially for rainfall-runoff modules it will not take much time to create such calibration workflows.

When running the calibration utility a database must be used with a complete set of historical data. Such a database can be created using the on-line or off-line systems or by importing data from HARP.

20 Configuration Manager

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 - Steps for verifying the configuration in the master-controller database
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 - Adding command-line options using the launcher
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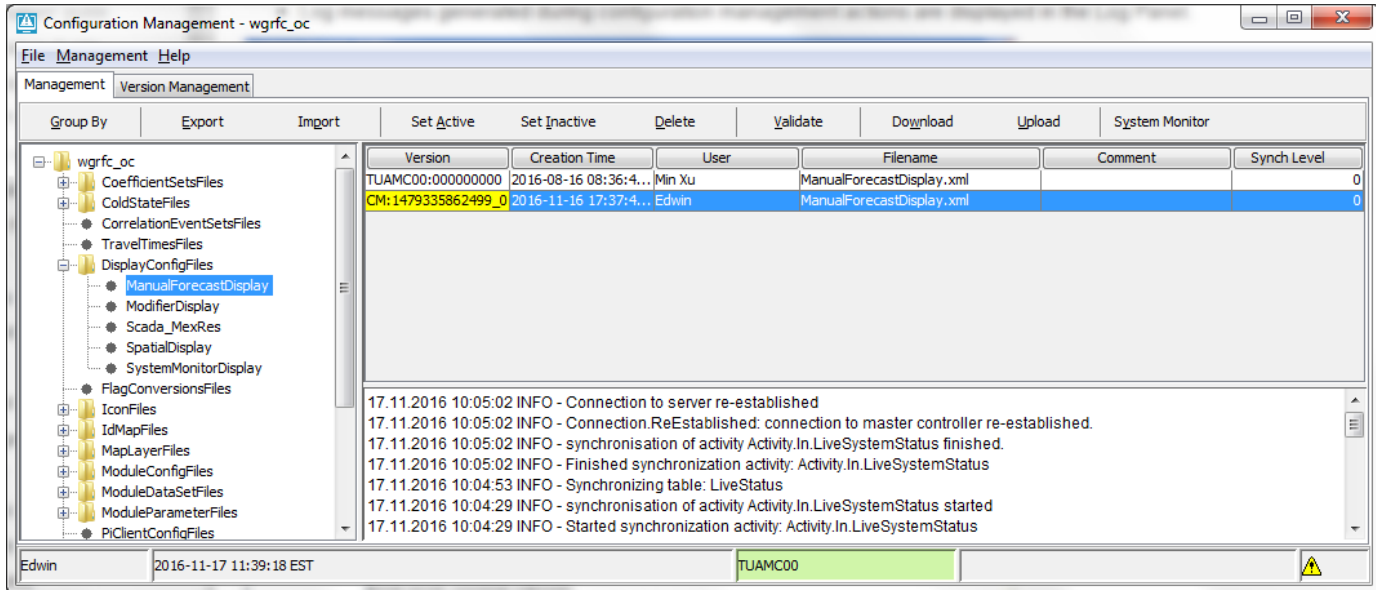
Configuration Manager - Introduction

From Delft-FEWS 2011_01 onwards the Configuration Revisions are stored more efficiently in the database. Please note that when the ConfigManager 2011_01 is started, it will not display Configuration Revisions from before 2011_01. Read [Migration of Configuration Revisions](#) (restricted access) for information on how to migrate the Configuration Revisions to the new 2011_01 format.

The Configuration Manager supports management of Delft-FEWS configurations. With help of the Config Manager files can be uploaded to and downloaded from the FEWS system. The tool also facilitates version management.

The display of the Config Manager is presented below.

- The tree view on the left hand side of the screen shows the various groups of configuration files.
- Configuration files of a selected type are displayed in the table in the centre of the screen. Files highlighted with yellow are part of the active configuration.
- Log messages generated during configuration management actions are displayed in the Log Panel.



The features offered by the Config Manager are available via the dropdown menus. A frequently used subset of the features is also available via Button Bar.

All options are described in the next sections.

Typical workflow for adding new Configuration

A typical workflow for adding new configuration via the ConfigManager consists of the following steps.

1. Remove the ConfigManager localDataStore.
2. Start the ConfigManager.
3. Login to the Master-Controller using the File->Login option.
4. Press Download and wait until all configuration is downloaded.
5. Press Import and import the new Configuration in the localDataStore.
6. Select the top root node in the config tree and press Validate the new Configuration.
7. When no errors are present, upload the changes and type a comment describing the changes.

Steps for verifying the configuration in the master-controller database

1. Remove the ConfigManager localDataStore.
2. Start the ConfigManager.
3. Login to the Master-Controller using the File->Login option.
4. Press Download and wait until all configuration is downloaded.
5. Use the Management -> Export All button to export all the configuration.
6. Inspect configuration in the *export_config* directory.

The Configuration Manager MenuBar

The following dropdown menus are available...

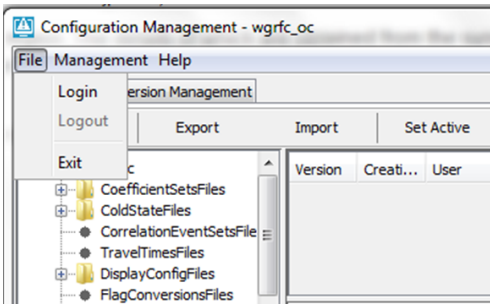
- File menu
- Management menu
- Help menu

File menu

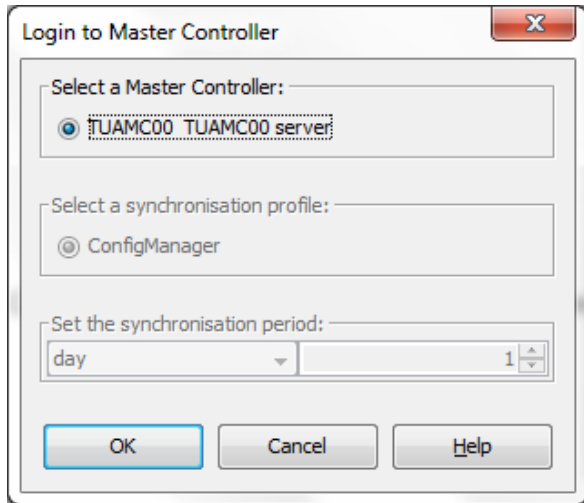
Login

In order to upload configurations to or download configurations from the server, you have to be logged in. By selecting Login you can choose to which of the servers running the Delft FEWS you want to connect.

When being logged in the [Upload] and [Download] button become active.



After selecting Login the following window is shown. In case multiple master controllers are available, these will be shown in the display.



Logout

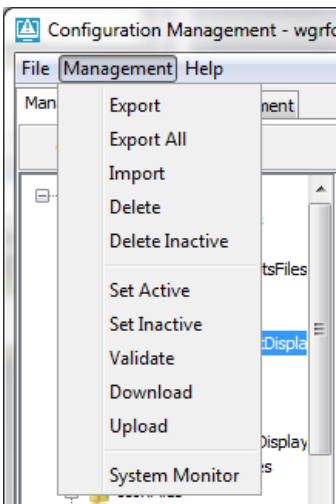
Logs out again after logging in at a MasterController.

Exit

Exits the Configuration Manager.

Management menu

The management menu offers you the following options...



Please that most options are also available from the Button Bar.

The various option available for managing configuration files are discussed below.

Export

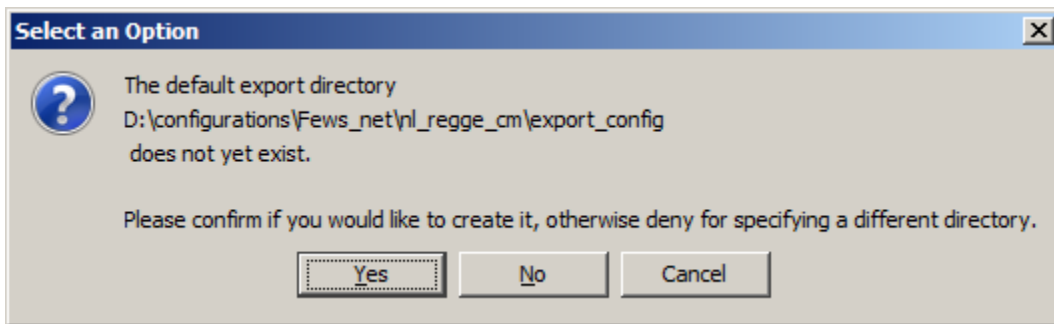
Allows you to export a selected configuration file to your file system. The exported files can be found in the \export_config folder in your Delft FEWS configuration folder.

See Export All, starting from 2015.01 two confirmation panels may be displayed that allow selecting the export directory. This directory is remembered via the user_settings.ini.

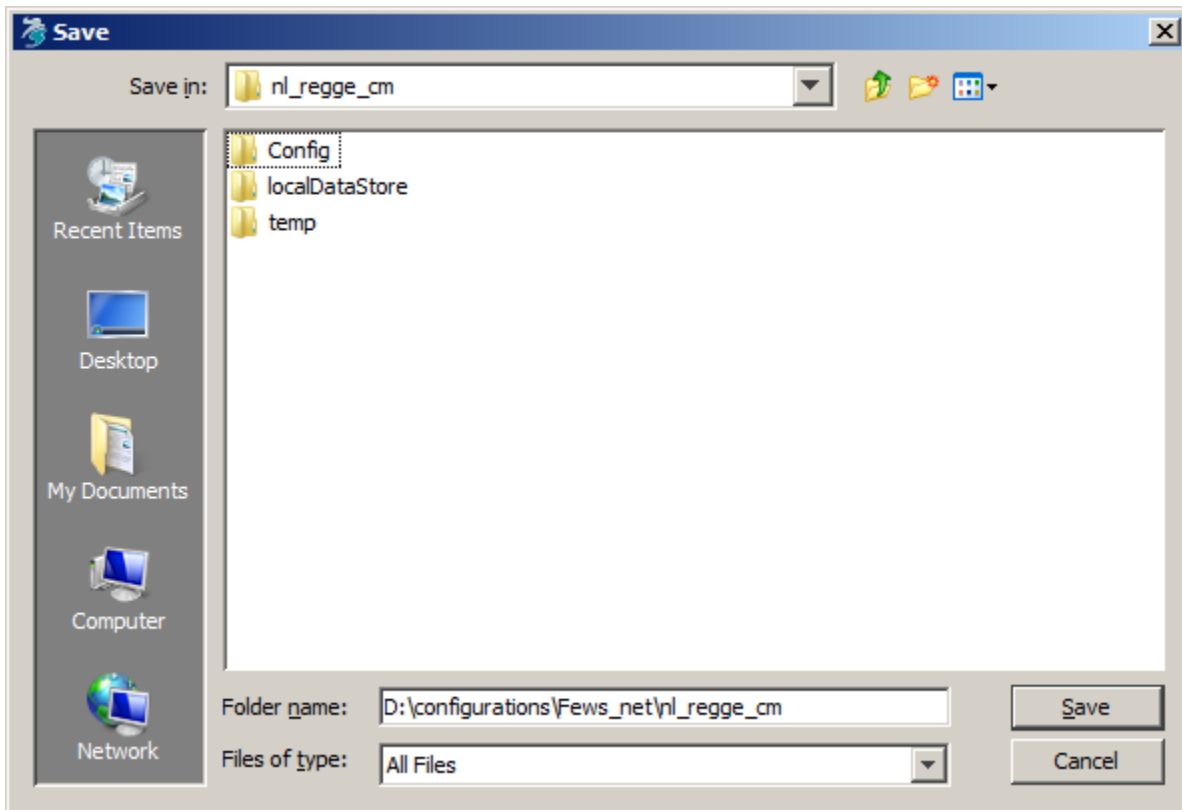
Export All

Allows you to export the complete configuration to your file system. The exported files can be found in the \export_config folder in your Delft FEWS configuration folder.

Starting from 2015.01, two confirmation panels may be displayed that allow selecting the export directory. This directory is remembered via the user_settings.ini.

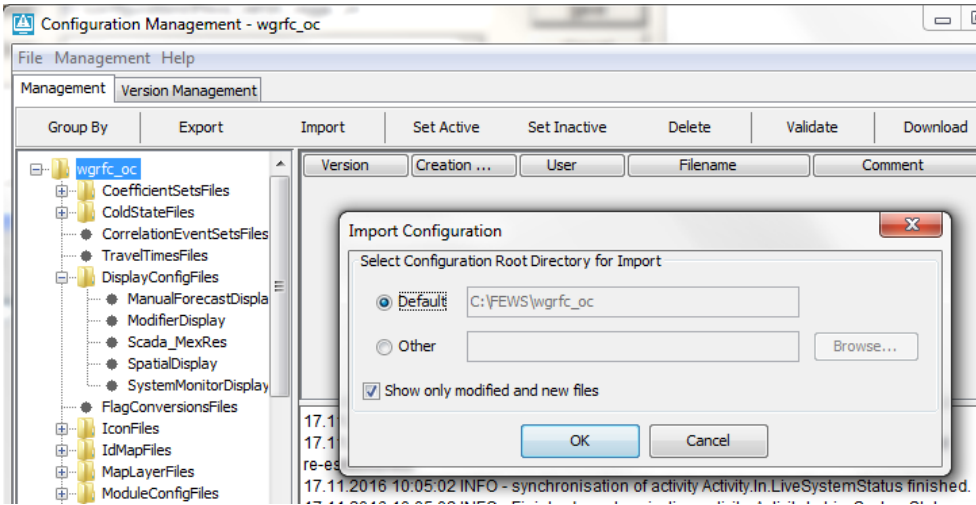


If the directory already exists, or no is selected, the user is allowed to enter a custom directory.



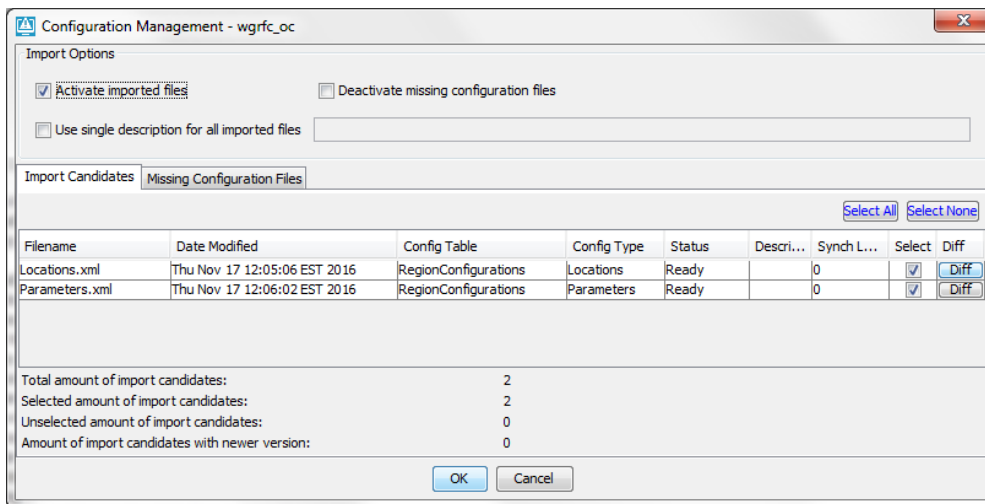
Import

Allows you to import configuration files from a user defined folder into the datastore of the Client. In case you select the root of the folder tree, you can import a complete configuration in one go. Make sure in that case you select the folder that holds the Config directory. Since 2015.01, the default import directory is preserved via the user_settings.ini.



Before an actual import takes place the following screen pops up and you will be able to perform the following actions...

- Ticking *Active imported files* allows you to automatically set all files to active upon import. In the table you can select and deselect individual files to be imported.



- Ticking *Use single description for all imported files* allows you to add the same description for all imported files. The description is shown in the Management tab. You can add description to individual files by placing your cursor in the relevant field in the table.

Delete

Allows you to delete selected configuration files.

Deleting configuration files is possible only in limited situations. A configuration file could at some stage be used in a forecast and must therefore remain available for at least the length of the rolling barrel.

Configuration files may only be deleted in the following situation:

- The configuration file ID is a local ID, ie it starts with the prefix "CM: ".
- The configuration file is not the active configuration file, i.e. it is not referenced in the default table

Set Active

Allows you to set files to active. This means that when synchronised to the server, they will be used throughout the system.

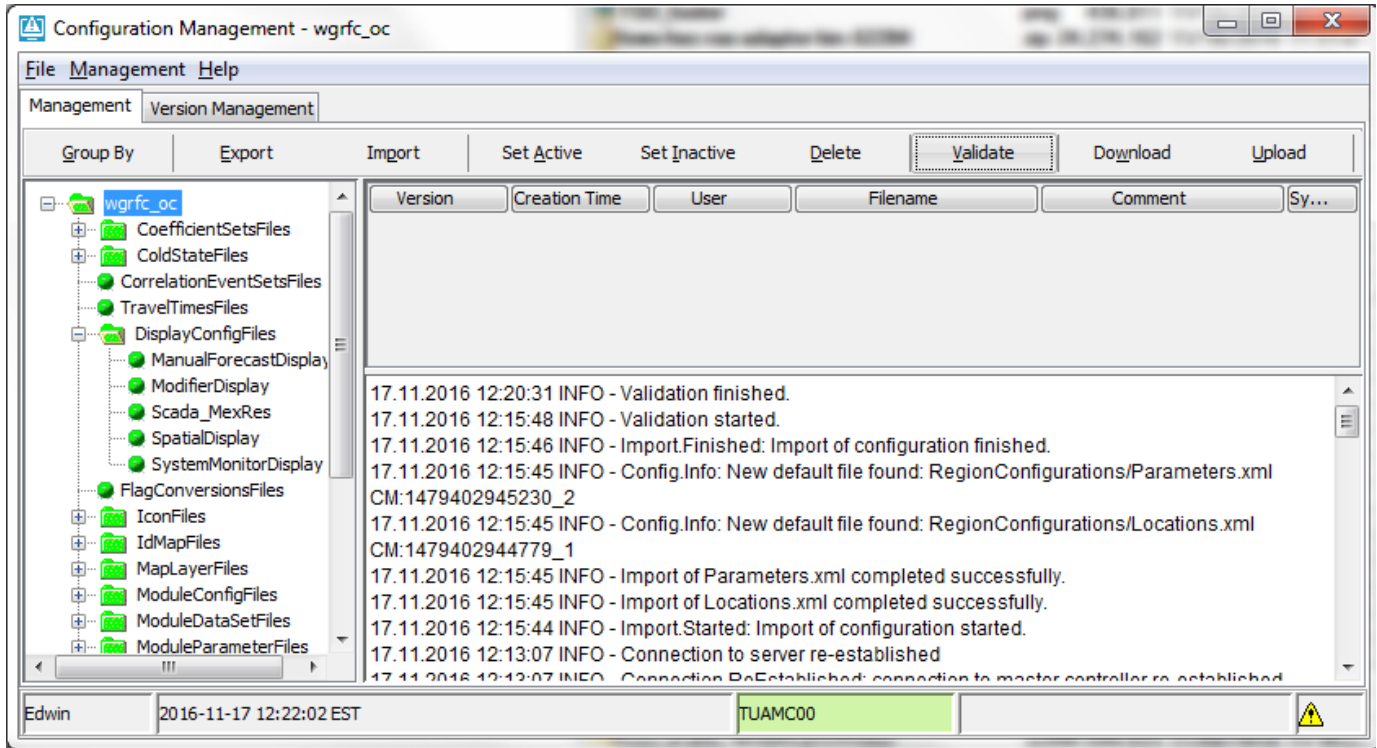
Validate

Allows you to validate the active configuration. It is checked whether all files that form part of the active configuration are valid XML files and comply to the XML schema they relate to. This should in principle always be done before uploading a configuration but is not mandatory. Following a *successful* validation the bullets in front of the groups of files turn green.

The Configuration Manager will not import or upload any configuration which violates the validation rules that have been set in the Configuration

Manager configuration file.

Any other configuration files that are not XML, ie HTML and binary files, cannot be validated.



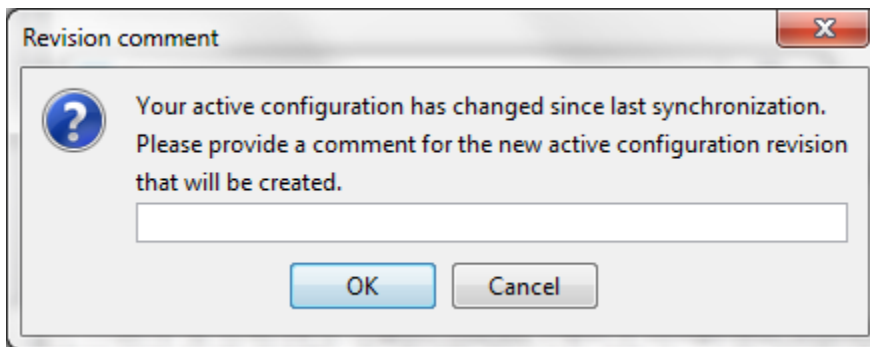
Download

Allows you to download a complete set of configuration files- active and non-active- from the server.

Upload

Allows you to upload the active configuration to the server. Please validate your configuration before you upload.

During the upload process you will be requested to add a comment to the upload action in order to be able to identify why this particular upload has been made. See screen below. This comment will be shown in the Version Management tab.



Uploading a configuration (file) involves that all modified and added configuration files are synchronized with the master controller database. An essential aspect of uploading is that the configuration files are provided with a unique Master Controller ID. The local ID that has been set for the configuration file cannot be guaranteed to be unique for the master controller as multiple users may be changing a configuration.

During the period between downloading a configuration and the ensuing uploading of a modified configuration, in theory some one else could have made a change to the same configuration. The configuration manager will not deal with this theoretical possibility. The procedure that is used is that of optimistic locking, where the last changes that are made to a regional configuration are the changes that are stored.

System Monitor

Opens the System Monitor to display log messages and status information. This display has been described elsewhere.

Log Browser Synchronisation Status Synchronisation Monitor

Log level	Log creation time	Workflow	Event Code	Log Message	taskRunId
ERROR	2016-11-17 12:12:55 EST		RemoteSession.Error	OC time out of synch with MC time by approx. 69 secs. This may result...	TUAMC00:000135041
WARN	2016-11-17 12:12:55 EST		Connection.Reconnecting	trying to reconnect ...	TUAMC00:000135041
WARN	2016-11-17 12:12:45 EST		Connection.Reconnecting	trying to re-login ...	TUAMC00:000135041
WARN	2016-11-17 12:12:44 EST		Connection.Lost	synchronisation problem reported: JMS connection lost	TUAMC00:000135041
WARN	2016-11-17 10:04:29 EST		Connection.Reconnecting	trying to reconnect ...	TUAMC00:000134317
ERROR	2016-11-17 10:04:22 EST		RemoteSession.Error	OC time out of synch with MC time by approx. 69 secs. This may result...	TUAMC00:000134317
WARN	2016-11-17 10:04:09 EST		Connection.Reconnecting	trying to re-login ...	TUAMC00:000134317
WARN	2016-11-17 10:04:05 EST		Connection.ReconnectFailed	reconnection (7) to master controller failed.	TUAMC00:000134317
WARN	2016-11-17 10:04:01 EST		Connection.ReconnectFailed	reconnection (6) to master controller failed.	TUAMC00:000134317
WARN	2016-11-16 18:53:46 EST		Connection.ReconnectFailed	reconnection (5) to master controller failed.	TUAMC00:000134317
WARN	2016-11-16 18:53:41 EST		Connection.ReconnectFailed	reconnection (4) to master controller failed.	TUAMC00:000134317
WARN	2016-11-16 18:53:36 EST		Connection.ReconnectFailed	reconnection (3) to master controller failed.	TUAMC00:000134317
WARN	2016-11-16 18:53:31 EST		Connection.ReconnectFailed	reconnection (2) to master controller failed.	TUAMC00:000134317
WARN	2016-11-16 18:53:26 EST		Connection.ReconnectFailed	reconnection (1) to master controller failed.	TUAMC00:000134317
WARN	2016-11-16 18:53:25 EST		Logout.Warn	Exception closing process context: Couldn't close JMS queue connection	TUAMC00:000134317
WARN	2016-11-16 18:53:25 EST		Connection.Lost	synchronisation problem reported: Failed to perform GET on: https://h...	TUAMC00:000134317
ERROR	2016-11-16 18:08:07 EST		RemoteSession.Error	OC time out of synch with MC time by approx. 65 secs. This may result...	none
ERROR	2016-11-16 17:10:29 EST		Datastore.Error	3 of 43502 database system activity rows are missing in the index file (...)	TUAMC00:000134276

Log creation time

End time: 2016-11-17 12:32:15 EST

View period: day 2

Refresh periodically:

Log level: WARN

External event code:

Search in message:

Max. number of messages displayed: 250

Buttons: Refresh, Acknowledge, Save, Close, Help

Version Management

Configurations changes are registered in the Version Management tab. Here is shown when configuration changes have been made and by whom. Comments entered during the upload are displayed to be able to identify the reasons for a particular configuration change. By default the system will show all the files belonging to the selected version. By selecting the "filter new or modified items" tick-box the list will only show the changed files compared to a version select in the drop down box next to it.

Configuration Management - wgrfc_oc

File Management Help

Management Version Management

Revisions

Revision	Date	User	Comment	Changes
TUAMC00:000000008	Thu Nov 17 12:23:30 EST 2016	Edwin	None	25865
TUAMC00:000000007	Wed Oct 26 11:02:30 EDT 2016	Min Xu	None	25865
TUAMC00:000000006	Wed Oct 26 09:50:10 EDT 2016	Min Xu	None	25865
TUAMC00:000000005	Wed Oct 26 09:46:13 EDT 2016	Min Xu	None	25865
TUAMC00:000000004	Fri Oct 21 08:30:50 EDT 2016	Min Xu	None	25865
TUAMC00:000000003	Fri Oct 14 05:06:49 EDT 2016	Evert de Vos	fews-development-201602-63543-patch	25865
TUAMC00:000000002	Thu Oct 13 06:02:57 EDT 2016	Min Xu	None	25864
TUAMC00:000000001	Wed Oct 05 09:52:00 EDT 2016	Min Xu	None	25864
TUAMC00:000000000	Tue Aug 16 08:47:22 EDT 2016	Min Xu	None	25857

Buttons: Full Reset, Export, Restore

Active configuration for revision TUAMC00:000000001

Compare with revision: Revision: TUAMC00:000000000, created at Tue Aug 16 08:47:22 EDT 2016 by Min Xu filter new or modified items

Modification	Table name	Config type	Version
New	IdMaps	IdImportMOSQTF	TUAMC00:000000000
New	IdMaps	IdImportRTMA	TUAMC00:000000000
New	IdMaps	IdImportMOS	TUAMC00:000000000
New	ModuleInstanceConfigs	ImportRTMA	TUAMC00:000000000
New	RegionConfigurations	RatingCurves	TUAMC00:000000000
New	WorkflowFiles	ImportPIXML	TUAMC00:000000000
New	ModuleInstanceConfigs	ImportQTF_MOS	TUAMC00:000000000

Edwin 2016-11-17 12:34:09 EST TUAMC00

With [Export] you can export a complete configuration to your file system. [Restore] allows you to revert back to a previously active configuration.

Command-line options for the Configuration Manager

For users of the ConfigManager who want to add command-line options, these must be added in the jpif file under Windows or in the fevs.sh script under linux. See the next section on howto add these for use with Windows/Linux/Launcher.

Automatic configuration download (-auto_download_configuration)

For users of the ConfigManager who want to automatically download the latest config, the option -auto_download_configuration is available (since 2011_02).

Note: The auto download option simply logs on and starts the configmanagers download like it is configured, which is <single> and not <continuous> by default. Therefore with multiple configmanagers the autodownload will not receive automatically updates when opened longer except on startup. There is a way to use autodownload with multiple configmanagers in this manner, but this requires a small edit of SynchProfiles.xml.

See the section

```
<profile id="ConfigManager">
```

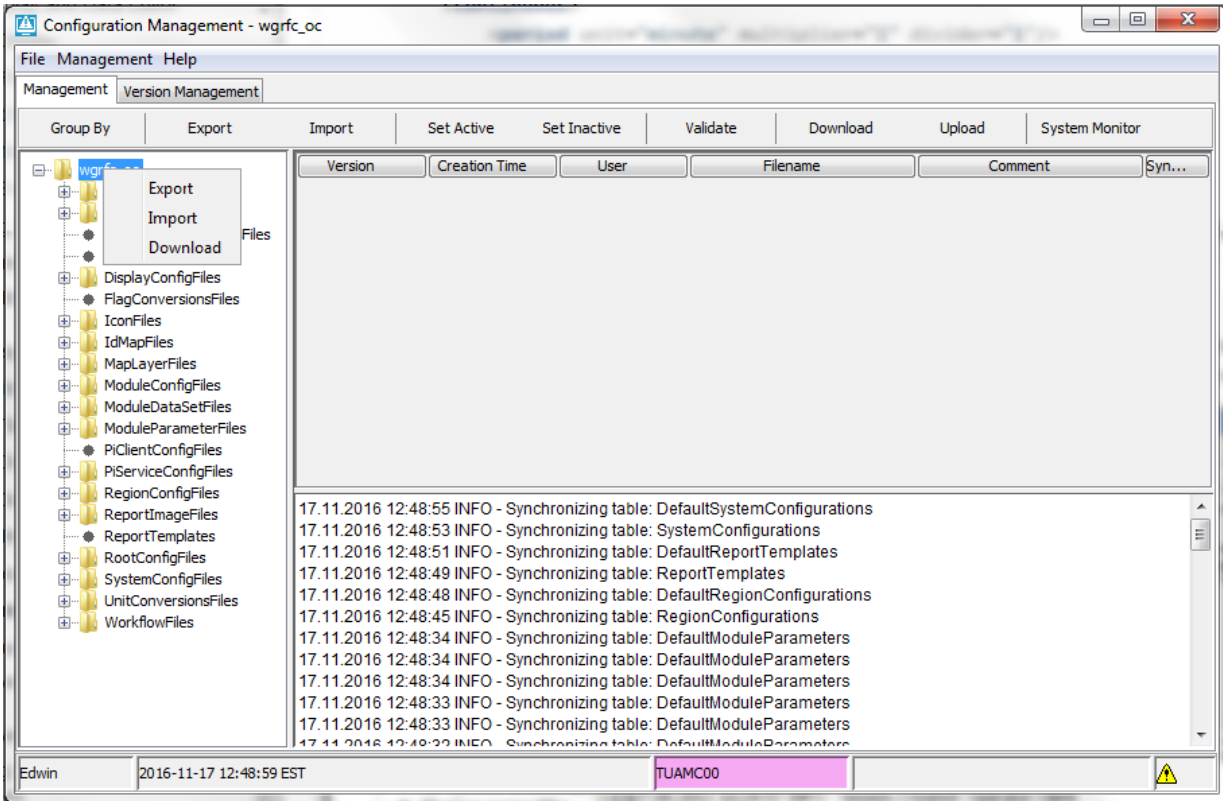
```
<activity id="Activity.In.Configuration">
  <channelId>Channel.In.Configuration</channelId>
  <schedule>
    <single>
      <priority>normal</priority>
    </single>
  </schedule>
  <timeOut>10000</timeOut>
</activity>
```

replace it with

```
<activity id="Activity.In.Configuration">
  <channelId>Channel.In.Configuration</channelId>
  <schedule>
    <continuous>
      <period unit="minute" multiplier="1" divider="1"/>
      <priority>normal</priority>
    </continuous>
  </schedule>
  <timeOut>10000</timeOut>
</activity>
```

Prevention of deletion (-prevent_deletion)

By design, the deletion of configuration files means that some existing config revisions may become incomplete (or corrupted). In order to prevent deletion of config files using the ConfigManagementApplication, the option -prevent_deletion has been added. This option will hide the buttons / menuitems and popup menu items that allow this to happen. The following screen shot illustrates that there is no delete button visible.

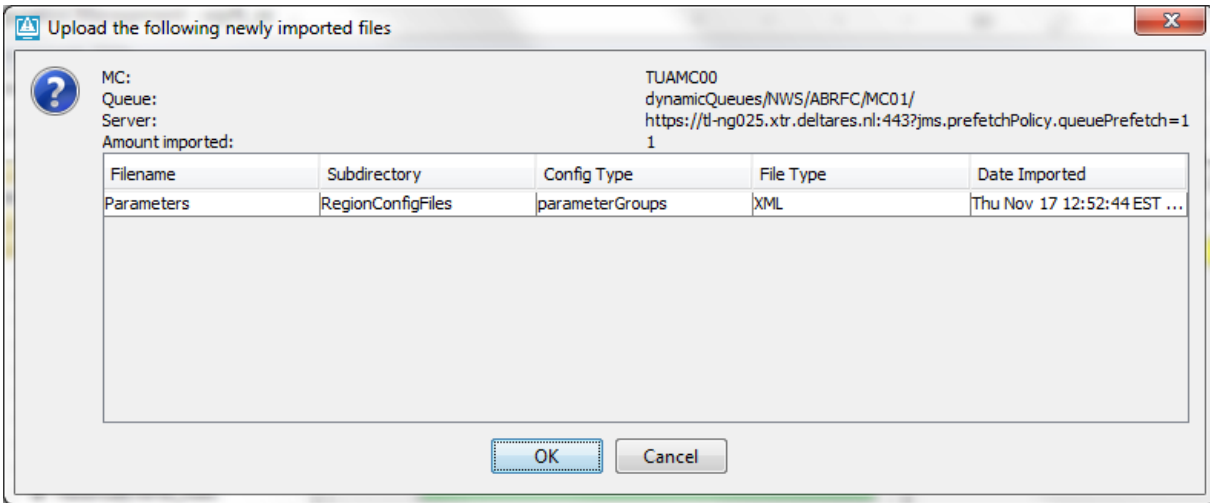


Prevention of upload (-no-upload)

For novice users, there is the option `-no-upload` that will allow only download and disable the upload button.

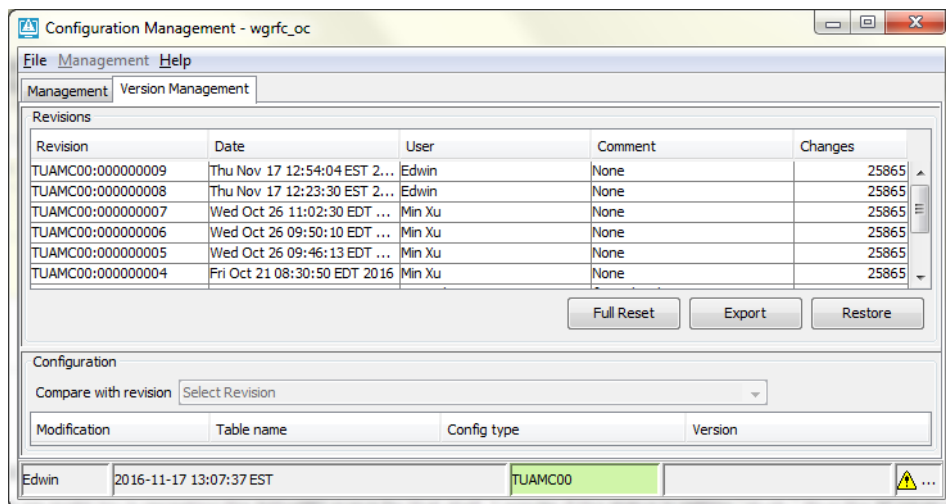
Extra confirmation of upload (-upload_confirmation)

In order to have the ConfigManager display an additional confirmation screen containing the newly imported configuration files, the ConfigManager can be started using the `-upload_confirmation` command-line option. This will allow the user to confirm before the upload is executed.



Enable full reset of config revisions (-enable-revision-full-reset)

The commandline option `-enable-revision-full-reset` enables the button in the revision management screen (and only when logged in). Since 2014.01 this button is disabled by default.



Howto add help command-line options

The following examples demonstrate how the **auto_download_configuration** is added to the command-line for several startup modes. Other command-line options can be added in a similar fashion.

Adding command-line options the jpif file under Windows

Before 2014.02 in the jpif file

```

..\jre
-mx512m
-cp
$JARS_PATH$
nl.wldelft.fews.configmanagement.ConfigManagementApplication
[FEWS_APPLICATION_DIRECTORY]
-prevent_deletion
-upload_confirmation
-auto_download_configuration
-enable-revision-full-reset

```

Note that the last line should be a linefeed.

Since 2014.02 in the .ini file

```

#Delft-FEWS ini file
main.class=nl.wldelft.fews.configmanagement.ConfigManagementApplication
classpath.1=*.jar

#Java Runtime jvm.dll location
vm.location=../jre/bin/client/jvm.dll
vmarg.1=-Xms512m
vmarg.2=-Xmx1024m

#location of the bin dir
working.directory=.

#region_home directory - <region_home> to be replaced with actual region
home directory
arg.1=../midlands_OC_activeMQ
arg.2=-prevent_deletion
arg.3=-upload_confirmation
arg.4=-auto_download_configuration
arg.5=-enable-revision-full-reset

```

Adding command-line options in the fews.sh script under linux.

```

if \[ "$configmanager" = "true" \]; then
${JAVA_HOME:-/opt/fews/java}/bin/java \-Xmx512M $JVM_OPTS
\ -Djava.library.path=$BINDIR \
\ -classpath "$classes" \
nl.wldelft.fews.configmanagement.ConfigManagementApplication $REGIONHOME
$BINDIR -auto_download_configuration
elif \[ "$launcher" = "true" \]; then
${JAVA_HOME:-/opt/fews/java}/bin/java \-Xmx128M $JVM_OPTS
\ -Djava.library.path=$BINDIR \
\ -classpath "$classes" \
nl.wldelft.fews.launcher.Launcher $REGIONHOME
else
${JAVA_HOME:-/opt/fews/java}/bin/java \-Xmx512M $JVM_OPTS
\ -Djava.library.path=$BINDIR \
\ -classpath "$classes" \
nl.wldelft.fews.gui.explorer.Application $REGIONHOME $BINDIR
fi

```

Adding command-line options using the launcher

When the Configuration Manager is started using the Launcher, please refer to the Launcher documentation for adding command-line options.


```

...
<javaApp region="FEWS Scotland" operationMode="OnLine"
javaClass="nl.wldelft.fews.configmanagement.ConfigManagementApplication"
jvmOption="-Xmx512m" argument="FewsSC_OC -auto_download_configuration"/>
...

```

How to deal with big ModuleInstanceDataSets files

The ConfigManager uses synchronisation, and as such is limited by what the synchronisation is capable of downloading and uploading. Some module instance datasets / cold state files can be large enough to cause trouble to the synchronisation. If the configmanager does not upload or download all the config files without problems, the synchChannels.xml file can be edited to skip for instance the moduleinstancedatasets as shown in the sample. Sometimes the solution can be that the big files are splitted up in smaller ones, or alternatively they should be distributed via a different mechanism to their destination (e.g. Forecasting Shells).

Sample synchChannels.xml excluding the ModuleInstanceDataSets and DefaultModuleInstanceDataSets

```

<channel id="Channel.In.Configuration">
  <incoming>
    <table>CorrelationEventSets</table>
    <table>DefaultCorrelationEventSets</table>
    <table>CorrelationTravelTimes</table>
    <table>DefaultCorrelationTravelTimes</table>
    <table>DisplayConfigurations</table>
    <table>DefaultDisplayConfigurations</table>
    <table>FlagConversions</table>
    <table>DefaultFlagConversions</table>
    <table>IdMaps</table>
    <table>DefaultIdMaps</table>
    <table>ModuleInstanceConfigs</table>
    <table>DefaultModuleInstanceConfigs</table>
    <!-- optional -->
    <!-- <table>ModuleInstanceDatasets</table> -->
    <!-- <table>DefaultModuleInstanceDatasets</table> -->
    <!-- end optional -->
  </incoming>
</channel>

```

Occasional clean up of config files using the MCRRecoveryTool

The design of the ConfigManager tool and master-controller database is intended for distributing the Delft-FEWS configuration, but is not suitable as an archive software for the configuration. We recommend that this is done by a dedicated backup system or versioning tool. Whenever the ConfigManager fails to upload / download config files, then it's probably time to clean up some inactive config files. The MCRRecoveryTool (to be found in the MC build directory) includes several options for cleaning the config files. One can either clean all the config or remove the inactive config files only. The active workflow files are never removed by the MCRRecoveryTool, since tasks for these active workflow files may be scheduled in the Admin Interface.

Known issue with patch mechanism

There is a known issue in 2014.01 with the Config Manager patch mechanism, where the first command-line argument of the Config Manager is ignored by the Config Manager. This is fixed in 2014.02. The workaround is to include the <binDir> just after the <regionHome>. See the following example.

```
..\jre
-Xmx512m
-cp
$JARS_PATH$
nl.wldelft.fews.configmanagement.ConfigManagementApplication
<regionHome>
<binDir>
-prevent_deletion
-enable-revision-full-reset
```

Configuration Editor

Getting started

Stand-alone using the file system

Before 2014.02 using a jpf file:

```
..\jre
-mx512m
-cp
$JARS_PATH$
nl.wldelft.fews.configeditor.main.ConfigEditorController
<REGION FOLDER>
```

Since 2014.02 in an ini file:

```
main.class=nl.wldelft.fews.configeditor.main.ConfigEditorController
```

Before 2014.02 Use within the Config Manager

Add the option "-edit-menu" to the JPIF to get the Editor available in the Config Manager. The Editor can be started through the menu option <Edit>.

```
..\jre
-mx512m
-cp
$JARS_PATH$
nl.wldelft.fews.configmanagement.ConfigManagementApplication
<REGION FOLDER>
-edit-menu
```

Since 2014.02 in an ini file:

```
#Delft-FEWS ini file
main.class=nl.wldelft.fews.configmanagement.ConfigManagementApplication
classpath.1=*.jar

#Java Runtime jvm.dll location
vm.location=../jre/bin/client/jvm.dll
vmarg.1=-Xms512m
vmarg.2=-Xmx1024m

#location of the bin dir
working.directory=.

#region_home directory - <region_home> to be replaced with actual region
home directory
arg.1=../<region_home>
arg.2=-edit-menu
```

21 Background Information

Background Information

Use of Time in FEWS

Within Delft FEWS, different concepts of time are used. In this section an overview is given of the various time concepts and their role in the system.

Internal time

The internal time is always Greenwich Mean Time (GMT). All time related information is stored in the FEWS database in GMT.

Current time

The current time is taken from the computer clock. For internal use GMT is derived from the computer clock and the time zone. The current time is by default displayed in GMT, but can also be displayed in local time.

Current system time

The current system time is the time in which the system 'lives'. The current system time moves forward in the so-called "Cardinal Time Step". In the live system the current system time will generally be the same as the current time. For analysis purposes, the system time can be set back to simulate a particular situation in the past.

When the system time is set back, only information- e.g. observed data and external forecasts- will be available to the system with a time stamp before the set system time. In case an hindcast for a particular flood is made with the *system time set back* to for example 13:00 on 21 January 2004, only data, that where imported into the database before this time will be used by the system. The system behaves as if the current time was 13:00 on 21 January 2004. When part of the required import data streams were missing at that moment but have been received later, they are *not* used in the analysis.

In case however, the same analysis is done *without setting back the system*, all data until the current time will be available for the analysis. This means that in this case also the above mentioned missing import data will be used in the analysis.

Display time

The display time is used in the time series display and allows the operator to define view windows on the selected time series. Setting the display time has no effect on data stored in the database.

22 Interactively modifying display colors

Users can interactively modify the colours used in their OC for a numbers of displays. This will not affect the configuration, but changes will persist between different sessions for that operator client (settings are saved in a user_settings file in the root directory).

Map display

Colours for map layers can be changed from the Layers pop-up, which holds the Map legend. Double clicking on an item there allows the user to modify the fill and line colour of the this layer. Color changes will impact the map as shown in the Grid display as well, as long as the layers in there have the same ID. The colour chooser will always open up with the default, configured colour to enable a reset.

Grid display

Colours for the classification of data in the grid display can be changed by double clicking on the colour-box in the legend. After modifications are made, the (right click) context menu will show an option 'Discard user-defined classification colours' to revert to the original, configured colour scheme.

Timeseries display

Timeseries: Colours for timeseries can be changed by double clicking on the legend for a timeseries. The colour chooser will always open up with the default, configured colour to enable a reset.

Thresholds/Time markers: These can be changed by double-clicking on these lines in the plot itself. The colour chooser will always open up with the default, configured colour to enable a reset.

23 Interactive Forecasting Displays

What is the IFD?

The IFD is short for Interactive Forecast Displays.

The IFD is a set of displays which enable the forecaster to create a forecast manually in comparison to a batch run which creates a forecast in a background process triggered either by a schedule or manually.

When a forecaster creates a forecast in the IFD, the forecast created in the background process is usually used as the starting point for the forecaster.

The forecaster validates the results from the server run and adjusts the forecast by using modifiers where needed.

When the forecaster is satisfied with the adjusted forecast the forecast is finalized and published to other forecasters.

Usually when creating a forecast by using the IFD, FEWS runs in a mode where all the windows are dockable.

This is an important aspect of the IFD because this feature enables the forecaster to keep an overview of the system.

Contents

- Contents
- Which displays are used in the IFD?
 - Forecast panel
 - Modifiers panel
 - Topology panel
 - Plot
 - Plot overview
 - Forecaster help
 - Run info
 - Forecaster notes
- How to create a forecast with the IFD
 - Steps in creating a forecast
 - Starting FEWS
 - Selecting the forecast panel
 - Review the list of available state date/times
 - Adjust state and/or forecast length
 - Starting the forecast process
 - Reviewing run status workflow
 - Review graphs (graph display listens to segment selection)
 - Creating a mod in the time series display
 - Creating a mod in the mods display
 - Continue with the forecast process downstream
 - Ending the forecast process
- Dockable windows
 - Docking and undocking main displays
 - Save display layout and reload on opening with same user

- Save display layout and reload default layout

Which displays are used in the IFD?

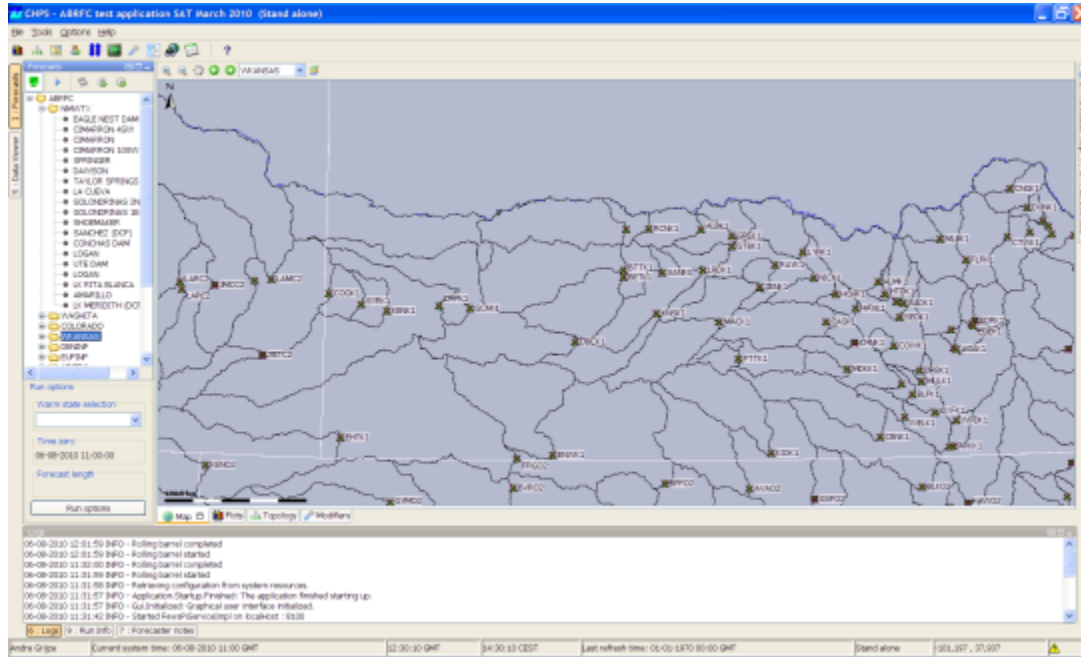
The IFD consists of several panels.

Each of these panels has a specific role in the process of creating a forecast with the IFD.

In this chapter the functionality of each panel in the IFD will be explained.

In the next chapter will be explained with a use case how a forecast can be created with the IFD by using the combined functionality of the separate panels.

Forecast panel



The forecast panel plays a central role in creating a forecast in the IFD.

The forecast panel shows a tree with all the forecast points for a region and the grouping of these forecast points.

Each node in the tree can be linked to a workflow. For example node EAGLE NEST DAM has its own workflow.

Each node also shows the current status of the last run of the workflow to which the node refers.

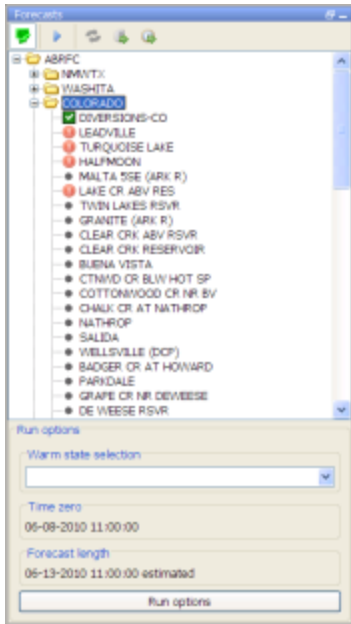
Workflows of parent nodes are always run on the server. By default leaf nodes are locally run, however it is also possible that these workflows are run on the server.

This can be done by setting the optional tag localRun to false for a node.

The leaf nodes are indicated by the small black balls in the display, parent nodes (node containing other parent nodes or leaves) are indicated as a folder in the forecast display.

When a leaf node is selected the ifd will automatically run the workflow of that node.

This behaviour can however be disabled in the configuration by setting the enableAutoRun-tag to false in the topolog.xml.



If the node shows a green checkmark (as is seen in the image above at the node DIVERSIONS-CO) item it means that the workflow has run successfully.

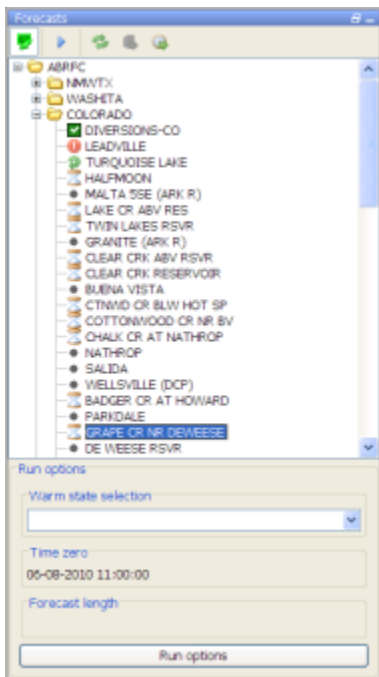
A red exclamation (as is seen in the image above at the LEADVILLE node) mark indicates that the workflow is failed.

A yellow ball indicates that the workflow was successful in a prior run, but the results have since been invalidated by some upstream change.

For example, when the forecaster has created a modifier but did not rerun the workflow yet.

Or when an upstream node was run later than one off its downstream nodes then the results of the downstream nodes are set to invalid.

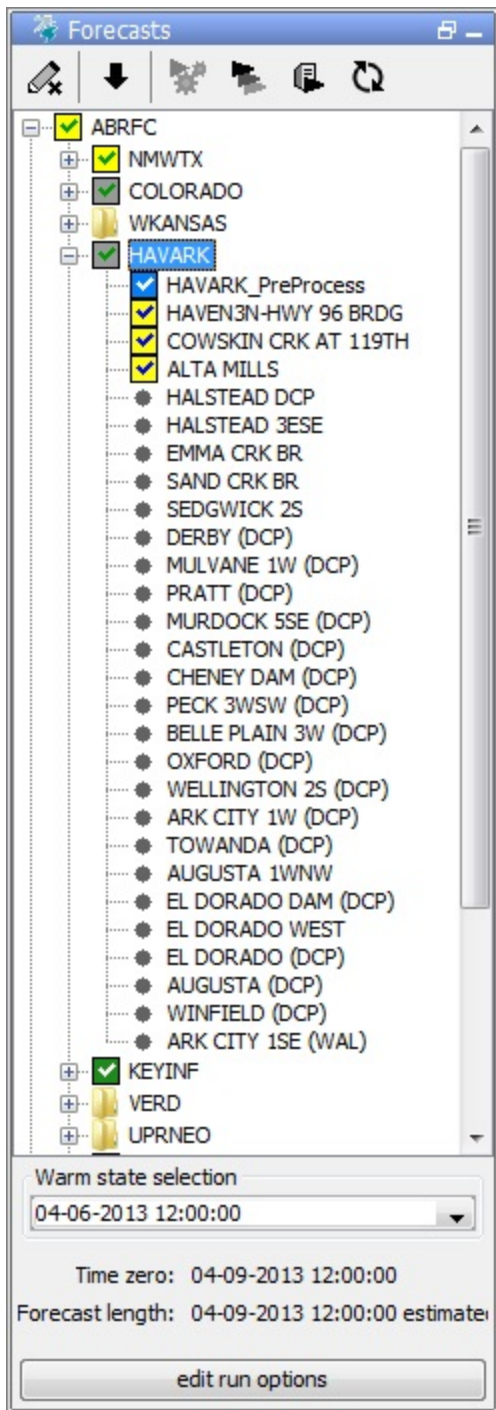
When a folder is shown for a parent node (as is seen for the COLORADO node in the image below) or a black ball for a leaf node (as is seen in the MALTA 5SE node) then the workflow has not run yet for the current time zero.



A green arrow (as is seen in the node TURQUOISE LAKE) indicates that the workflow is currently running (locally or at server).

An hour glass (see node HALFMOON above) indicates the workflow is scheduled to run.

As part of 2014.02, the color of the forecast icons has changed (see figure below).









We still have the green and blue boxes with the white check marks. They represent a server (green) or local (blue) run, with the same T0 and state settings as shown in the IFD.

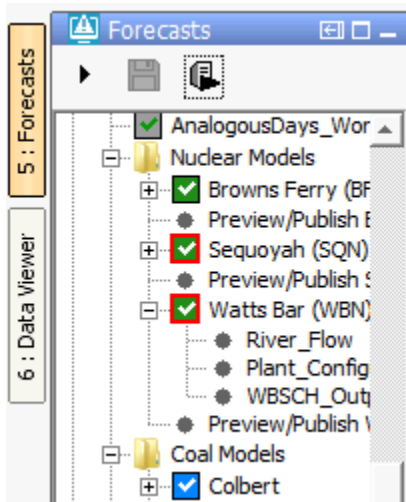
Prior to 2014.02 you would not see an icon at all if the T0 in the IFD was different than the T0 of the approved run in the database, or if the state settings in the IFD were different than the state settings of the approved run in the database. For releases starting with 2014.02, you will see multiple icons for the various situation:

A grey box with either a green or blue check mark. A grey box means the T0 of the approved run in the database is different than the one in the IFD. The check mark indicates whether the approved run is a local or a server run.

A yellow box with either a green or blue check mark. A yellow box means the state settings of the approved run in the database are different than the settings in the IFD. For example you might have a different warm state, warm state search interval, or forecast length. The check mark indicates whether the approved run is a local or a server run."

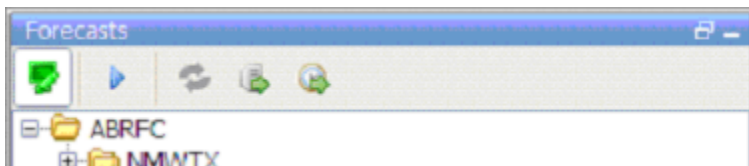
	Local	Server
Normal		
T0 diff		
State diff		

As of 2016.01, The IFD status icon can be surrounded by a red outline. See figure below. This red outline surrounding the IFD status icon indicates that the workflow task completed but not all of the data has been synchronised back to the operator client. This red outline feature is disabled for DDA clients as it pertains only to synchronisation in LDS clients.



Go to next segment Adjust T0

Run on Server Forecast/View-button



Re-Run button

At the top of the forecast panel several buttons are shown.

The first button is a **Forecast/View** toggle button (Put image of the button here) which can be used to switch from *View* mode to *Forecast* mode.

In the *Forecast* mode the forecaster can create modifiers and when a leaf node is selected the workflow is run automatically. In *View* mode the forecaster can view the results of other forecasts.

However, it is not allowed to create modifiers and workflows will not be run automatically when a node is selected. A workflow can be forced to run by pressing the **Re-Run** button.

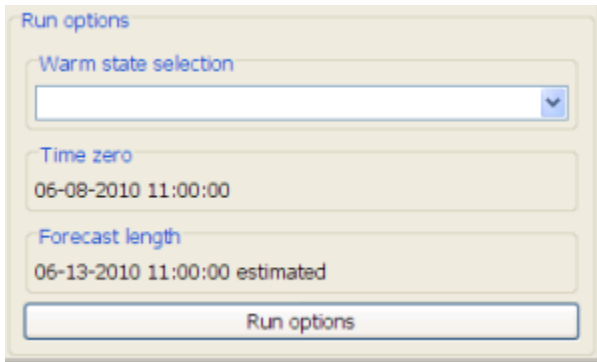
The second button is the **Go to Next Segment**-button (image of button here). By pressing this button automatically the next leaf-node in the forecast panel will be selected.

The third button is the **Re-Run**-button (need button image). This button is only enabled when a node is selected which has a workflow which runs locally.

The fourth button is the **Run on Server**-button (need button image here). This button is only enabled when a node is selected with a workflow

which should run on the server.

The last button is the **Adjust T0** (need image of button) button which allows the forecaster to adjust the current system time to the nearest cardinal time step prior to the current time.



At the bottom of the forecast panel there is a Run options section. In this section the forecaster can set the properties of the run. The warm state can be selected and the current Time zero is also displayed. More advanced options are available with the button **Run options**.

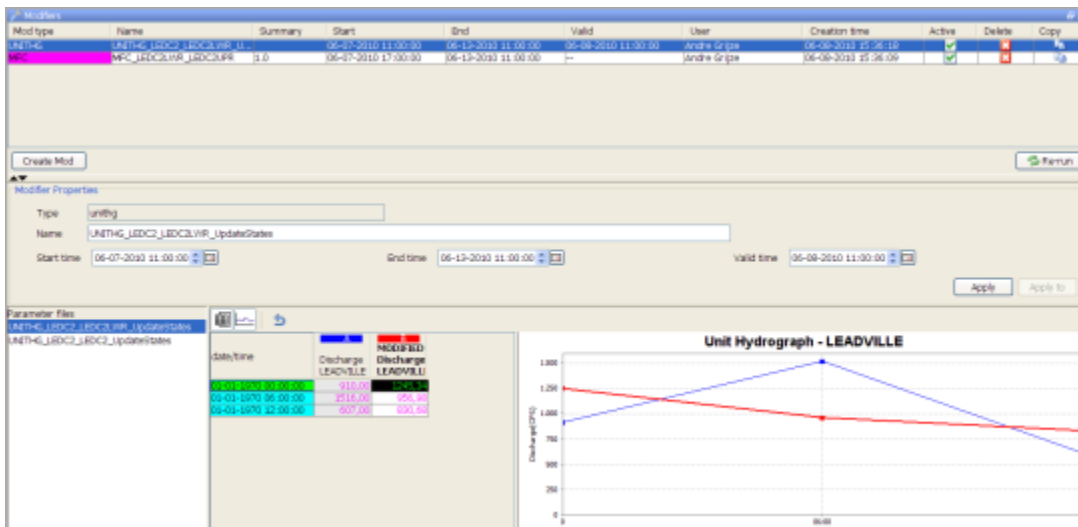
Modifiers panel

The modifiers panel is an important display in the IFD.

It shows the modifiers which are created for a certain node. Modifiers can be created, modified or deleted in this panel.

The upper part of the display gives an overview of the modifiers created for the currently selected node in the forecaster panel. It lists the Start Date, the End Date, the Valid Date and the Creation time of the mod. It also allows the user to make mods active and inactive with the checkbox in the column Active.

A mod can be deleted by pressing the red cross icon and a copy can be made pressing the copy-icon.



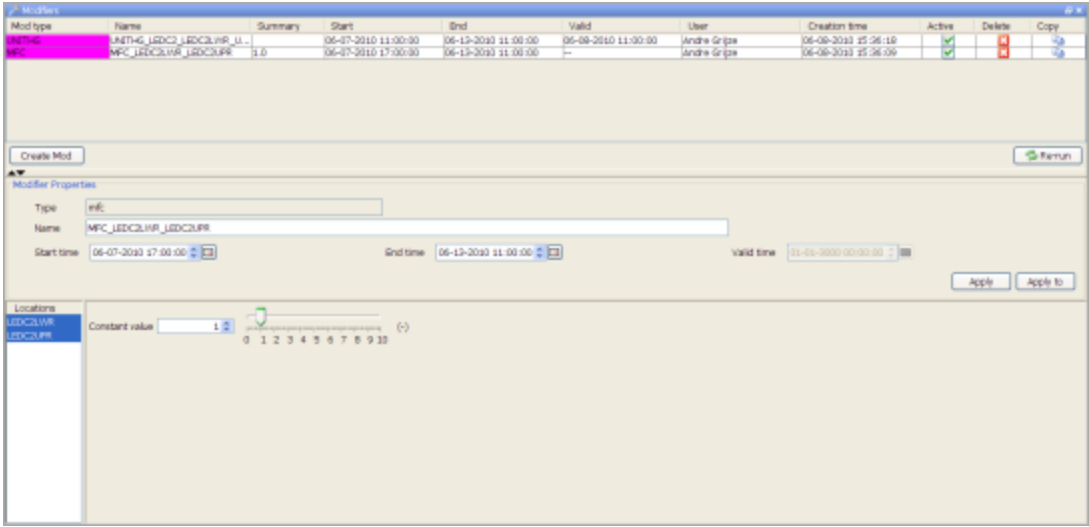
With the create mod-button the forecaster can create new modifiers. When the button is pressed a dropdown-list with the available modifier types for the currently selected node is shown.

The modifiers which are shown are depended on the models, transformations and module parameterfiles available in the workflow of the selected node and the plots which are associated with the node.

In the modifierTypes.xml is defined which modifiers are available for the forecaster. The combination of the configuration of the modifierTypes.xml and the workflow and the time series in the plots

When a modifier type is selected, the details of the new modifier is shown in the lower part of the display. In some cases it is also necessary to specify to which models the modifier should be applied.

For example when the forecaster selects the modifier type MFC and there are two SNOW17-models available in the segment, the forecaster should also specify to which models the modifier should be applied.



When the modifier can be applied to more than one model in a basin a 'location'-panel shows up at the left part of the details display. In this panel the forecaster can select to which locations the modifier should be applied.

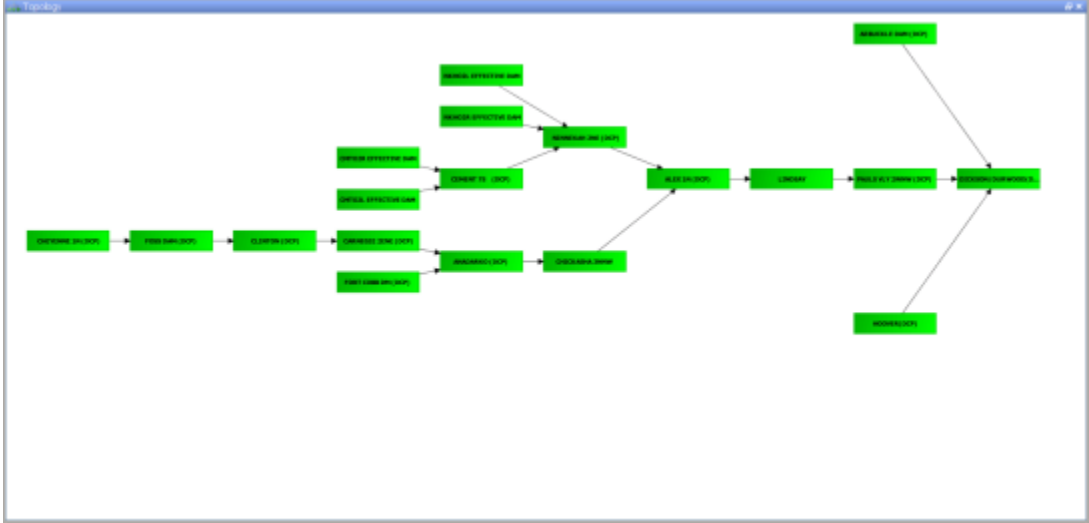
The Re-run button runs the workflow from the selected node and the workflows from the upstream nodes.

The lower part of the display shows the details of the selected modifier or when the forecaster is creating a new modifier the details of the new modifier.

Topology panel

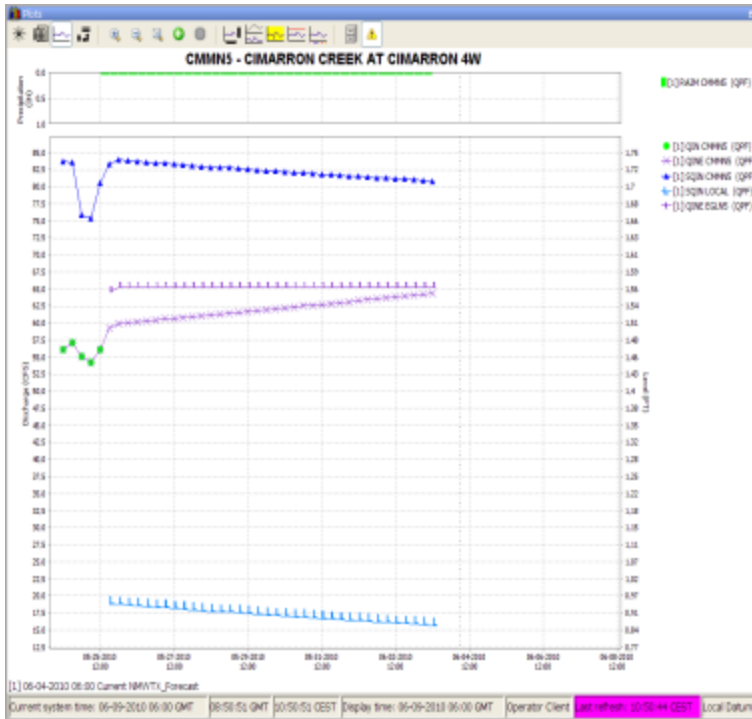
The topology panel shows the topology of the selected node. When a leaf node is selected the topology of the parent node is shown. When a parent node is selected the topology of its children is shown.

The colors of the boxes in the topology change when a threshold is passed. The color of the box and the thresholds which are monitored can be configured.

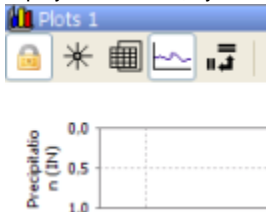


Plot

The plot display is used to show scalar time series. Each node has its own set of predefined displays configured. When a node is selected the plots display automatically updates the plots which are already displayed to show data for the new node. The first plot configured for the selected node is automatically shown in this display.



When the IFD is started, there is always at least one plot display available. This plot is called the primary plot display. The primary plot doesn't have lock icon at the left of the toolbar. When a new plot display is started this plot will have a lock icon at the left on the toolbar. When a new plot displayed is started, by default the plot will be locked.

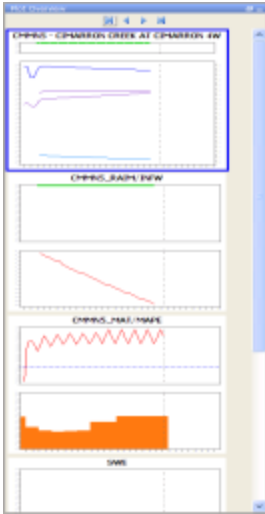


When a plot is locked, the display is locked to that set of time series. When the forecaster moves from basin to basin, the plot will continue to display the original timeseries. The plot is not updated. However, as new data is brought in, the plot is updated with new data. When the toggle-button is switched off (icon changes to unlock) the plot window is updated automatically when a new node is selected.

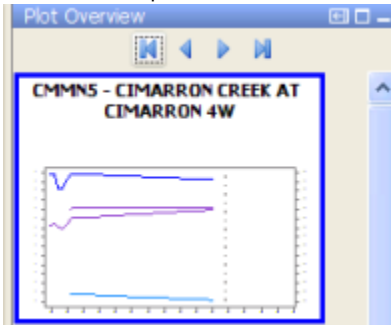
Plot overview

The plot overview is a panel which shows a thumbnail of each plot which is configured for the selected node. This panel gives an overview of the selected node. This overview is enabled by configuring the following task in the explorer tasks; `nl.wdelft.fews.gui.plugin.displaythumbnails.ShortcutsThumbnailsDialog`

When a plot is selected the primary plot is automatically updated, also other plots display which are not locked (see previous chapter) are updated. Primary plot is defined by including the following task in the explorer tasks: `nl.wdelft.fews.gui.plugin.timeseries.PlotsTimeSeriesDialog`. If such task is not defined the Plot Overview works only if a time series dialog window is open.



At the top of the panel there are four buttons. The first button selects the first plot, the second button selects the previous plot, the third button selects the next plot and the last button selects the last plot.



Forecaster help

The forecaster help panel shows user provided documentation which is available for a node.

Currently the following formats are supported: textfiles, images and pdf-files.

Users can place documents in a directory within predefined directories.

These directories can be configured in the topology.xml configuration file by adding a forecasterHelperDirectories element that contains a directory element for all directories.

For instance:

```
<forecasterHelperDirectories>
  <directory>d:\Data\ForecasterHelperData\</directory>
  <directory>d:\Data\FHD3\</directory>
</forecasterHelperDirectories>
```

If this is not present in the topology.xml the directory in the global.properties defined by the INFORMATION_PANEL_FOLDER property will be used.

Within these directories each node has its own directory. The directory should have the same name as the node id.

Within that directory the documentation for that node can be placed.

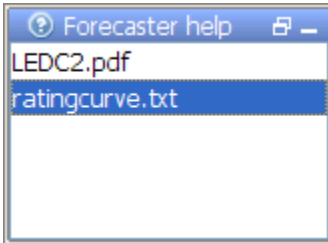
If you make use sub-folders, make sure to also include the main folder as a directory when you list the <forecasterHelperDirectories>. Documents in the folder configured as <allNodesDirectory> will be visible at all nodes.

```

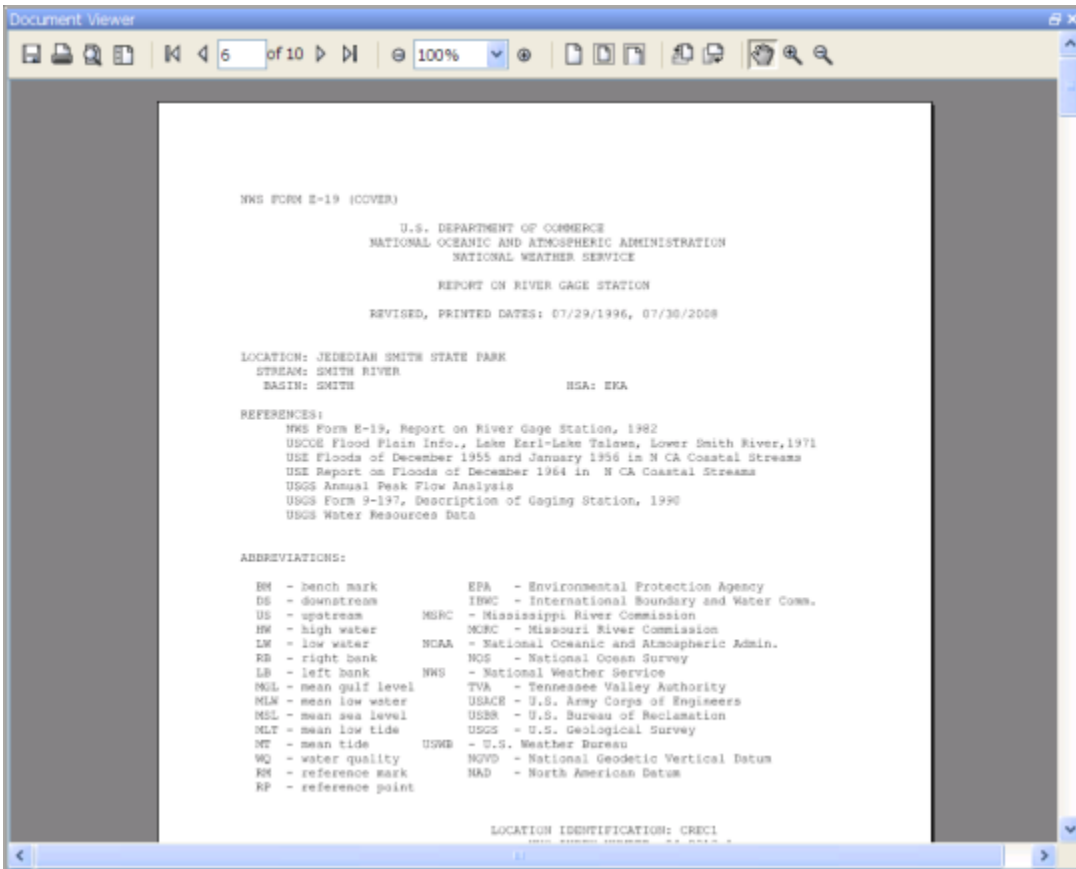
<forecasterHelperDirectories>
  <directory>$DOCUMENTS_ROOT_FOLDER$</directory>
  <directory>$DOCUMENTS_ROOT_FOLDER$/subfolder_1/</directory>
  <directory>$DOCUMENTS_ROOT_FOLDER$/subfolder_2</directory>
  <allNodesDirectory>$DOCUMENTS_ALWAYSVISIBLE_FOLDER$</allNodesDirectory>-->
</forecasterHelperDirectories>

```

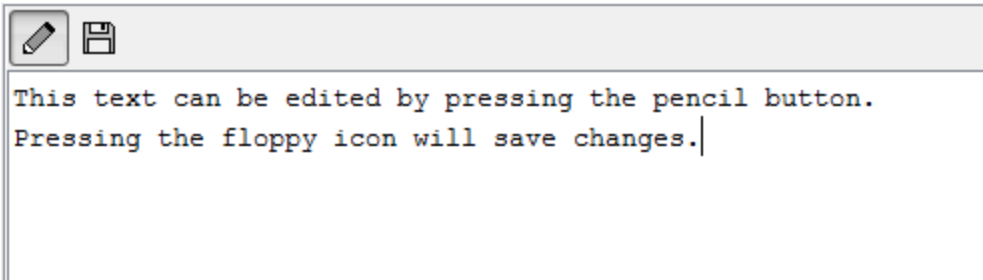
Below an example of the tool window forecaster help. In this example the forecaster has two documents available for information. If multiple directories are configured this window will show all available files for the node from the different predefined directories together.



When one of the files is selected in this panel the content of the selected file is shown in the document viewer. The document viewer is a dockable window in the centre of FEWS.



When a text file is selected it can also be edited. To facilitate this an edit and save button are displayed above the document when selecting a text file.



The content of the forecast help dialog is depended of which node is selected in the forecaster panel.
When a new node is selected the content of the forecaster help dialog is automatically updated.

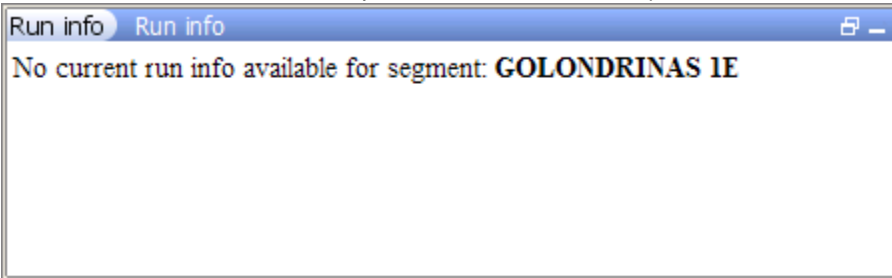
To add the Forecaster help panel and document viewer to the Delft-FEWS explorer, please add the following tasks to Explorer.xml:

```
<explorerTask name="Forecaster help">
  <taskClass>nl.wldelft.fews.gui.plugin.information.ForecasterAidSelectionPanel</taskClass>
</explorerTask>

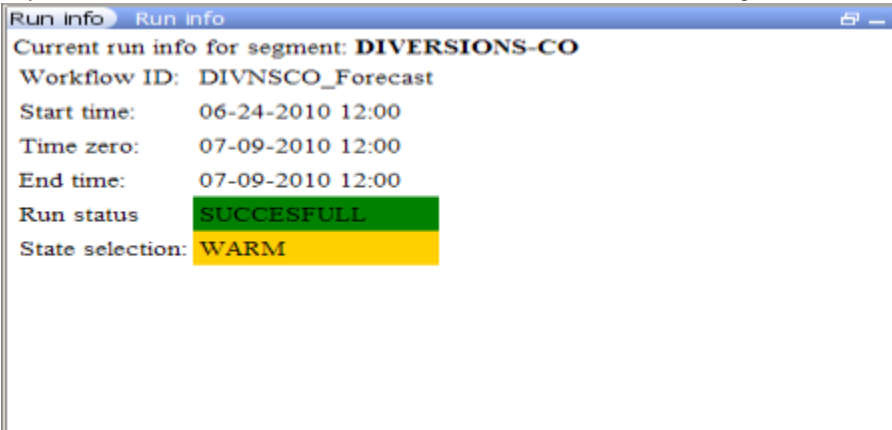
<explorerTask name="Documents viewer">
  <taskClass>nl.wldelft.fews.gui.plugin.information.ForecasterAidDocumentPanel</taskClass>
</explorerTask>
```

Run info

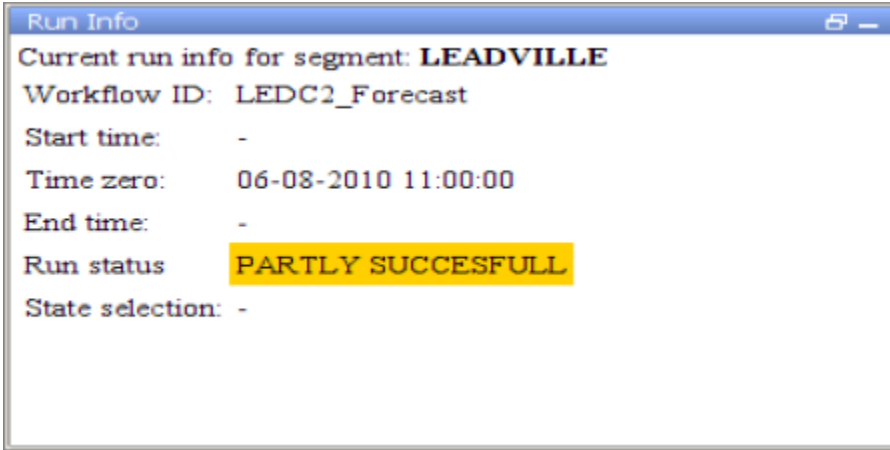
The run info panel shows detail information of the latest run of the workflow of the selected node.
If the workflow of the node has not run yet for the current T0 then the panel will show that there is no current run info available



When the workflow has run. The status can either be succesfull, failed or partly successful.
Only when the workflow was succesfull than the icon of that node will be set to green. The run status will be shown green in the run info box.

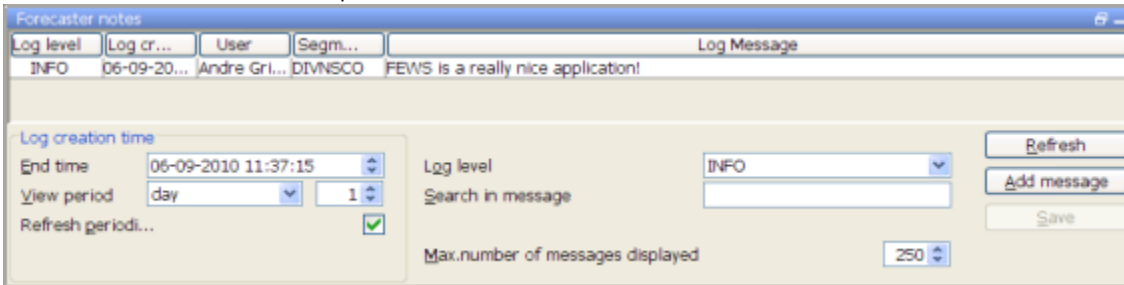


When the run is partly successful the icon of that node will be set to the red exclamation mark, the run status box in the run info panel will be set to yellow. When the run is failed the icon of the node will be set to the red exclamation mark, the run status box will be set to red.



Forecaster notes

The forecaster notes panel shows the notes other forecaster have created regarding their previous forecasts for the forecast point. Forecasters can also created their own note and publish them.



How to create a forecast with the IFD

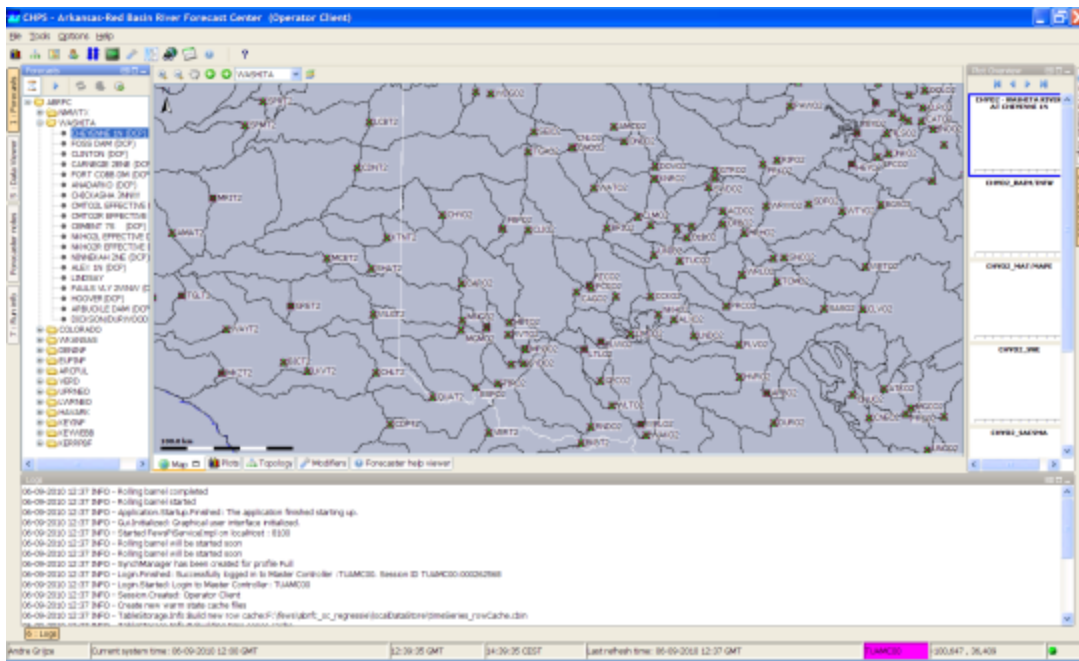
Steps in creating a forecast

Below is a list of all possible steps in creating a forecast with the IFD. Please note that not all of the listed steps are obligated. For each step will be explained how this step can be carried out using the IFD in FEWS.

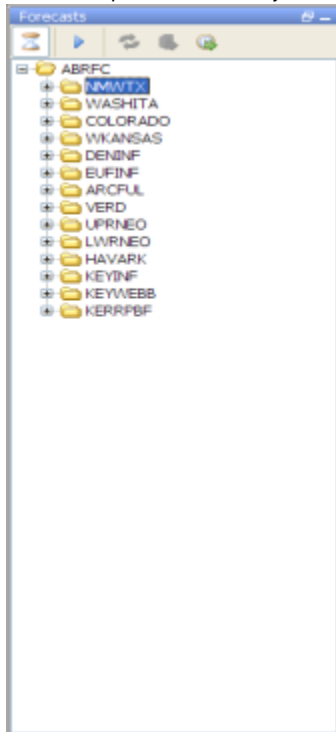
1. Start FEWS
2. Selecting the forecast panel
3. Reviewing the topology
4. Review the list of available state date/times
5. Adjust state and/or forecast length
6. Starting the forecast process and selecting the workflow for which the forecast should be made
7. Reviewing workflow status
8. Reviewing graphs (graph display listens to segment selection)
9. Reviewing graphs (graph display is independed from segment selection)
10. Continue with the forecast process downstream
11. Ending the forecast process

Starting FEWS

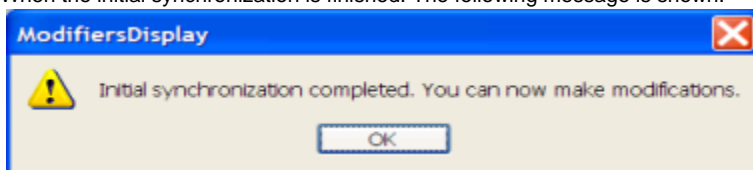
After starting FEWS, the map-display will be displayed in the centre and the Forecast Panel-tab at the left will be selected. This the default layout. The layout after starting FEWS is however configurable by creating and saving a custom layout by using the option in the File menu at the top left of the display.



First the IFD will try to synchronize the local datastore with the central database. Until that process is finished it is not possible to create a forecast with the IFD. To indicate that the IFD is doing its initial synchronization after startup the forecast-button shows a hour glass icon. While the Operator Client if synchronizing, it is possible to view scalar and spatial data.

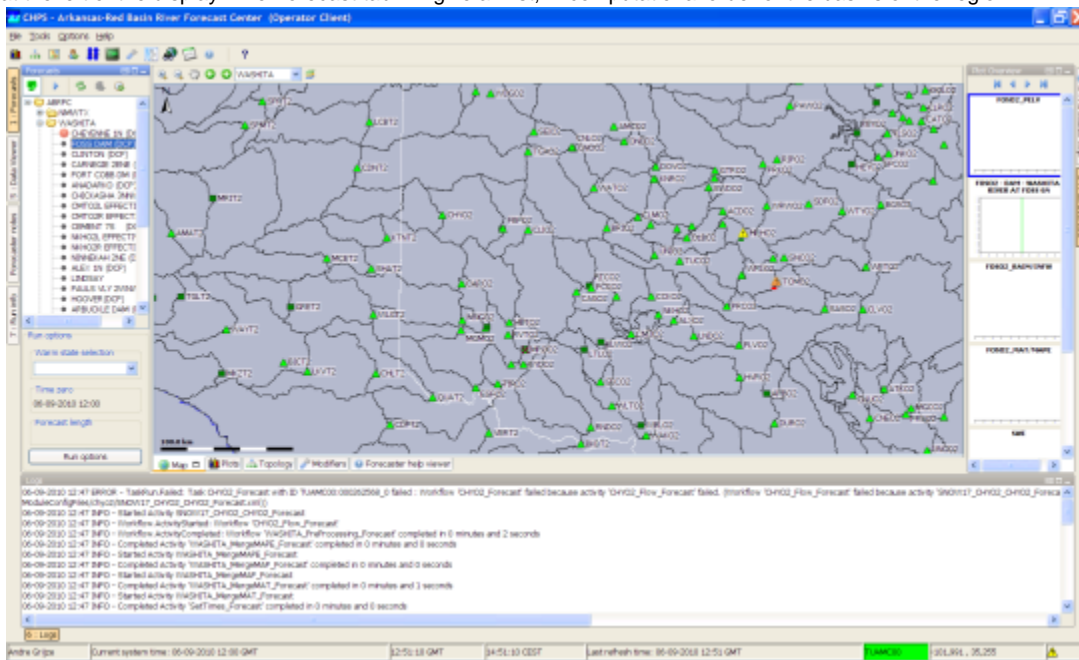


When the initial synchronization is finished. The following message is shown.



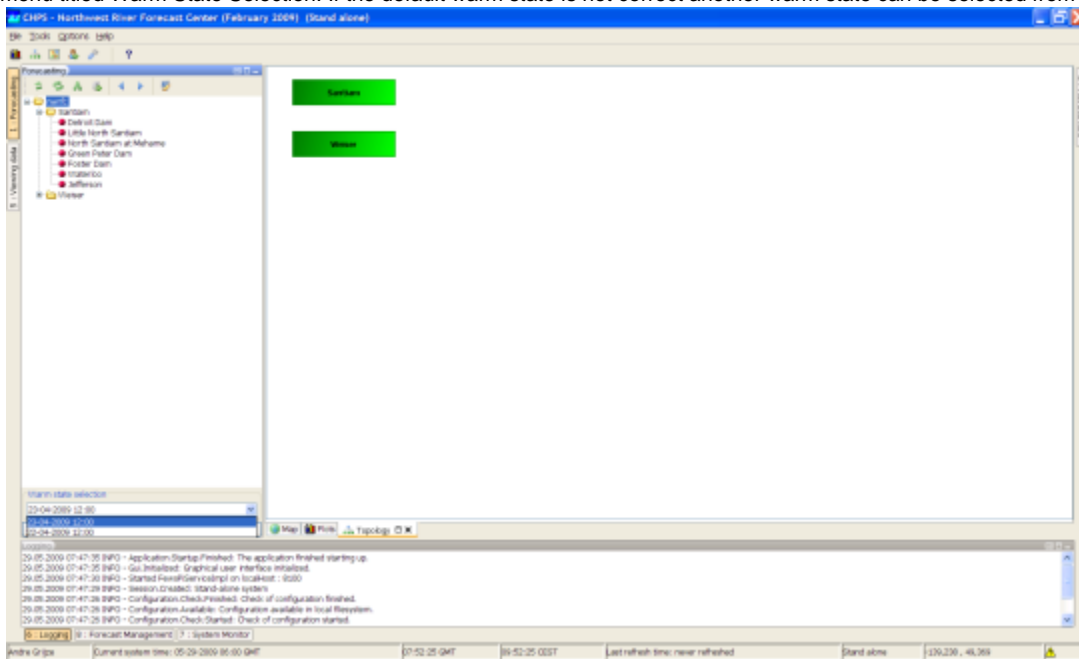
Selecting the forecast panel

The whole process of creating of forecast by using the IFD is managed by the forecast dialog, therefore the first step is selecting the Forecast tab at the left of the display. The Forecast tab will give an list, in computational order of the basins of the region.



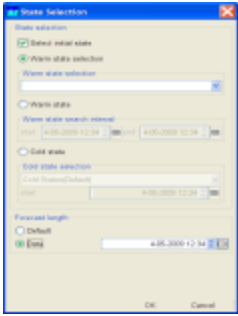
Review the list of available state date/times

The forecast panel also shows at the bottom the currently selected (default) warm state. By clicking on the drop-down box all the available warm states are shown. If the forecaster needs to use a different warm state than the default, a new warm state date may be selected from drop down menu titled Warm State Selection. If the default warm state is not correct another warm state can be selected from the drop-down box.



Adjust state and/or forecast length

By pressing the Run Options button at the bottom of the forecast dialog the user will have access to alternative ways of selecting states. After pressing the advanced button a dialog will be shown in which the user can select the state, forecast length and a what-if scenario.



After selecting the OK-button the selected state or forecast length will be applied and used in the runs.

Starting the forecast process

To start the interactive forecast process, the user should select a leaf node. If the IFD is in forecast mode (which it is by default) the workflow of the selected node will also be automatically run. Models can be run by selecting a node, or pressing the rerun button. In view mode the forecaster can view data but it is not possible to create a forecast.

Reviewing run status workflow

When a run is finished the segment-dialog will show the status of the run.

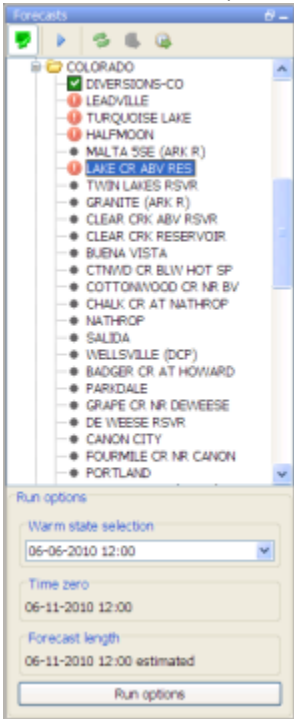
If a run is in progress a refresh-icon will be shown. A green box will indicate a successful run.

A red exclamation mark will indicate that run workflow has failed.

A yellow dot will indicate the workflow has run successfully but that the results are invalid.

For example when an upstream segment has run later than the workflow for a downstream segment the results of the downstream segment workflow are invalid.

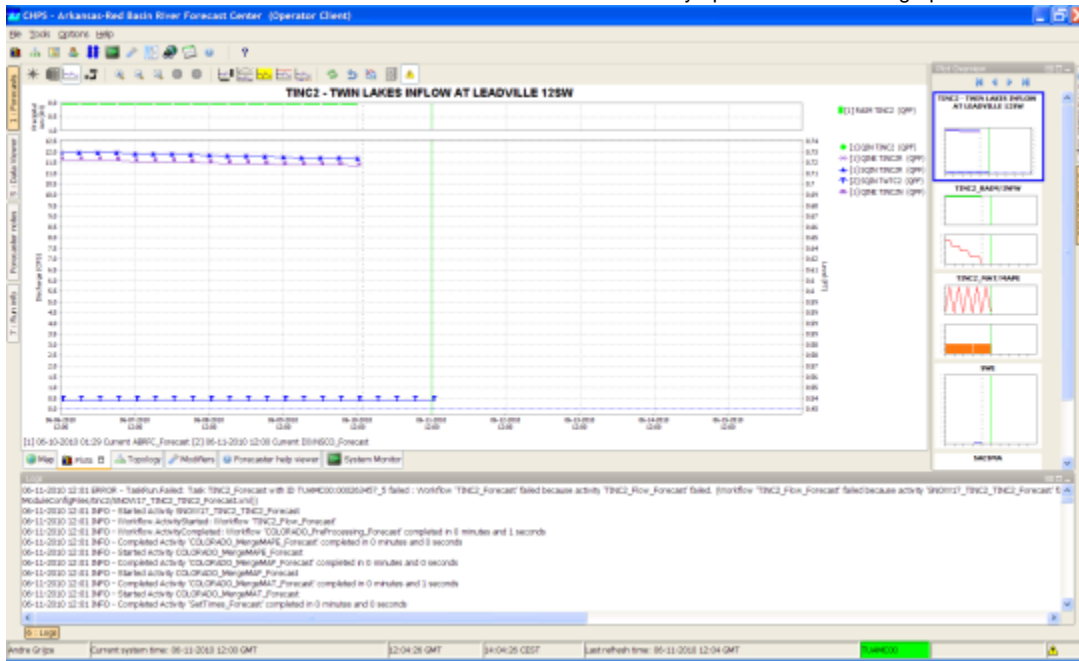
The icons displayed on the leaf node (for individual basins) indicate the status of local runs. If the icon is blank then the server run is the most recent run. Icons on the parent nodes indicate the status of server runs.



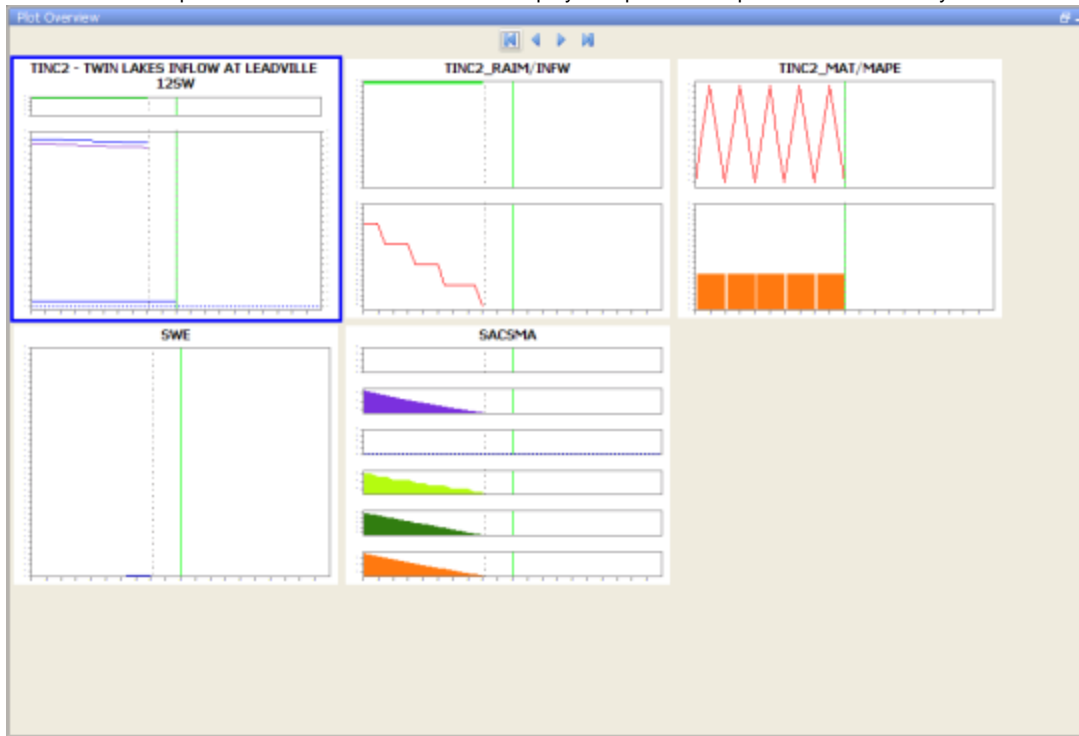
Review graphs (graph display listens to segment selection)

When a basin run has finished the results of the run should be reviewed. By selecting the plot overview at the right a list of thumbnails will be displayed. For each graph available for the current node a thumbnail will be shown. To display a graph, the forecaster selects a thumbnail and

then this graph is displayed in the main plot window. The plot display will show the selected graph. Navigation between the graphs can be done by selecting a graph by clicking on a thumbnail with the mouse or by pressing alt+g (go to next graph) or by pressing shift+alt+g (go to previous graph). When the Thumbnail Panel is selected it is also possible to navigate by using the arrow keys up and down on that panel. When a new node is selected in the Forecast Tab the list of thumbnails is automatically updated to show the graphs available for the newly selected node.

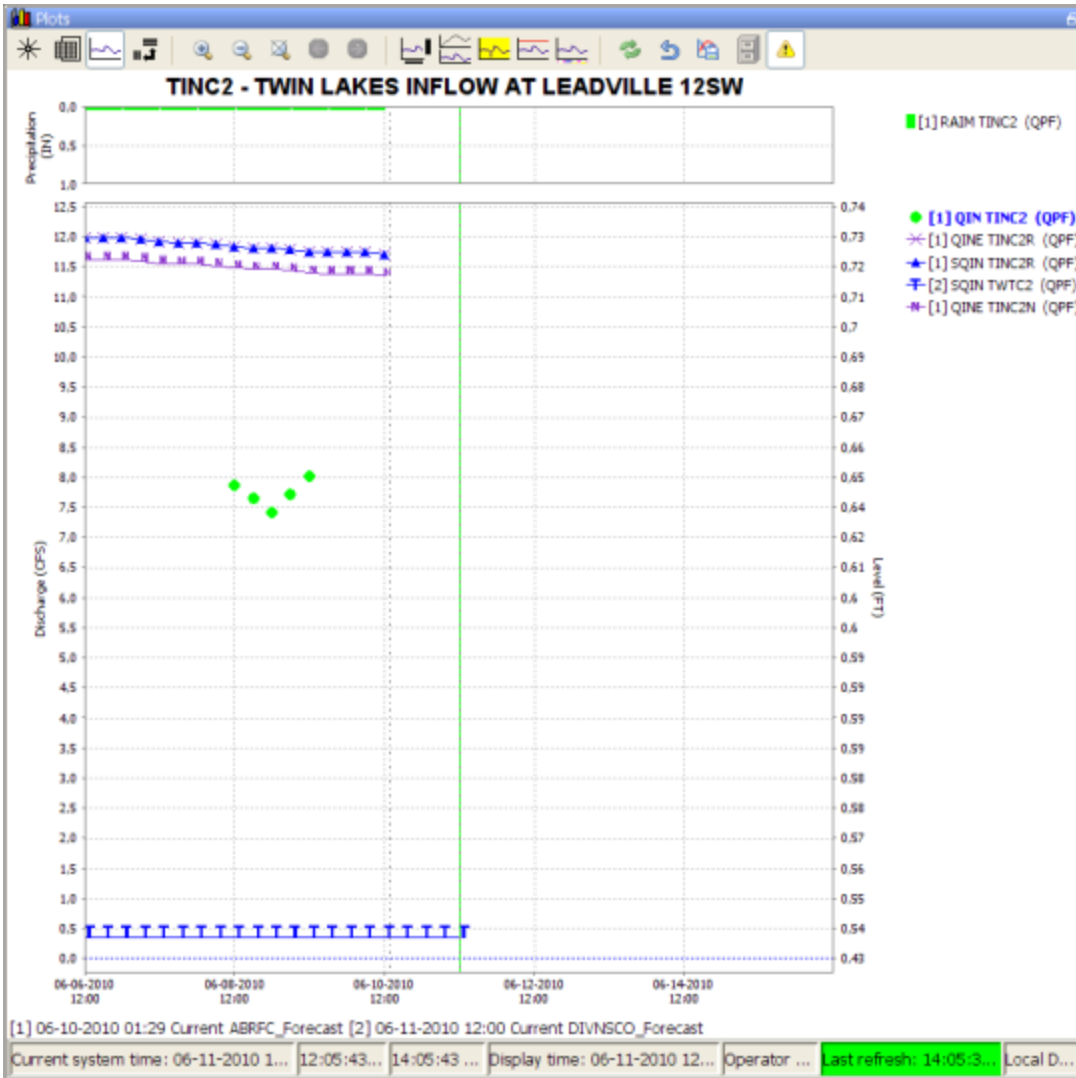


The Plot Overview panel can be undocked. When the display is expanded the plots are automatically resized.



Creating a mod in the time series display

Mods can be created in the mods display or directly in the plot display. To modify a time series directly in a plot, a time series has to be selected. This can be done by selecting a time series in the legend of the plot. To indicate that a time series is selected the legend and the time series will be plotted bold.



Creating a mod in the mods display

The modifier display can be started by clicking on the wrench icon at the toolbar or by using the shortcut `ctrl+m`. The modifier display will show all the mods which are applied in the currently selected segment. By clicking on the create mod button a new mod can be created. After pressing the create mod button a list of available mods will be shown. When the mod is created it can be applied by pressing the apply button. With the run buttons (rerun, rerun to selected and rerun all to selected) it is possible to rerun the workflows. Pressing the run buttons will also automatically apply the mod.

Continue with the forecast process downstream

After reviewing the graphs and if needed applying mods the forecaster can proceed to the next segment. Going to the next segment can be done easily by pressing `alt+s` (go to next segment) or by pressing the next segment button in the forecast panel or by selecting the next node. After selecting the segment the workflow will be run automatically and after finishing the run the status of the run will be shown by color of the dot of the segment.

Ending the forecast process

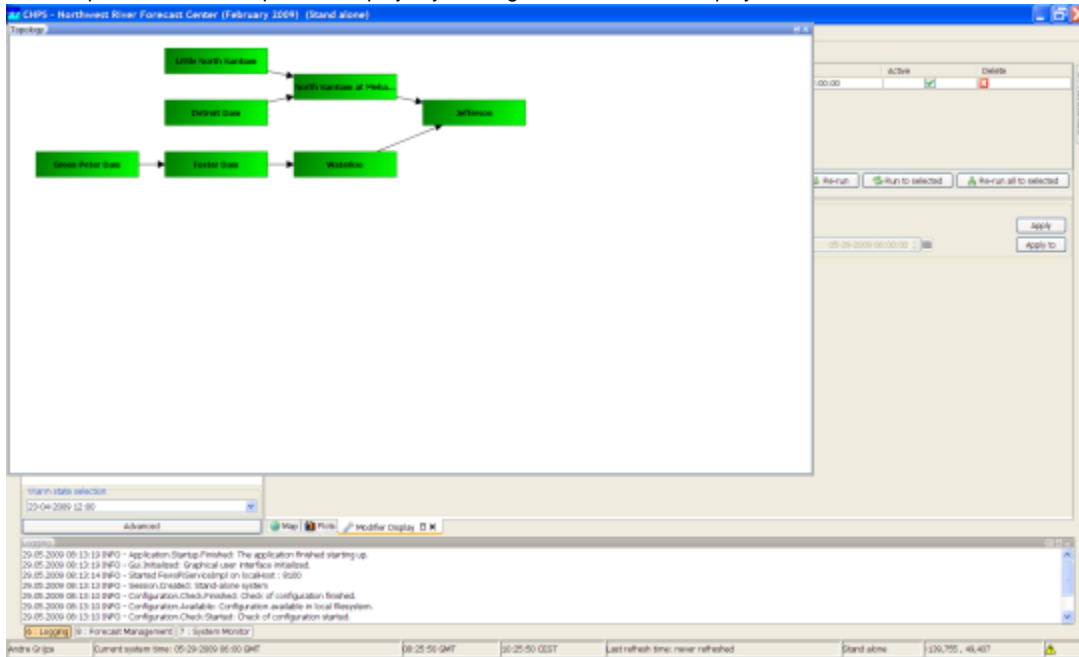
When the forecaster thinks that the current forecast is sufficient. The forecaster can select the parent node of the leaf nodes and press the 'run on server' button. When this button is pressed, first all the new modifiers and changes to the existing modifiers of the child nodes of the selected node will be uploaded to the server. When the upload is successful the workflow will be run at the server. The locally created runs will be deleted when the server run was successful and the results are downloaded successfully back to the Operator Client.

Dockable windows

Docking and undocking main displays

All windows in the centre section of FEWS can be undocked. This can easily be done by clicking on the square-box icon beside the x-icon at the tab of each display. Undocking the windows allows the forecaster to arrange the windows as they like.

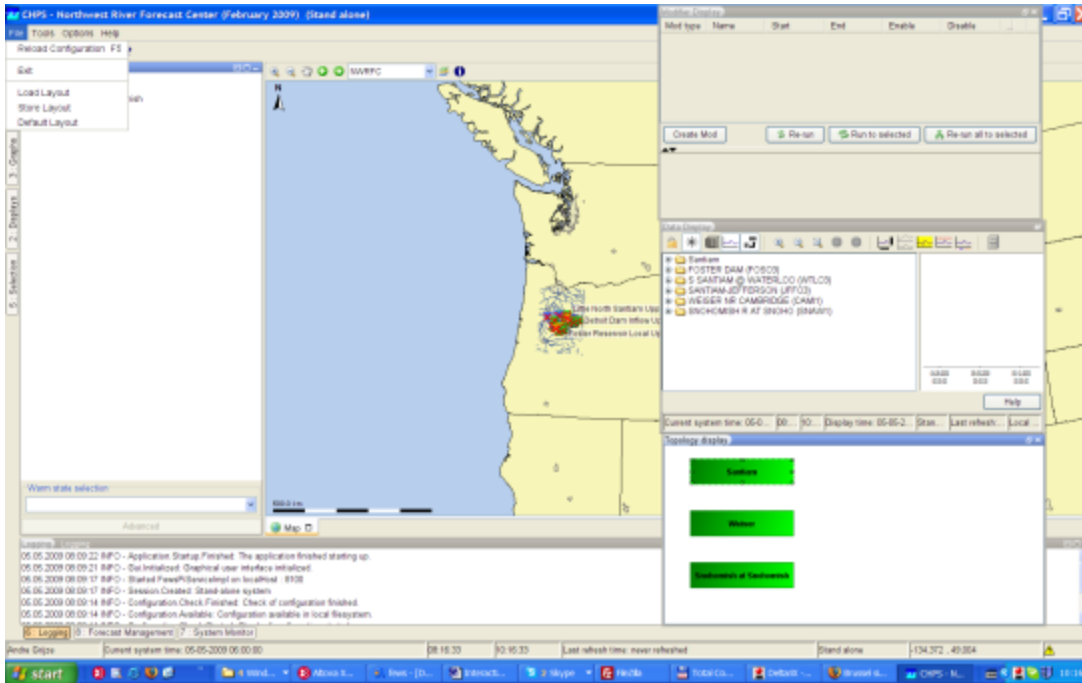
After clicking on the icon the display will automatically be undocked. Putting the display back in docking mode can be done by clicking on the double square icon at the top of the display. By clicking on the x-icon the display can be closed.



Save display layout and reload on opening with same user

By default FEWS will start with the map display opened in the centre section of the display and with the map display, data display and the topology display docked in the center section of FEWS. It is possible to customize the display layout. First step in customizing the display layout is to manually place the display in the desired display layout. In the example below three displays are undocked and the graph-tab and the display are moved to the left section of the display. In the File-menu the user can store this layout by selecting the option store layout. The next time FEWS is started it will start with the stored layout.

Keep in mind that the layout manager is only responsible for laying out open windows. It will not open a window by itself. Only once the user opens the window, will the stored layout be applied!



Save display layout and reload default layout

The file-menu also provides an option default layout. By selecting this option the default layout can be reloaded.

24 Archiving and extended filtering of log messages

Archiving and extended filtering of log messages

For Water Coach purposes archiving and extended filtering of log messages is available. This functionality includes:

- inserting (retrospectively) extended manual messages,
- archiving selected log messages the users are interested in, and
- downloading archived messages and filtering them from the other messages.

The collected and filtered log messages can be used to build Water Coach game.

Archiving log messages

Create ArchiveRun module with export task LogEntriesArchive and include it in an archiving workflow. Log messages are archived by (periodically) running this archiving workflow. Use constraints to select log messages that should be archived. A log message will be archived when its event code is configured as logEventConstraint option and/or the log message text contains the specified messageText configured as logEventConstraint option.

Configuration example:

```

<exportArchiveRun>
  <archivePeriod start="-2" end="0" unit="day"/>
  <archiveType>LogEntriesArchive</archiveType>

  <logEventConstraint eventCode="Manual."/>
  <logEventConstraint eventCode="Validation.HardLimit"/>
  <logEventConstraint eventCode="Validation.SoftLimit" messageText="at
Lobith"/>
  <logEventConstraint eventCode="Workflow.ActivityStarted"
messageText="Workflow 'Rijntakken_Forecast'"/>
  <logEventConstraint eventCode="Workflow.ActivityCompleted"
messageText="Workflow 'Rijntakken_Forecast'"/>

/exportArchiveRun>

```

In this example the following messages will be archived:

- all manual messages,
- all Validation.HardLimit messages
- Validation.SoftLimit messages only for Lobith
- Workflow.ActivityStarted/Finished messages only for workflow Rijntakken_Forecast

Retrieving archived log messages from archive

Log messages can be retrieved using ArchivedDialog. The user selects and downloads the log messages archive in the same way as for example thresholds.

ArchiveDialog configuration

Configure in this dialog an archive type LogEntriesArchive.
An example:

```

<archiveTask name="Log Entries" workflowId="Import_Archive_LogEntries"
iconName="icons/LookUpTable.gif" queryServiceUrl="$ARCHIVE_SERVER_URL$">

  <archiveRun>
    <importDirectory>$ARCHIVE_IMPORT_PATH$</importDirectory>
    <importArchiveRun>
      <archiveType>LogEntriesArchive</archiveType>
    </importArchiveRun>
  </archiveRun>
</archiveTask>

```

ArchiveRun configuration

Create ArchiveRun module with import task LogEntriesArchive and include this module in the workflow specified in ArchiveDialog.
An example:

```

<importArchiveRun>
  <archiveType>LogEntriesArchive</archiveType>
</importArchiveRun>

```

Displaying and filtering archived log messages in SystemMonitor

By default, all non-manual messages are displayed in LogBrowser tab, and all manual messages are displayed in BulletinBoard. For Water Coach purposes we need to display both manual and selected non-manual messages in one tab. For this purpose a new tab has been added – BulletinBoardPlus. In this new tab we also have some more choices to create manual messages quickly.

To show this tab, configure in SystemMonitorDisplay:

```
<bulletinBoardPlus>
  <tabName>Interesting events</tabName>
</bulletinBoardPlus>
```

We can also add several optional 'messageTemplates' to create quickly messages with a specific mark. Similarly we can add several optional 'users' to quickly create messages from a specific user.

An example:

```
<bulletinBoardPlus>
  <tabName>Interesting events</tabName>

  <messageTemplate>Analysed by operator</messageTemplate>
  <messageTemplate>Phone line went dead</messageTemplate>
  <messageTemplate>Emergency advice requested</messageTemplate>

  <userTemplate>Simone De Kleermaeker</userTemplate>
  <userTemplate>gast gebruiker</userTemplate>

</bulletinBoardPlus>
```

An example of BulletinBoardPlus tab of SystemMonitor:

Log level	Creation time	Event Code	Event time	User	Template	Log Message
WARN	29-11-2011 19:06:21	Validation.SoftLimit	29-11-2011 19:06:21			SoftLimit min violated for Discharge (Q.m) at Lobth, value 786.33997 below limit value 865.0 at 2...
WARN	29-11-2011 19:06:21	Validation.HardLimit	29-11-2011 19:06:21			HardLimit min violated for Water level (H.m) at Altenahr, value 0.39 below limit value 0.4 at 2011-...
WARN	29-11-2011 19:06:21	Validation.HardLimit	29-11-2011 19:06:21			HardLimit min violated for Water level (H.m) at Rheinfelden, value 0.0 below limit value 1.0 at 201...
WARN	29-11-2011 19:06:07	Validation.SoftLimit	29-11-2011 19:06:07			SoftLimit min violated for Discharge (Q.m) at Lobth, value 786.33997 below limit value 865.0 at 2...
WARN	29-11-2011 19:06:07	Validation.HardLimit	29-11-2011 19:06:07			HardLimit min violated for Water level (H.m) at Rheinfelden, value 0.0 below limit value 1.0 at 201...
WARN	29-11-2011 19:06:07	Validation.HardLimit	29-11-2011 19:06:07			HardLimit min violated for Water level (H.m) at Speyer, value -176.64 below limit value 1.0 at 201...
ERROR	18-09-2012 13:38:42	Manual.Error	29-11-2011 18:55:00	Simone De Kleermaeker	Phone line went dead	still dead !!
ERROR	18-09-2012 13:38:15	Manual.Error	29-11-2011 18:45:00	Simone De Kleermaeker	Phone line went dead	
WARN	18-09-2012 13:37:46	Manual.Warning	29-11-2011 18:40:00	Simone De Kleermaeker	Analysed by operator	
WARN	29-11-2011 18:35:50	Validation.HardLimit	29-11-2011 18:35:50			HardLimit min violated for Water level (H.m) at Altenahr, value 0.39 below limit value 0.4 at 2011-...
WARN	29-11-2011 18:35:50	Validation.HardLimit	29-11-2011 18:35:50			HardLimit max violated for Water level (H.m) at Rheinfelden, value 261.321 above limit value 7.0 ...
WARN	29-11-2011 18:35:50	Validation.HardLimit	29-11-2011 18:35:50			HardLimit min violated for Water level (H.m) at Rheinfelden, value 0.0 below limit value 1.0 at 201...
WARN	29-11-2011 18:35:50	Validation.SoftLimit	29-11-2011 18:35:50			SoftLimit min violated for Discharge (Q.m) at Lobth, value 786.33997 below limit value 865.0 at 2...
WARN	29-11-2011 18:35:35	Validation.HardLimit	29-11-2011 18:35:35			HardLimit min violated for Water level (H.m) at Rheinfelden, value 0.0 below limit value 1.0 at 201...
WARN	29-11-2011 18:35:35	Validation.SoftLimit	29-11-2011 18:35:35			SoftLimit min violated for Discharge (Q.m) at Lobth, value 786.33997 below limit value 865.0 at 2...
WARN	29-11-2011 18:35:34	Validation.HardLimit	29-11-2011 18:35:34			HardLimit min violated for Water level (H.m) at Speyer, value -176.64 below limit value 1.0 at 201...
WARN	29-11-2011 18:05:59	Validation.SoftLimit	29-11-2011 18:05:59			SoftLimit min violated for Discharge (Q.m) at Lobth, value 786.33997 below limit value 865.0 at 2...
WARN	29-11-2011 18:05:58	Validation.HardLimit	29-11-2011 18:05:58			HardLimit min violated for Water level (H.m) at Altenahr, value 0.39 below limit value 0.4 at 2011-...
WARN	29-11-2011 18:05:58	Validation.HardLimit	29-11-2011 18:05:58			HardLimit max violated for Water level (H.m) at Rheinfelden, value 261.321 above limit value 7.0 ...
WARN	29-11-2011 18:05:58	Validation.HardLimit	29-11-2011 18:05:58			HardLimit min violated for Water level (H.m) at Rheinfelden, value 0.0 below limit value 1.0 at 201...
WARN	29-11-2011 18:05:46	Validation.SoftLimit	29-11-2011 18:05:46			SoftLimit min violated for Discharge (Q.m) at Lobth, value 786.33997 below limit value 865.0 at 2...
WARN	29-11-2011 18:05:46	Validation.HardLimit	29-11-2011 18:05:46			HardLimit min violated for Water level (H.m) at Speyer, value -176.64 below limit value 1.0 at 201...
WARN	29-11-2011 18:05:46	Validation.HardLimit	29-11-2011 18:05:46			HardLimit min violated for Water level (H.m) at Rheinfelden, value 0.0 below limit value 1.0 at 201...
INFO	29-11-2011 18:01:00	Workflow.ActivityComp...	29-11-2011 18:01:00			Workflow 'Rijntakken_Forecast' completed in 0 minutes and 35 seconds
INFO	29-11-2011 18:00:24	Workflow.ActivityStarted	29-11-2011 18:00:24			Workflow 'Rijntakken_Forecast'
INFO	18-09-2012 13:39:07	Manual.Info	29-11-2011 17:50:00	Simone De Kleermaeker	Emergency advice requested	
WARN	29-11-2011 17:35:56	Validation.HardLimit	29-11-2011 17:35:56			HardLimit max violated for Water level (H.m) at Rheinfelden, value 261.321 above limit value 7.0 ...
WARN	29-11-2011 17:35:56	Validation.SoftLimit	29-11-2011 17:35:56			SoftLimit min violated for Discharge (Q.m) at Lobth, value 786.33997 below limit value 865.0 at 2...
WARN	29-11-2011 17:35:56	Validation.HardLimit	29-11-2011 17:35:56			HardLimit min violated for Water level (H.m) at Rheinfelden, value 0.0 below limit value 1.0 at 201...
WARN	29-11-2011 17:35:56	Validation.HardLimit	29-11-2011 17:35:56			HardLimit min violated for Water level (H.m) at Altenahr, value 0.39 below limit value 0.4 at 2011-...
WARN	29-11-2011 17:35:44	Validation.SoftLimit	29-11-2011 17:35:44			SoftLimit min violated for Discharge (Q.m) at Lobth, value 786.33997 below limit value 865.0 at 2...

Button Add message

Using this button we add a manual message 'plus'.

Messages Creation

Log time: 21-12-2011 12:07:00

Log level: WARN

User: Simone De Kleermaeker

Log template: Emergency advice requested

Text:

Manual message 'plus' is actually a standard manual message. The information entered in the additional fields, is stored in the messages text (message body) in LogEntries table field 'logMessage'. Compared to standard manual message, the additional fields are Event Time (default value is Current System Time) and messageTemplate.

The message text (body) entered in the example above is stored as follows:
 Simone De Kleermaeker@05-12-2011 13:47:00@Phone line went dead@

If we enter also some additional text, the messages body looks like:
Simone De Kleermaeker@05-12-2011 13:47:00@Phone line went dead@my comment

View period

In view period fields we specify the time filter. This time filter is applicable to the message Event Time or to the message Creation Time. For example, if the filter is Event Time and we choose one month, the log messages with Event Time inside this period are displayed.

User

The drop down box 'User' is filled with the current system user name and optionally with the userTemplates as defined in the configuration. It is also possible to enter any name in this editable drop down box. The user names can be entered while creating manual messages. Configure the userTemplates if you want to enter usernames that are different from the system user.

Template

The drop down box 'Template' is filled with messageTemplates configured in SystemMonitorDisplay <bulletinBoardPlus> tab. It is also possible to enter any text in this editable drop down box.

Other fields in the tab BulletinBoardPlus

Buttons Refresh, Save and fields log Level, Search in Message, Max number of events have the same meaning and behaviour as in standard BulletinBoard.

25. Using the Deltares Open Archive

Introduction

Currently, the only graphical user interface to access the Deltares Open Archive is via the Delft-FEWS GUI. In addition, data can be approached via the Geonetwork web client or via THREDDS web server.

The Deltares archive is located on a separate server and can be used for post-event analysis like (re-) calibration of models, reviews and performance analysis. Most of the data in the Deltares archive is archived through automated processes that are scheduled on the Delft-FEWS MC server. The archived data can be accessed and downloaded to the local computer through the Delft-FEWS Archive catalogue display.

The Deltares Archive is storing data (sets), these are the actual forecast time series, observation time series, configuration, rating curves, forecaster notes, model states, FEWS modifiers etc. Most of the data sets can be organized in events; this is a special type of metadata overarching multiple data sets. The area and period covered by the event determine, in combination with the type of event and associated data types, which data sets belong to an event.

A separate Deltares archive document is available that contains all technical details of the Deltares archive. An Installation of the Deltares Archive is available on the Deltares Delft-FEWS Wiki pages.

This user guide is derived from the HyFS application as used at the Bureau of Meteorology.

Archived data

In the Delft-FEWS application, scheduled and manual archive workflows can take care of archiving the data (sets) from the database. The scheduled archive workflow is generally run once a day and will generally archive the following type of data:

Archived data set	Data set	Data types
Astronomical data	Observed time series	NetCDF-CF timeseries
Observed series	Observed time series	NetCDF-CF timeseries
Surge forecasts	External Forecast time series	NetCDF-CF timeseries
Forecaster Notes on various level	Messages	text
Delft-FEWS configuration changes	Configuration	zip (FEWS-configuration)
Rating Curves	Rating Curves	xml (FEWS PI-rating)
NWP forecasts	External Forecast time series	NetCDF-CF timeseries

Simulations (forecast)	Simulated timeseries	NetCDF-CF timeseries Model States Modifiers Reports
Products as handed over to downstream users	Products	Products in original format
Local datastore	Snapshot	Local datastore

Note: External data which is archived elsewhere should in general not be archived within the context of the Delft-FEWS application.

Events

Within Forecasting organisations, events are situations that can be distinguished from business as usual as something special or interesting is happening, e.g. a flood, drought or calamity. Generally the operations during an event is hectic and no one wants to spent time on data archiving. however, after the event the archived data may be crucial for legal inquiries, performance assessment, or model calibration or to use as input for training. Therefore, the concept of Event has been introduced to label a period of interest for a certain area, such that one easily can find this data back.

Many of the important data sets stored in a Deltares Archive associated with a real time system can be organized in events, this is a special type of metadata overarching one or multiple data sets. The event type, area and period covered by the event determine which data sets belong to an event. Each event type will include one or multiple data sets. Typical event types within a real time application are:

- *Historic Event:* This event type contains *observed time series* that are stored in the archive. When a new historic event is made the data include in the historic event period will become available as historic event in the Delft-FEWS operator client and can be viewed together with the current observed or simulated data.
- *Review Event:* This event type may contain *observed time series*, *external forecast time series*, *simulated time series*, *modifiers* and *messages*. When a new review event type is made the data sets covered will be tagged and can be downloaded to a Delft-FEWS Stand Alone for post event review purposes.
- *Flood Watch Event:* This event type contains *observed time series* and *external forecast time series*. When a new flood watch event type is made the data sets covered will be tagged and can be downloaded to a Delft-FEWS Stand Alone for skill performance analysis
- *Watercoach/Training Event:* This event type contains *observed time series*, *external forecast time series*, *simulated time series*, *modifiers*, *model states* and *messages*. When a new water coach event type is made the data sets covered will be tagged and can be downloaded to a Delft-FEWS Stand Alone. The data downloaded can then be used for making a new Delft-FEWS Water Coach script for training purposes.

Event types can be defined as appropriate, but need to be registered on the archiver server side.

Additional to tagging an event in the Deltares archive it is also possible to have attachments uploaded and linked to an event in the archive. Creating an event, downloading events and data sets, and attaching attachments to events can be done with the Delft-FEWS Archive display.

Finally, events can play a crucial role in the data management of the archive. Data labelled for a specific type of event may be help longer in the archive compared to data not labelled for an event. E.g. Numerical Weather Predictions may be removed quickly, except for those external forecast that are part of a Flood Watch or training event.

Archive display

All data that is archived can be accessed and downloaded through the Delft-FEWS archive display. The archive display can be started from the Delft-FEWS Explorer from the Tools menu.

When the display is initialized it will try to contact the archive file server to download information about the archive content (the archive configuration).

Note: When the Delft-FEWS archive display cannot connect to the archive file server, there will be a error message shown when starting the display. If this is the case, make sure the computer has a network connection, access to the archive file server, and that the path to the archive file server is correctly configured in the global.properties file.

The Delft-FEWS Archive display contains three tabs:

- **Create a new event:** This tab can be used to create a new event file to tag data in the Deltares archive. It also contains functionality to update an event and/or upload an attachment to an existing event.
- **Search for events:** This tab can be used to search in existing Deltares archive for events and download the associated data and the attachment(s) that have been tagged to the event.

- Search in archive: This tab can be used to download data from the archive, without using the events functionality.

In the following paragraphs the functionality of the different tabs is explained.

Create an archive event

Events are created for Areas and are valid for a period; specified by the start and end time.

To create a new event; take the following steps:

- 1 Select the area for the event (an area is a basin or national). The list with events will be updated with all events found in the Deltares Archive.
- 2 Press the *create event* button to create a new event for the selected area.
- 3 Select the event type to add and enter the start and end time of the event. Complete the name and description textboxes for the event to make the new event understandable for other forecasters.
- 4 Press the *search* button on the right part of the display to check if there is any data in the archive for the selected area and period.
- 5 Press the *save event* button to save the event file on the local computer. The event will be added as a new line in the event list table in red.
- 6 Press the *upload event* button to upload the event file from the local computer to the archive server.

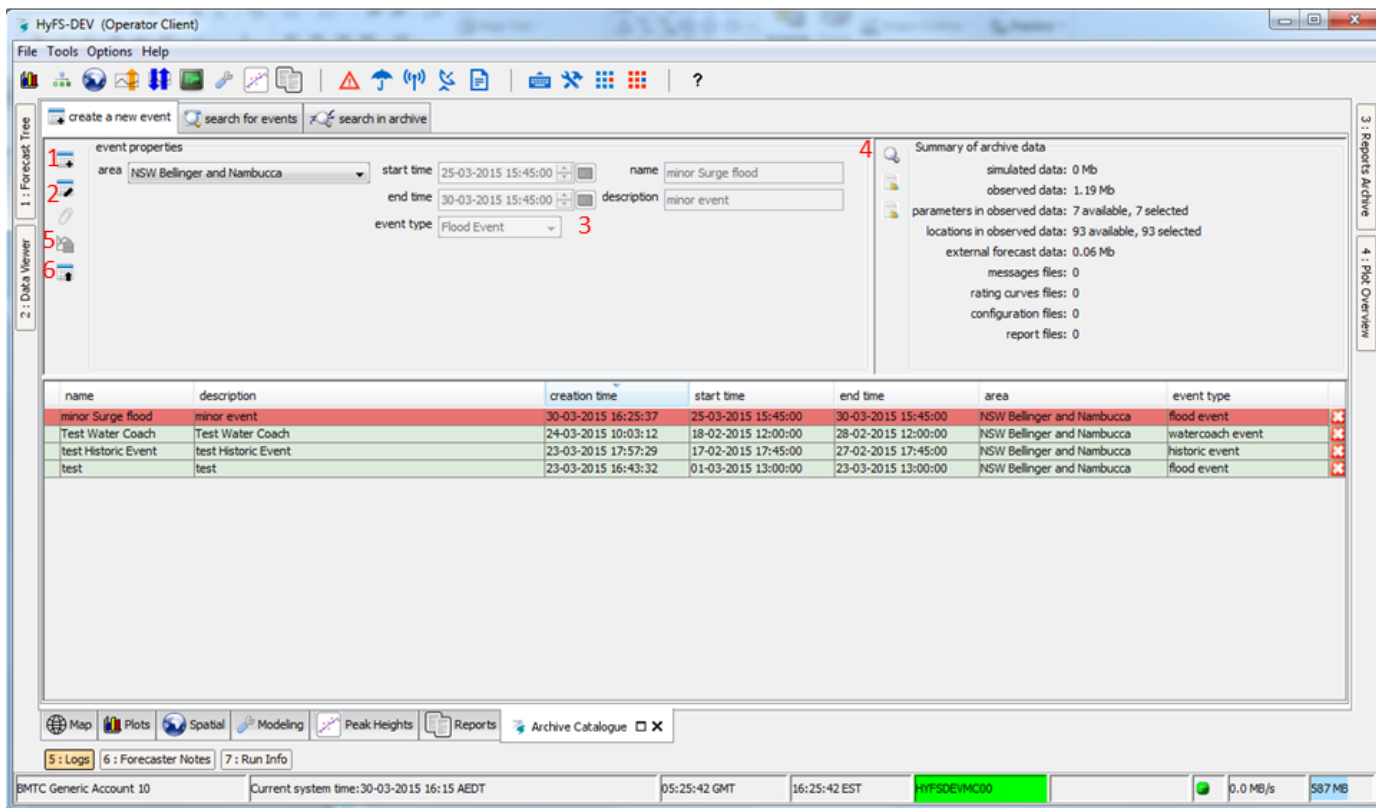


Figure Delft-FEWS Archive display; create new event

When an event is created it is possible to attach a file (pdf file, or zip file, max. 100Mb) to the event. Take the following steps to attach an attachment to an existing event.

- 1 Select the event from the list of events.
- 2 Press the *attach file* button to select a file and attach it to the selected event.

- 3 Press the *upload event* button to upload the event file from the local computer to the archive server.

Search and Download archive events

The Deltares archive will contain many events for all catchments. The events can be searched and downloaded in the Search for Events tab.

To search for events; take the following steps:

- 1 Select the area and set the search start and end times. The list with events will be updated with all events found in the Deltares Archive that match the selected criteria.
- 2 Press the *search* button on the right part of the display to check if there is any data in the archive for the selected area and period.
- 3 Select one or multiple events from the list with events.
- 4 Press the *download attachment* button to download the attachments for the selected events from the archive server to the local computer. The attachments will be stored in the ArchiveDownload folder (configured); check the log file in the system logs to find the names of the correct folders.
- 5 Press the *download event with data* button to download the data for the selected events from the archive server to the local computer.

Note: By double clicking one of the cells in the event list, the event list will be filtered and show only those events that have the same content of the selected cell. To filter for example on historic events, double click in the event type cell where the content is historic event. All cells in that event table column will now have a blue background color indicating there is a filter active. To remove the filter, double click again on one of the event type cells.

name	description	creation time	start time	end time	area	event type
minor Surge flood	minor event	30-03-2015 16:25:37	25-03-2015 15:45:00	30-03-2015 15:45:00	NSW Bellinger and Nambucca	flood event
test	test	23-03-2015 16:43:32	01-03-2015 13:00:00	23-03-2015 13:00:00	NSW Bellinger and Nambucca	flood event

Figure Delft-FEWS Archive display; search for events (filtered by flood event using double click)

Search and Download archive data

The Deltares archive will contain data that is not always included in an archive event file. If the data is not included in an event file it can be downloaded in the Search in archive tab.

To search for data in the archive; take the following steps:

1. Select the area

2. Set the search start and end times.
3. Select the type of dataset
4. Select the source of the data (if available, from 2015.01 onwards only)
5. Press the *search* button
6. Select one or multiple data sets from the list for download
7. Press the *download and import data* button to download the data from the archive server and import into the local datastore. If do not want the data imported, you can also press the *download (only)* button.

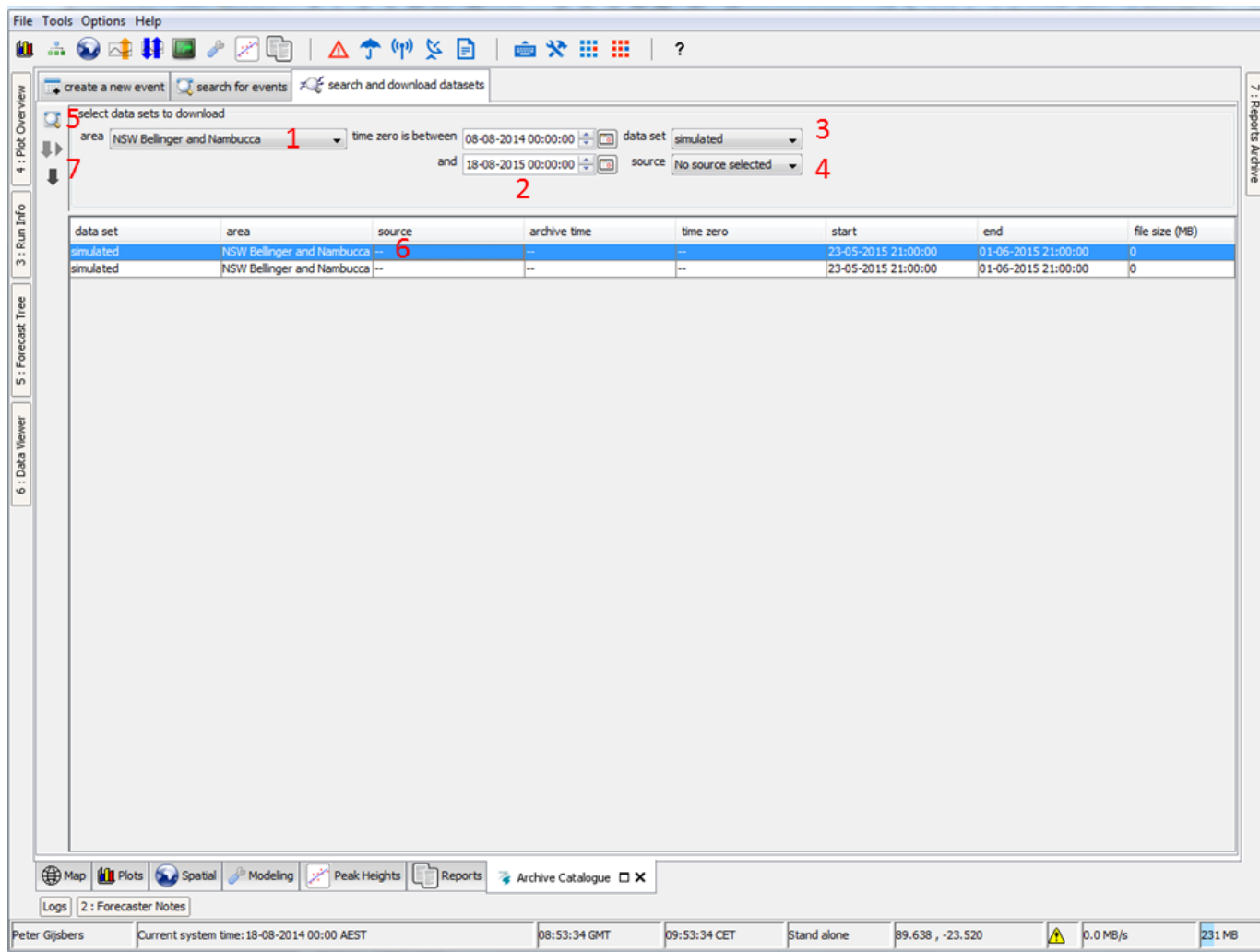


Figure Delft-FEWS Archive display; search in archive and download data

Note: After selecting an area and period make sure to press the search in archive data before downloading the files from the archive server. Especially the National area can contain many external forecast data files and the size of the files can be considerable.

Importing archived data into Delft-FEWS stand alone application

If you did not import the data directly as part of the download, you can import the data in the Delft-FEWS Stand Alone system with use of the Manual Forecast display. To import downloaded data; take the following steps:

- Open the Manual Forecast display from the Delft-FEWS Explorer Menu or Toolbar.
- Select the Import data from Archive workflow.
- Press the Run button.

All data that is downloaded and available in the ArchiveDownload folder will be imported in the localdatastore of the Stand Alone system. As the imported data will be imported in the localDatastore of the Delft-FEWS Stand Alone it is advised to delete or rename the existing localdatastore folder and all data in the ArchiveDownload folder before starting a new Archive download and import session. Note that this import activity will bring back the data using the original data administration.

If you want to use the data within a different context, you may also copy the data to the normal Import folders, and setup a normal timeSeriesImport run module with idmapping to bring the data into the Delft-FEWS stand alone application registered under your timeSeriesImport run module.

26. Validation Status

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Overview

Besides seeing the result of a series of validation steps, the user will be able to determine the results of individual validation steps. The progress in the validation process is called Validation Status.

This functionality is available from Delft-FEWS version 2015.02 onwards.

Use Cases

Validation Status should support the users in their specific validation practices and allow the users to confirm that the data has been adequately validated. The following use cases will be supported:

- For a time series, it will be registered per timestep, which validation steps have been performed
- The progress in the validation process can be used to make time series data (un)available for transformations / display
- The user gets a visual indication (tooltip, validation step columns in table view, background color and color bar) which validation steps have been performed
- The user gets extended possibilities to validate timeseries manually

Summary of Validation Status implementation

The validation procedure of an organisation can consist of various (serial) validation tasks: Primary/Secondary validation, transformation interpolation of data, visual inspection, ... In the end, a validated timeseries will possibly have a quality flag (Reliable/Doubtful/Unreliable/Missing) as a result from the validation process. Since version 2012.01 FEWS stores not only the quality flags, but also the source of the flag, the so-called **flagSource**. So the user is able to see why a certain value is validated as unreliable, eg. due to exceeding of the hard max. The regular flagSource (which is visible in the Delft-FEWS interface as the 'Validation' item), in combination with the quality flag is therefor a summary of the validation process.

Since version 2015.02 FEWS makes it possible to configure so-called 'flagSource columns' for each individual validation step, in which the flagSource of the specific validation step will be recorded. From these flagSource columns the user can deduct which individual validation steps

have been performed and to what result. Even when a defined validation step has been executed successfully and no quality flag has been changed, a default flagSource "OK" will be set for the respective flagSource column. The flagSource columns therefor provide details on all the validation steps.

Since version 2016.01 the concept 'Time of Validity' (Tv) has been introduced. This is defined the last timestep for which a timeseries has been validated (i.e. for which a specific flagSourceColumn has been set). Specific functionality related to the Time of Validity (Tv) becomes available for the timeseries display whenever a 'Time of Validity mode' is activated by activating a Tv button in the toolbar. The Tv is also available in the database lister.

Functionality

FlagSource columns can be defined in a dedicated flagSourceColumns regional configuration file, see [FlagSourceColumns](#) in the Configuration guide. These flagSource Columns are stored for each timestep for all timeseries that have been validated in the FEWS database. Various configuration options allow the user to harness the Validation Status in the operational process, either by visualisation, export, conditional filtering in transformations, etc.

The following principles apply and options are available:

FlagSourceColumns are optional

All Validation Status related configuration options are optional. When flagSourceColumns are not defined in the configuration, they will not be used by Delft-FEWS. When timeseries in a database contain flagSource Columns which are not configured, they will be ignored by FEWS.

Specific flagSource related functionality will not be available to users when the flagSourceColumns file is not configured.

On startup, Delft-FEWS performs a check whether all flagSource ColumnId's referenced in the configuration are defined in the flagSourceColumn configuration file. When there are configuration inconsistencies, FEWS will throw an error/warning.

Writing of flagSources

A validation step where a flagSourceColumn has been defined will write the appropriate flagSource in case of a flag change, both to the flagSource column and the regular flagSource element.

In case the flag is not changed, the default flagSource "OK" which indicates that the validation step has been performed, will be written to the flagSource column. In this case, the flagSource will only be written to the regular flagSource element when this is empty.

This ensures that the regular FlagSource element (visible to the user in the FEWS interface with the 'Validation' option) remains a summary of the validation status.

FlagSource columns are configured using an columnId and a storageKey

The Id of the column is only used to reference this column from the rest of the configuration. This id is not stored in the database. This id can be changed at any time without the requirement of deleting the datastore.

The storageKey is an integer between 0 to 127 that is used in the datastore to reference a columnId. After changing this key you have to delete the local datastore and MC database.

flagSources contained in the flagSource Columns

The flagSourceColumns can only contain the existing flagSources. Also see [D Time Series Flags](#). These flagSources will automatically be set to the flagSource Column when a flag is changed in the respective validation step

<i>Primary Validation</i>	FlagSource
soft min.	SN
hard min.	HN
soft max.	SX
hard max.	HX
rate of rise	RO

rate of fall	RO
same reading	SR
temporary shift	TS

<i>Secondary Validation</i>	FlagSource
spatialHomogeneityCheck	SH
seriesComparisonCheck	SC
minReliableValuesCheck	RV
minReliableOrDoubtfulValuesCheck	RDV
minNumberOfValuesCheck	NV
minNonMissingValuesCheck	NM
mannKendallCheck	KT
flagsComparisonCheck	FC
flagPersistencyCheck	FP

To support transformation and visual validation steps, custom flagSources can be configured in the customFlagSources configuration file, see [27 CustomFlagSources](#).

<i>Transformation/Manual</i>	Custom FlagSource
default validation (success)	OK
Interpolation small gap	SG
Interpolation large gap	LG

Validation Status as a condition

By defining a 'visibilityControllingFlagSourceColumnId' element in the timeSeriesSet, the existence of a flagSource Column for a particular timeseries (step) can be used as a condition for for example a transformation. When the configured flagSourceColumn is not existing for a particular timeseries step, the value will be perceived as 'Missing' for the transformation. All values that did not pass this validation step are removed on read. They are set to missing for equidistant timeseries and removed for non-equidistant timeseries.

timeSeriesSet	
moduleInstancelId	\$MODELCODES_\$MODELNAMES_Prep_FB_\$RUNTYPES
valueType	scalar
parameterId	FB_Seed
locationSetId	ALL_KOT
timeSeriesType	simulated forecasting
timeStep unit=hour	
relativeViewPeriod unit=day start=-8 end=0 endOverrulable=false	
readWriteMode	read only
visibilityControllingFlagSourceColumnId	Visual_Inspection

This element can also be used to prevent non-validated data to be exportable through a PI-Webservice. If the timeseriesSets in the filterId that is used for the Webservice are configured with a visibilityControllingFlagSourceColumnId, timesteps that do not have the correct validation status will not be exported.

Assign a FlagSource Column per module run

It is possible to add an element `defaultFlagSource` and a `FlagSourceColumnId` in a **workflow**, at the module activity level of the validation step. This will dictate which `flagSourceColumn` (`FlagSourceColumnId`) will be used to write the `flagSources` to and what `flagSource` will be written in case no flag is changed (`defaultFlagSource`).

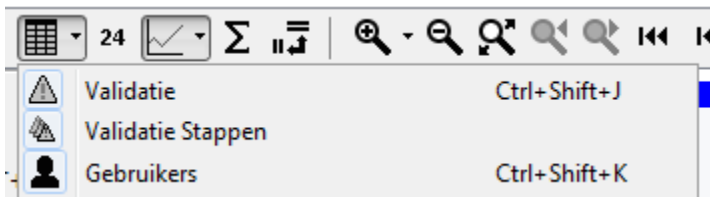
The [interpolation serial transformation](#) also has the possibility to assign a custom `flagSource` to a `flagSourceColumn` for interpolated values.

Example

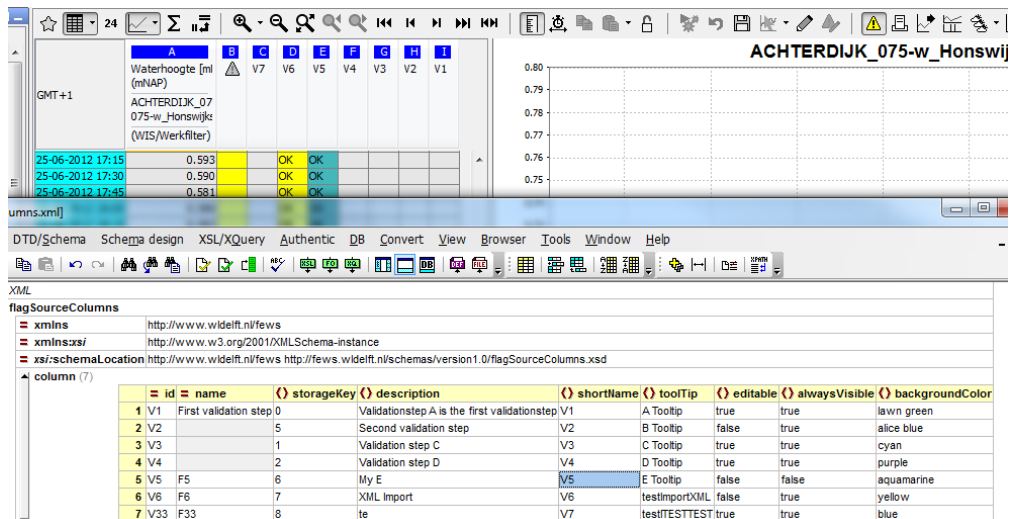
```
<transformation id="interpolation serial linear">
  <interpolationSerial>
    <linear>
      <inputVariable>
        <variableId>input</variableId>
      </inputVariable>
      <maxGapLength>5</maxGapLength>
      <outputVariable>
        <variableId>output</variableId>
      </outputVariable>
      <outputComment>outputCommentTest</outputComment>
        <outputCustomFlagSourceId>INTP</outputCustomFlagSourceId>
    </linear>
  </interpolationSerial>
</transformation>
```

Validation Status in the GUI (Time series display)

An option 'Validation Steps' is available in the table view options (when `flagSource` Columns are configured). When this option is activated, all `flagSource` Columns that are either filled (the validation step has been performed) or are configured 'editable' will be shown next to the value column. The header of the `flagSource` Columns is equal to the configured 'shortName' and when the user hovers above the header, a configured tooltip for the `flagSource` Column is shown.



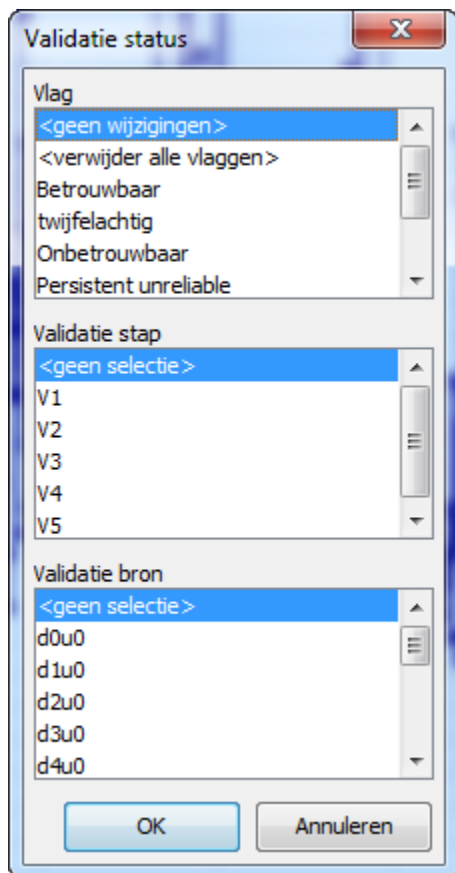
The order in which the `flagSourceColumns` are configured should reflect the sequence of the respective validation steps in the validation process. This order is also used in the `timeseriesDisplay` - tableview, when the 'Validation Steps' are visualized. Note that the order in the configuration file is from top (first validation step) to bottom (last validation step), in the interface the order is from right (first) to left (last).



Mark and edit Validation Status

The regular 'Validation' column cell for each individual timeseries will get background color that is equal to the configured color of the last validation step that has been performed for that timestep. When a distinctive color is used for a specific validation step that is of interest to the user, it is easy to gauge the progress of validation from the color. This color is also visible as a bar chart under the timeseries graph, and represents the last validation step that has been executed for all timeseries.

It is possible to include an explicit manual validation step in the validation procedure using the 'Mark' option that is available in the toolbar when the timeseries display is in edit mode and flagSources have been configured. This allows the user to set a flag (or not) for selected timeseries and timesteps and at the same time indicate for what flagSource Column (e.g. 'Visual_Inspection') which flagSource (e.g. 'OK') should be written.



Validation History

When a data value is deleted (either by the user or by a different action), the flagSources for that timestep will remain. For an individual value in the time series table, the history of that value can be shown using the right-mouse menu - Show history (CTRL+H). This menu also shows the 'state' of the flagSourceColumns for each time the value was changed in the datastore.

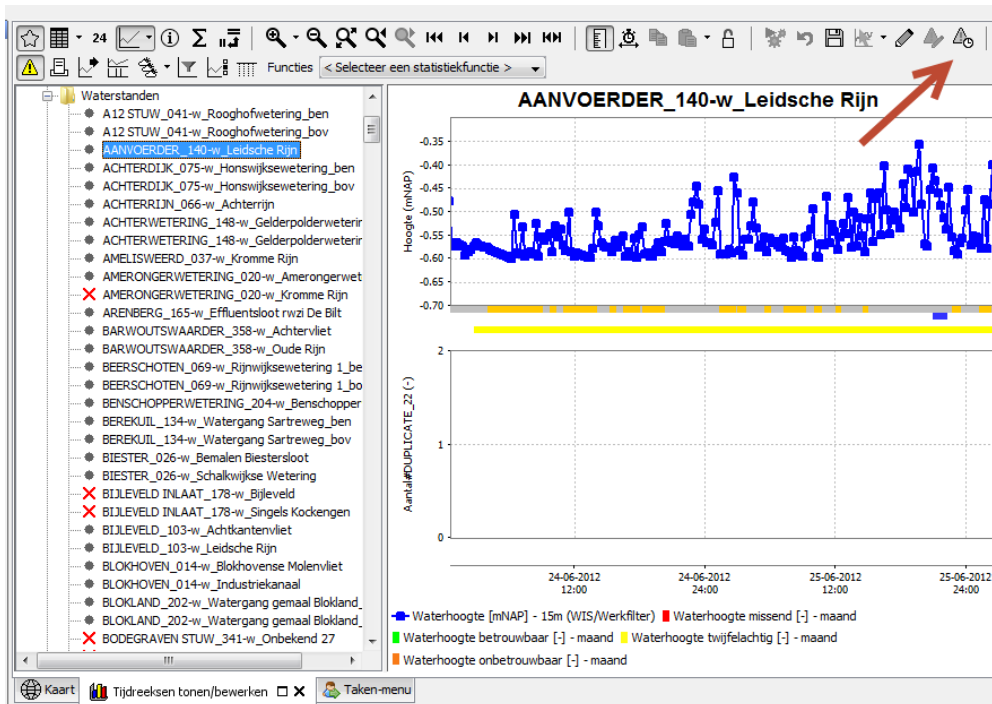
Gewijzigd op	Workflow/Gebruiker	Waarde	Vlag	Validatie	V6	V5	Commentaar
11-12-2015 16:11:44	SecondaryValidation_Test	0.586	corrected reliable	INTP	OK	INTP	
11-12-2015 16:10:59	InterpolateTest	0.586	corrected reliable	INTP		INTP	
11-12-2015 16:10:08	Ivo Miltenburg	missing	corrected unreliable				
30-10-2013 03:56:38	?	0.587	original reliable				

Time of Validity

Since 2016.01 it is possible to open up 'Time of Validity' (Tv) related functionality in the timeSeries display, by configuring a `timeOfValidity` element in the `flagSourceColumns.xml` configuration file.

Activating Time of Validity 'mode'

A Tv button becomes available in the time series button panel, which activates all 'Time of Validity' related functionality. The button is only be visible in the button panel, when the `timeOfValidity` element has been defined in the `flagSourceColumns.xml` file. Note that none of the Tv functionality is available when the Tv button is not activated.



Besides the functionality as described below, when the Tv button from the toolbar is activated, the time series display will be set to 'edit mode' automatically.

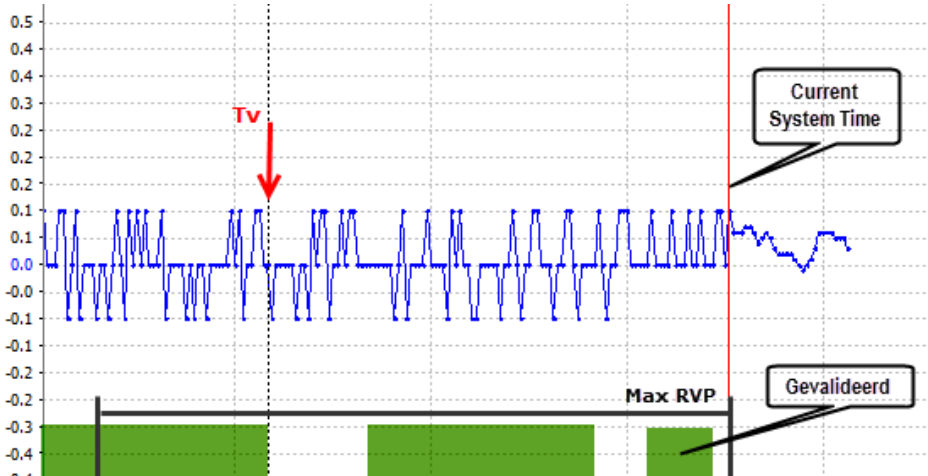
Definition Time of Validity

The time of Validity is defined as the last timestep for which a timeseries has been validated with a particular validation step (in other words: for

which a specific flagSourceColumn contains a flagSource). The Time of Validity of a single timeseries in a display is calculated according to the following logic:

- the **TimeOfValidity** flagSourceColumn, as defined in flagSourceColumns.xml, will be used
- The timeseries is read for the maximum relative view period **timeOfValiditySearchPeriod**, as defined globally in the timeseriesDisplayConfig.xml configuration file
- The timestep **before** the first timestep where the Tv flagSource is not available is considered as the Tv for that time series
- When no single timestep within the **timeOfValiditySearchPeriod** has the Tv flagSourceColumn filled, the timeseries will have no Tv
- When the first timestep within the **timeOfValiditySearchPeriod** does not have the flagSourceColumn filled but later timesteps do have the Tv flagSource, the Time of Validity will be equal to this first timestep within the **timeOfValiditySearchPeriod**

An example for a single timeseries is given in the image below



The Tv (Time of Validity) for a display node needs to be calculated by aggregating the Tv's for all the timeseries displayed under that node. Display nodes are configured in the displayGroups.xml configuration file.

- The Tv furthest in the past of all the time series under the display node will be considered as the display Time of Validity.
- The Tv also needs to be calculated for the (sub)directories in which the displaynodes are contained.
- Read Only time series should be ignored when calculating Time of Validity
- Recalculating (and displaying the (updated)) Tv should take place after every save action.

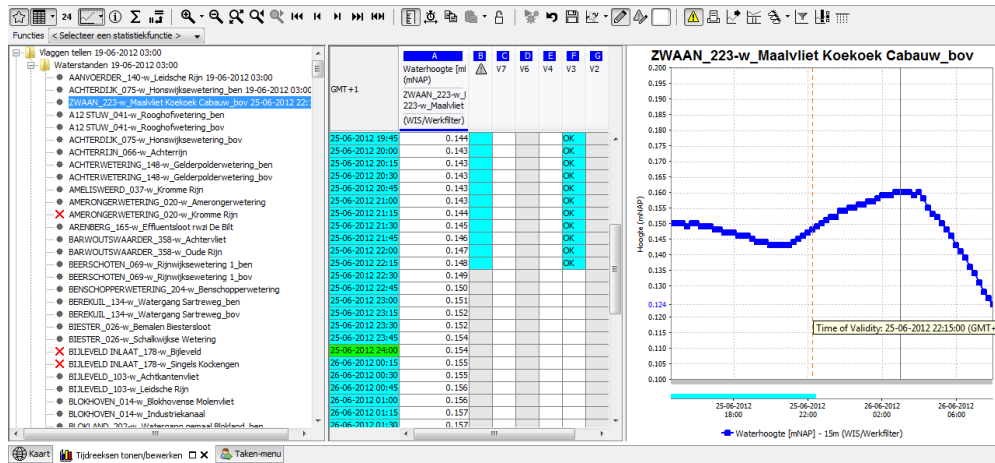
Time of Validity in Database Viewer

When the **timeOfValidity** element has been defined in the flagSourceColumns.xml file, the Time of Validity will be calculated for each timeseries in the database lister. Note that - different from the time series in the time series display - the Tv is calculated based on the complete time series.

Y	Tijdsrie-type	Waarde-type	Tijdstap	Start	Eind	Tijd van Validatie	Tijdspanne	Tijdstip Aantal	Opgesl. Tijdstip
	1	1	1	24-06-2012 03:00:00	26-06-2012 03:00:00	24-06-2012 03:00:00	2		484
i781	448667 external hist...	scalar	15 minuten	25-06-2012 ...	26-06-2012 ...		1		97
i714	443508 external hist...	scalar	15 minuten	25-06-2012 ...	26-06-2012 ...		1		97
i714	443508 external hist...	scalar	15 minuten	25-06-2012 ...	26-06-2012 ...		1		97
i623	454951 external hist...	scalar	15 minuten	24-06-2012 ...	26-06-2012 ...	24-06-2012 03:00:00	2		193

Time of Validity marker

When Time of Validity has been configured, a Tv marker for the time series display will be displayed in the timeSeries display (when configured).



Tv in displayNode text

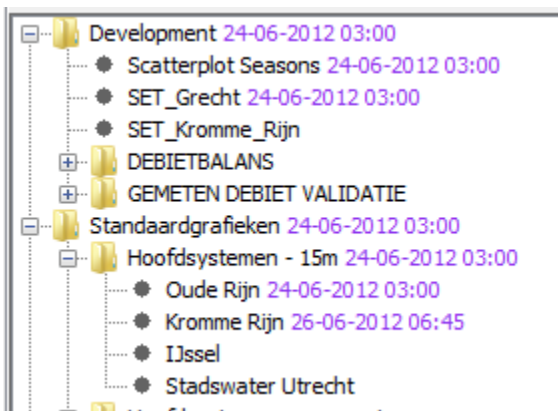
The Tv that is calculated for all timeseries in a display node will be shown in the display node text.

Format:

<displayGroupName> <time>

The position of the Tv time will be either before or after the displayGroupName and can be toggled through the right mouse menu ('Time of Validity position'). The dateTimeFormat as defined in the Explorer.xml configuration file is used, where the :ss (seconds) is removed. The color of the time will be the same as the Tv marker (and black by default, when the Tv marker is not configured).

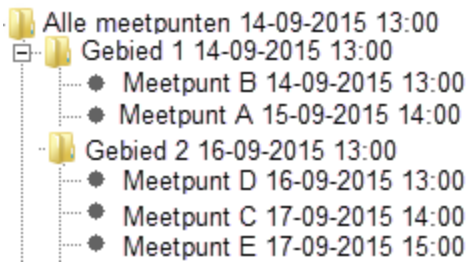
Recalculation and displaying the (updated) Tv takes place after every save action.



Ordering of display nodes based on Tv

When the Tv mode is activated, the displaygroups nodes are dynamically ordered based on the Tv of that display node

- The node with the Tv furthest in the past will be displayed on top within the (sub)directory.
- When Tv's are equal, the order will be as configured in the displayGroup.xml file
- (Sub)directory display nodes will show the Tv as an aggregation of the nodes/directories in that (sub)directory



It is noted that the this automatic ordering of the display nodes within a (sub)directory will only be executed at the moment the Tv button is selected. When a validator wants to update the sorting, the Tv button can be de-activated and activated again.

View period and cursor behaviour

A required [default view period for the time of Validity \(Tv\)](#) has been configured to define the time span of data displayed in the time series display whenever the Tv button is selected. The view period is relative to the Tv of the time series in the display and not to T0. This view period is enforced every time the user switches to another display node.

Also, when Tv button is selected, the cursor will default to the last timestep of the view period, whenever:

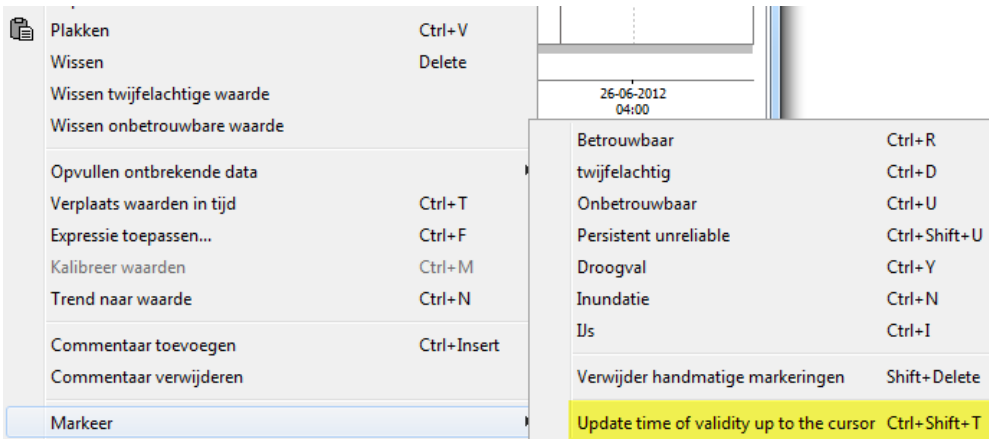
- the user selects switches from display node
- the user changes the view period (use case is CTRL+ALT+Right quickkey to change viewperiod, but this also works for manual zooming)

Note: the cursor will update to the last time step for which data is available

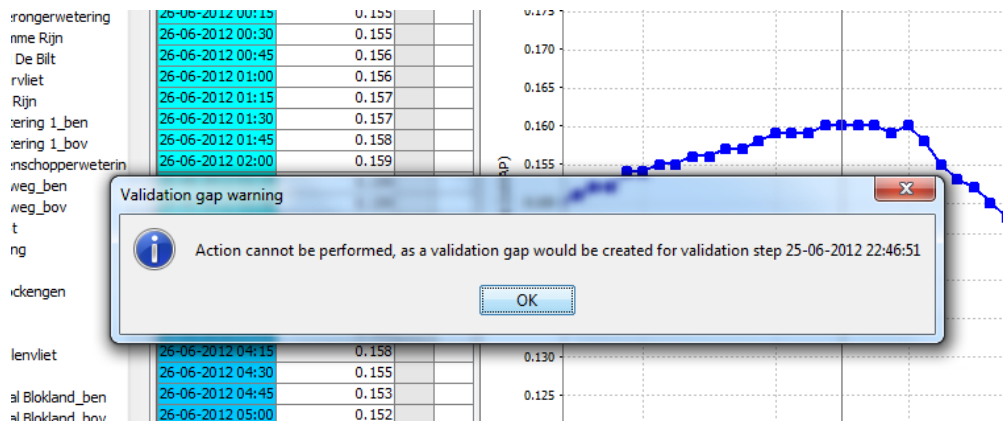
Update Tv flagSource column

When the Tv button is selected, the user is able to update the [flagSource column related to Tv](#) for all timesteps up to the current position of the cursor (current selected timestep) with the [defaultFlagSource](#) as defined in the flagSourceColumn configuration file.

- using an option through the rightmouse menu
- using a simple keyboard shortcut: **CTRL+SHIFT+T**

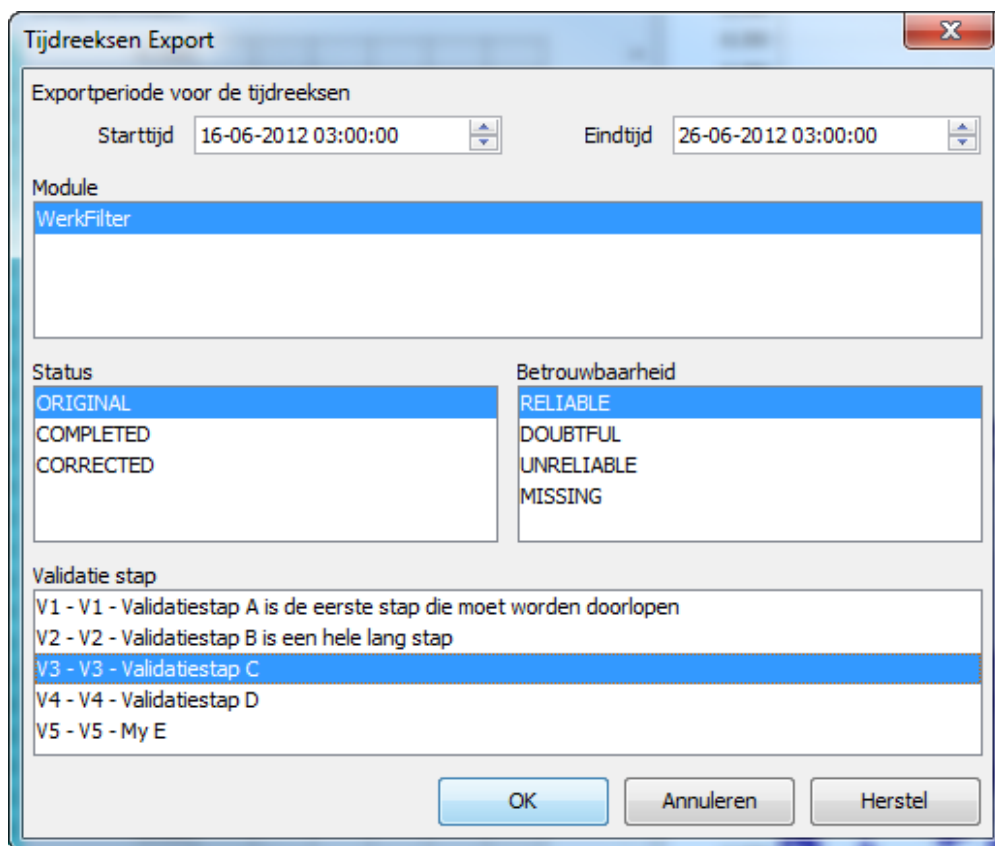


The update will only take place for the view period of the display. When this update function is used when Tv is outside the view period of the display, a pop up will be displayed warning the user that a validation gap would be created. The update action will not be performed in this case. This might for example happen when the validator updates the flagSourceColumns using the functionality described above - without saving. Delft FEWS does not know in that case that the Tv should be updated, as the Time of Validity is only recalculated after the timeSeries have been saved.



Export of flagSourceColumns

In the FEWS client, it is possible to use the validation status as a condition for the interactive export. A specific flagSource Column can be selected which is used as a filter for the export. The flagSource Columns are included for the PI-XML data type and will always be exported when available. The GeneralCSV datatype can be configured as an interactive export type as well. The flagSource columns that should be exported can be configured in the explorer.xml configuration file.



In the regular timeseries exports, the export of flagSourceColumns is supported for the PI-XML format and the GeneralCSV format. In PI-XML, the flagSource columns will always be exported. When exporting using the generalCsv export format, inclusion of flagSourceColumns can be defined in the configuration with the use of Table Layout.

Import of flagSourceColumns

The flagSource Columns are included for the PI-XML data type and will be imported.

The GeneralCSV datatype can be configured as an import type as well. The flagSource columns that should be imported can be configured in the explorer.xml configuration file.

Below is given an example on how to configure a generalCSV import with flagSource columns.

```
<?xml version="1.0" encoding="UTF-8"?>
<timeSeriesImportRun xmlns="http://www.wldelft.nl/fews"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.wldelft.nl/fews
http://fews.wldelft.nl/schemas/version1.0/timeSeriesImportRun.xsd">
  <import>
    <general>
      <importType>generalCSV</importType>

<folder>../junit_test_output/nl/wldelft/fews/system/plugin/dataImport/Time
SeriesImportTestData/import/generalcsv</folder>
    <table>
      <dateTimeColumn name="DATE" pattern="dd-MM-yy HH:mm"/>
      <locationColumn name="LOC"/>
      <unitColumn name="UNIT"/>
      <parameterColumn name="PARAM"/>
      <flagSourceColumn id="A" name="FS_A"/>
      <!-- column with name fs a will be mapped to the flag source column
with identifier A -->
      <flagSourceColumn id="B" name="FS_B"/>
      <flagSourceColumn id="C" name="FS_C"/>
      <flagSourceColumn id="D" name="FS_D"/>
      <flagSourceColumn id="E" name="FS_E"/>
      <valueColumn name="VALUE"/>
    </table>

<logWarningsForUnmappableLocations>true</logWarningsForUnmappableLocations>

<logWarningsForUnmappableParameters>true</logWarningsForUnmappableParamete
rs>

<logWarningsForUnmappableQualifiers>true</logWarningsForUnmappableQualifie
rs>
    <maxLogWarnings>1000</maxLogWarnings>
    <missingValue>-999</missingValue>
    <importTimeZone>
      <timeZoneOffset>+01:00</timeZoneOffset>
    </importTimeZone>
    <dataFeedId>generalCSV</dataFeedId>
  </general>
</import>
</timeSeriesImportRun>
```

The CSV file for this example could look like this:

```
DATE , LOC , VALUE , UNIT , PARAM , FS_A , FS_B , FS_C , FS_D , FS_E  
01-01-81 00:00 , H-2001 , 2.3 , m , P.m , OK , OK , OK , OK , OK
```

Note that during import, the mapping goes from 'name' to 'id'. When importing the data, the flagSourceColumnId's should be configured in the `flagSourceColumns` configuration file.

Copying of flagSource columns to other timeseries

It is possible to manually copy and paste the flagSources in the flagSource Columns to other flagSource Columns (from the same, or from other timeseries), when in edit mode.

It is not possible to copy flagSource columns in a transformation to another timeseries.

27 Resampling Dialog

Contents

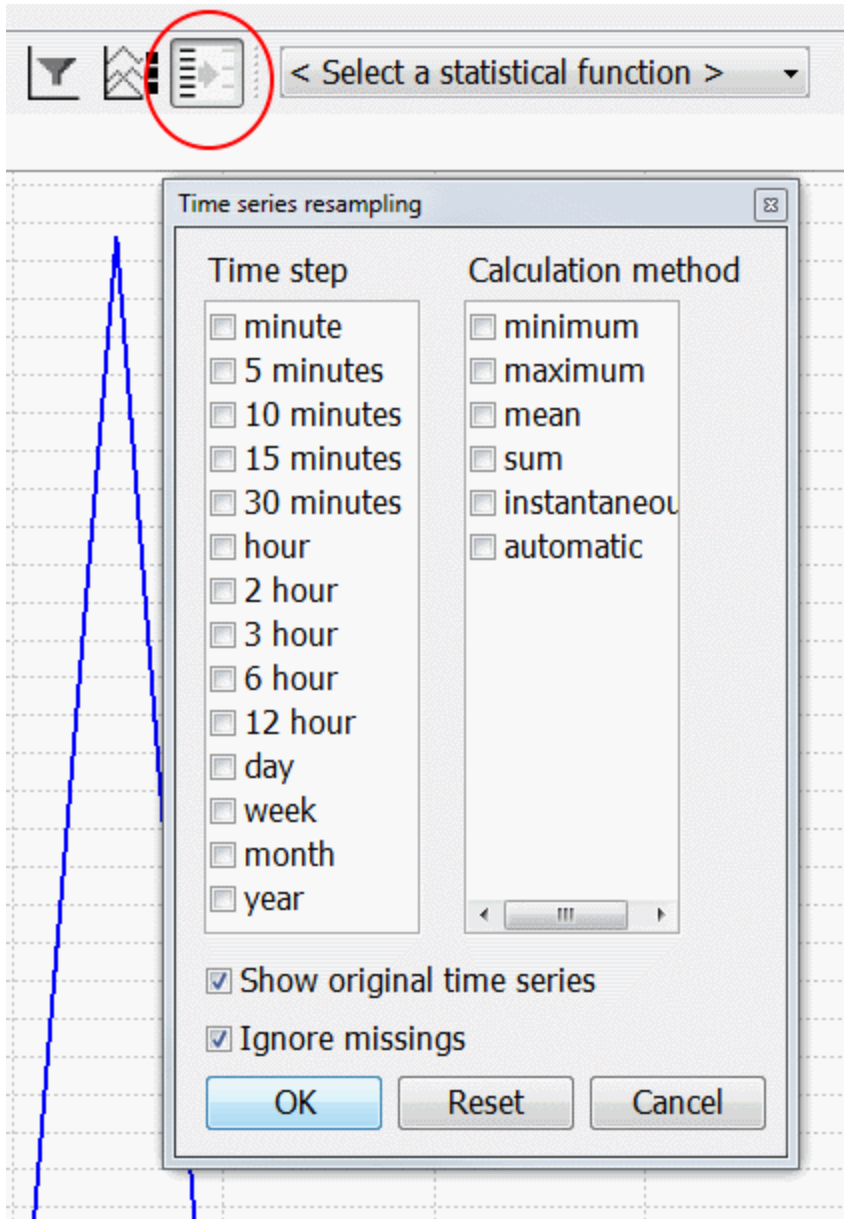
- Contents
- Overview
 - Button on toolbar
 - Adding a time serie with new interval
 - Adding time series for each original time serie
 - Selecting multiple intervals and calculation methods
 - Ignore missings values checkbox
 - Buttons
 - Calculation Methods
 - Minimum
 - Maximum
 - Mean
 - Sum
 - Instantaneous
 - Automatic

Overview

The time series resampling dialog lets the user select different intervals and calculation methods for the time series available in the Time Series Dialog. The different intervals and calculation methods will result in newly on the fly calculated time series which will be added to the Time Series Display. These newly added time series are just for displaying in the graph and table and will not be stored in the data store so will not be available for functionality outside of the Time Series Dialog.

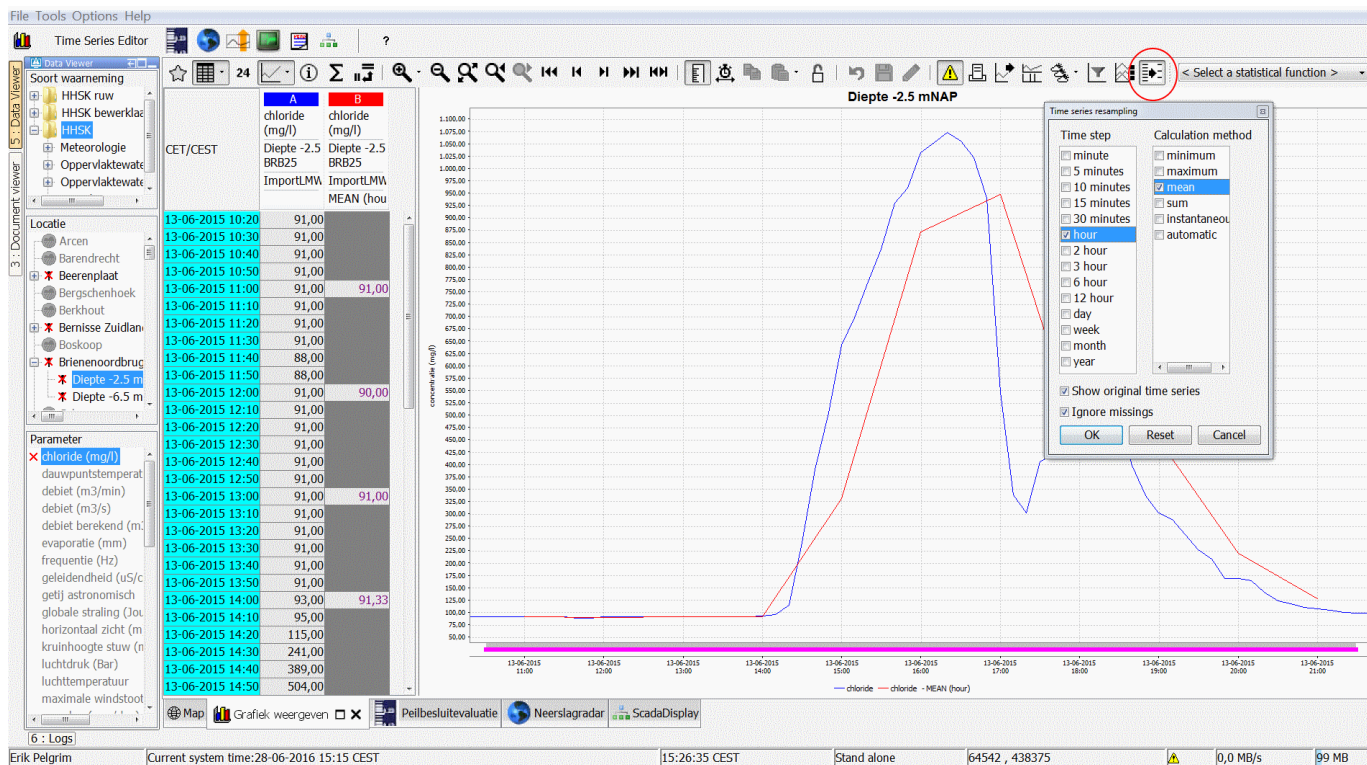
Button on toolbar

The resampling dialog will appear after clicking the button in the toolbar of the Time Series Dialog.



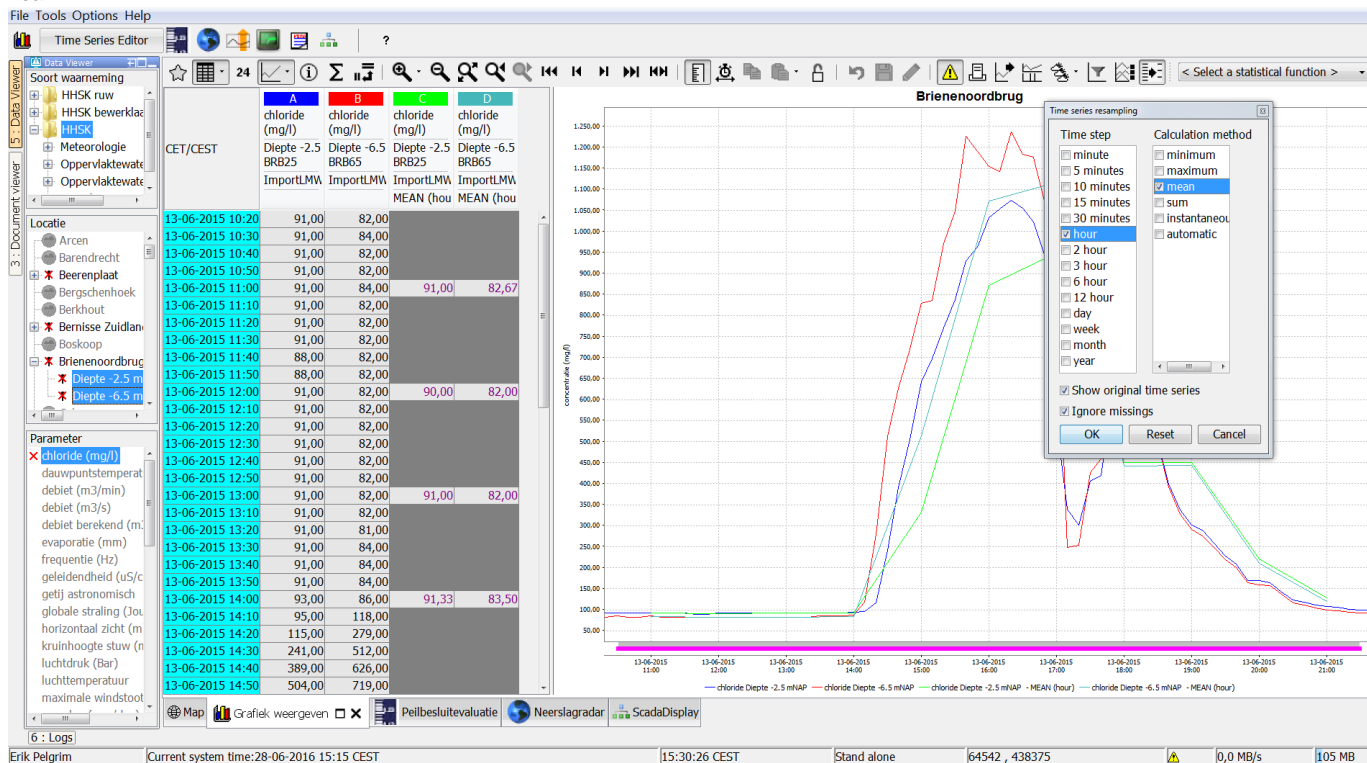
Adding a time serie with new interval

When selecting the time step "hour" and calculation method "mean", the time series "chloride -MEAN (uur)" will appear after clicking the "ok" button. When time series are added in this way, the icon of the button will have a black arrow and black stripes instead of grey to show it is active.



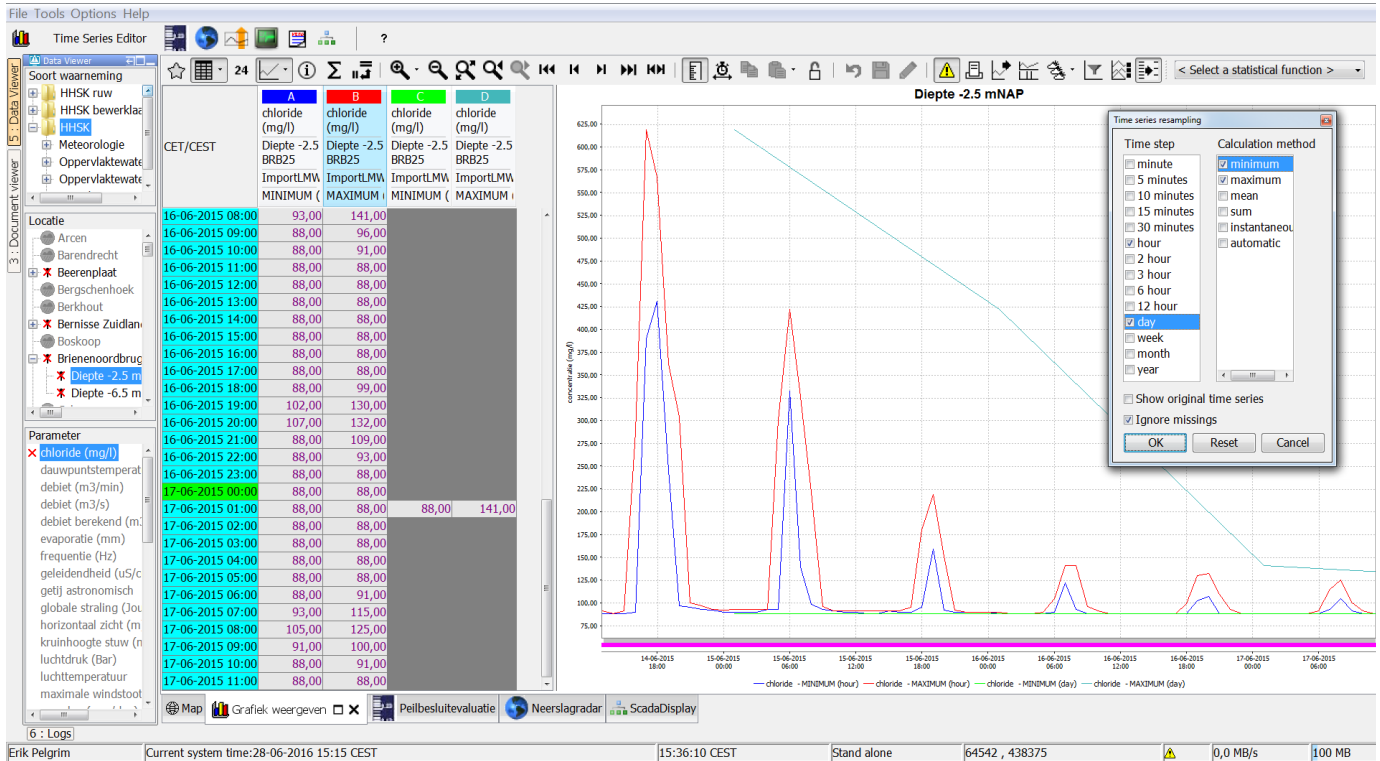
Adding time series for each original time serie

Each combination of selected intervals and calculation methods will result in a new time series for each original time serie. Below an example is shown where for both locations "Diepte -2.5 mNAP" and "Diepte -6.5 mNAP" a time serie is added with interval hour and calculation method mean:



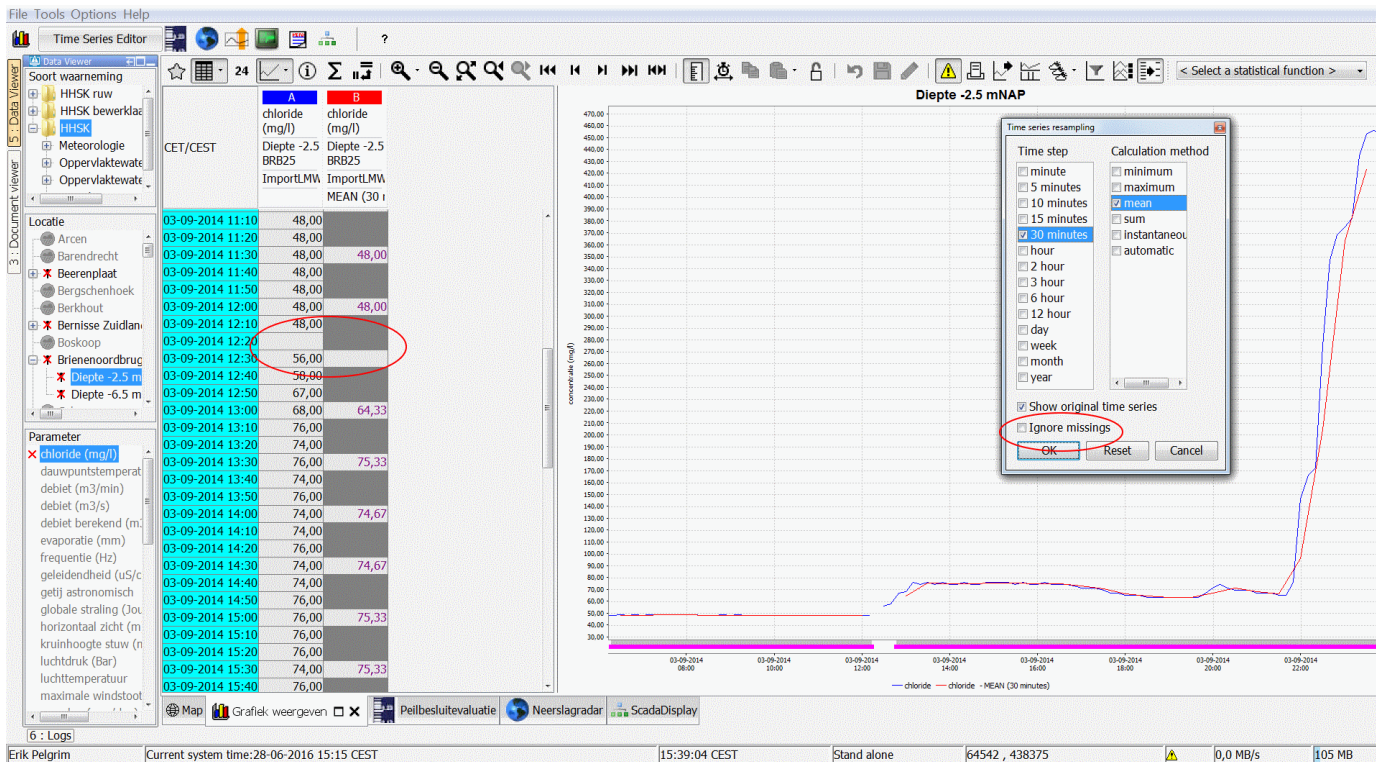
Selecting multiple intervals and calculation methods

Selecting multiple intervals and multiple calculation methods will result in adding new time series for each combination. In the example below the intervals hour and day are selected and calculation methods minimum and maximum, this way 4 time series are added. Also the checkbox "show original time step" is not selected anymore, this way the original time series is not shown anymore.

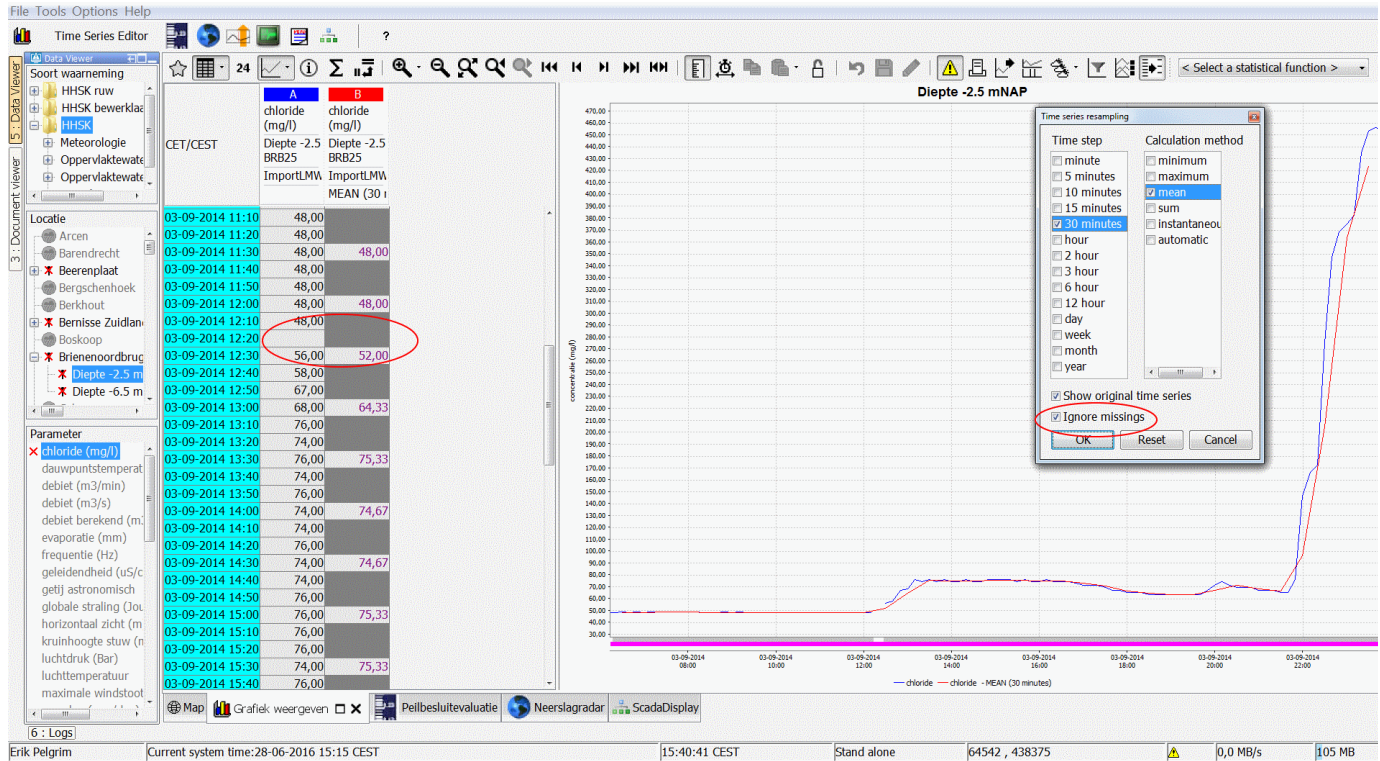


Ignore missing values checkbox

If the checkbox "ignore missing values" is not selected a new value will not be calculated for a new interval time step when a missing value is present in the original interval:



When this checkbox is selected, the missing values will be ignored:



Buttons

The reset button will deselect all intervals and calculation methods and select both checkboxes, this is the default setting in which the dialog is also originally opened for the first time.

The cancel button will close the dialog and not apply the changes made while it was open.

The changes made to this dialog will only be applied to the time series after clicking the ok button.

Calculation Methods

There are multiple calculation methods:

Minimum

Minimum value that is present in the original time serie within each interval.

Maximum

Maximum value that is present in the original time serie within each interval.

Mean

This is calculated by first adding the values from the original time serie within each interval together, and then dividing it by the amount of values.

Sum

This is calculated by adding the values from the original time serie within each interval together.

Instantaneous

This takes the last value from the original time series within each interval.

Automatic

This picks the calculation method according to the parametertype:

- Parameter type "instantaneous" => Calculation method "instantaneous"
- Parameter type "accumulative" => Calculation method "sum"
- Parameter type "mean" => Calculation method "mean"

This option is introduced to help users to pick a valid calculation method. Because for some parameters certain calculation methods do not make sense.

For instance for a parameter "Precipitation Intensity" with type "mean" and unit "mm/h" it does not make sense to chose calculation method sum because intensity is not meant to be summed. If in 1 hour every 15 minutes the intensity was measured at 5, 10, 0 and 5 and you calculate the sum over that hour you get an intensity of 20 mm/h, which is wrong. But for a parameter "Precipitation" with type "accumulative" and unit "mm" this does make sense. If in 1 hour every 15 minutes the precipitation was measured at 5, 10, 0 and 5 and you calculate the sum over that hour you get a total precipitation of 20 mm, which is perfectly fine.

For a parameter "Gate position" with type "instantaneous" it could be that the only valid values are 0 or 1, meaning closed and open. Calculating a sum or a mean will not make sense because it can result in invalid data above 1 or between 0 and 1.

28 Interval Statistics Dialog

Contents

- [Contents](#)
- [Overview](#)

Overview

The interval statistics dialog is a predefined display that needs to be configured as an ExplorerTask in Explorer.xml:

```
<explorerTask name="Interval Statistics">
  <predefinedDisplay>interval statistics</predefinedDisplay>
  <toolbarTask>true</toolbarTask>
  <menubarTask>true</menubarTask>
  <loadAtStartup>true</loadAtStartup>
</explorerTask>
```

This dialog will enable the user to divide the selected time series from the data viewer into intervals between a specific start and end date and calculates statistical values for those intervals. The example below shows the percentage of non missing values for each calendar month between start and end date:

Tennessee Valley Authority (Stand alone)

File Tools Options Help

Interval Statistics

Start: 08-11-2015 07:00:00
 End: 10-18-2015 07:00:00
 Current date: 09-18-2015 07:00:00

Interval: calendar month

Statistic:

- % available
- % unreliable
- % doubtful
- minimum
- maximum
- mean
- > threshold value
- < threshold value

 Threshold value:

 Apply Close

Location Id	Location Name	Parameter Group	Parameter Id	Parameter Name	Module Instance	Statistic	Aug-2015	Sep-2015	Oct-2015
APLV2	Appalachia	Precip	PP	Precipitation...	Preprocess...	% available	0	83	14

Map Plots Spatial Data Modifiers Data Editor Manual Forecast Interval Statistics

Logs 2: Forecaster Notes 8: Run Info

Erik Pelgrim || Current system time:09-18-2015 07:00 CDT 16:31:26 CET Stand alone -88,436 , 32,582 0,0 MB/s 99 MB

A different interval can be chosen from a dropdown list, like year

Tennessee Valley Authority (Stand alone)

File Tools Options Help

Interval Statistics ?

Start: 08-11-2015 07:00:00
End: 10-18-2015 07:00:00
Current date: 09-18-2015 07:00:00

Interval: year
Statistic: % available
 % unreliable
 % doubtful
 minimum
 maximum
 mean
 > threshold value
 < threshold value

Threshold value:

Apply Close

Location Id	Location Name	Parameter Group	Parameter Id	Parameter Name	Module Instance	Statistic	2015
APLV2	Appalachia	Precip	PP	Precipitation...	Preprocess...	% available	8

Map Plots Spatial Data Modifiers Data Editor Manual Forecast Interval Statistics

Logs 2 : Forecaster Notes 8 : Run Info

Erik Pelgrim || Current system time:09-18-2015 07:00 CDT 16:34:41 CET Stand alone -88,436 , 32,582 0,0 MB/s 99 MB

By selecting the interval month, the intervals will be divided over the 12 months within a year. This means for example that the data from September 2014 and September 2015 is taken together in the column Sep.

Tennessee Valley Authority (Stand alone)

File Tools Options Help

Interval Statistics ?

Start: 08-11-2014 07:00:00
End: 10-18-2015 07:00:00
Current date: 09-18-2015 07:00:00

Interval: month
Statistic: % available
 % unreliable
 % doubtful
 minimum
 maximum
 mean
 > threshold value
 < threshold value

Threshold value:

Apply Close

Location Id	Location Name	Parameter Group	Parameter Id	Parameter Name	Module Instance	Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
BCRA1	Bear Creek ...	Precip	MAP	Precipitation...QPE_to_MAP		% available	0	0	0	1	2	14	15	36	7	0	0	0

Map Plots Spatial Data Modifiers Data Editor Manual Forecast Interval Statistics

Logs 2 : Forecaster Notes 8 : Run Info

Erik Pelgrim || Current system time:09-18-2015 07:00 CDT 16:41:35 CET Stand alone -88,436 , 32,582 0,0 MB/s 102 MB

The threshold value field can be filled and will be used when calculating the percentage of values above or below a threshold.

The screenshot shows the 'Interval Statistics' dialog box in the Tennessee Valley Authority software. The 'Statistic' dropdown is set to '< threshold value'. The 'Threshold value' field is set to '0,1'. The data table below shows a single row for location BCRA1 with values for August (31), September (71), and October (14).

Location Id	Location Name	Parameter Group	Parameter Id	Parameter Name	Module Instance	Statistic	Aug	Sep	Oct
BCRA1	Bear Creek ...	Precip	MAP	Precipitation...	QPE_to_MAP	< threshold ...	31	71	14

Multiple time series can be selected at once, this will result in multiple rows:

The screenshot shows the 'Interval Statistics' dialog box with the 'Statistic' dropdown set to '> threshold value'. The data table below shows multiple rows for various locations, including BCRA1, RBYA1, BIGT1, RBVA1, and BNAA1, with values for August-2015, September-2015, and October-2015.

Location Id	Location Name	Parameter Group	Parameter Id	Parameter Name	Module Instance	Statistic	Aug-2015	Sep-2015	Oct-2015
4	4	1	1	1	1	1	3	4	3
BCRA1	Bear Creek ...	Precip	MAP	Precipitation...	QPE_to_MAP	< threshold ...	31	71	14
RBYA1	Bear Creek ...	Precip	MAP	Precipitation...	QPE_to_MAP	< threshold ...	30	71	14
BNAA1	Big Nance C...	Precip	MAP	Precipitation...	QPE_to_MAP	< threshold ...	30	70	13
BIGT1	Big Sandy at...	Precip	MAP	Precipitation...	QPE_to_MAP	< threshold ...	30	69	13
BCRA1	Bear Creek ...	Precip	MAP	Precipitation...	QPE_to_MAP	< threshold ...	0	0	0
RBVA1	Bear Creek ...	Precip	MAP	Precipitation...	QPE_to_MAP	< threshold ...	0	0	0
BNAA1	Big Nance C...	Precip	MAP	Precipitation...	QPE_to_MAP	< threshold ...	0	0	0
BIGT1	Big Sandy at...	Precip	MAP	Precipitation...	QPE_to_MAP	< threshold ...	0	0	0

per time serie. This is shown below for just 1 time serie, Multiple statistics can be chosen as well for example minimum, maximum and mean:

The screenshot shows the 'Interval Statistics' dialog box in the Tennessee Valley Authority software. The 'Start' date is 08-11-2015 07:00:00, the 'End' date is 10-18-2015 07:00:00, and the 'Current date' is 09-18-2015 07:00:00. The 'Interval' is set to 'calendar month'. The 'Statistic' options are checked for '% available', '% unreliable', '% doubtful', 'minimum', 'maximum', 'mean', '> threshold value', and '< threshold value'. The 'Threshold value' is 0,1. The 'Apply' and 'Close' buttons are visible.

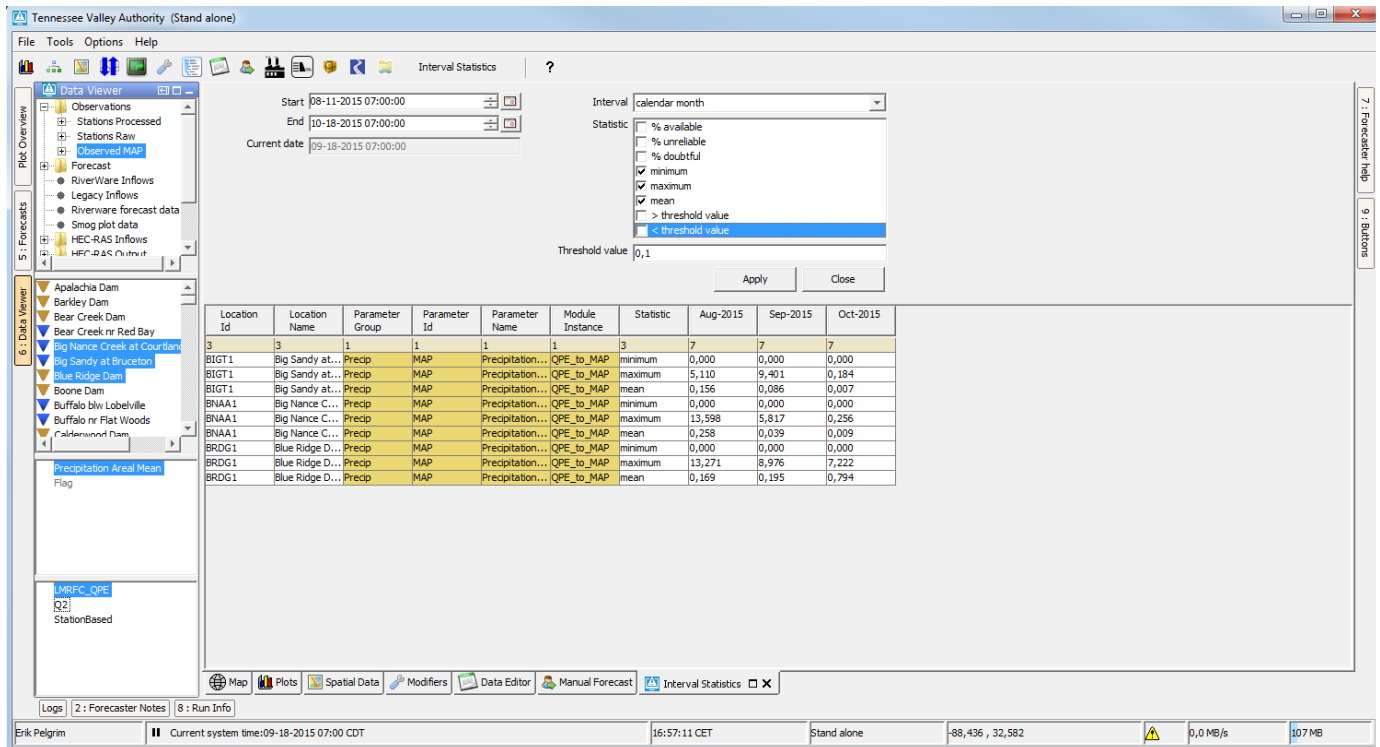
Location Id	Location Name	Parameter Group	Parameter Id	Parameter Name	Module Instance	Statistic	Aug-2015	Sep-2015	Oct-2015
1	1	1	1	1	1	3	3	3	3
RBYA1	Bear Creek ...	Precip	MAP	Precipitation...	QPE_to_MAP	minimum	0,000	0,000	0,000
RBYA1	Bear Creek ...	Precip	MAP	Precipitation...	QPE_to_MAP	maximum	4,460	5,770	0,001
RBYA1	Bear Creek ...	Precip	MAP	Precipitation...	QPE_to_MAP	mean	0,093	0,031	0,000

Multiple time series and multiple statistics can be chosen, this will result in a new row for each time series for each each statistic:

The screenshot shows the 'Interval Statistics' dialog box in the Tennessee Valley Authority software. The 'Start' date is 08-11-2015 07:00:00, the 'End' date is 10-18-2015 07:00:00, and the 'Current date' is 09-18-2015 07:00:00. The 'Interval' is set to 'calendar month'. The 'Statistic' options are checked for '% available', '% unreliable', '% doubtful', 'minimum', 'maximum', 'mean', '> threshold value', and '< threshold value'. The 'Threshold value' is 0,1. The 'Apply' and 'Close' buttons are visible.

Location Id	Location Name	Parameter Group	Parameter Id	Parameter Name	Module Instance	Statistic	Aug-2015	Sep-2015	Oct-2015
3	3	1	1	1	1	3	7	7	7
BNAA1	Big Nance C...	Precip	MAP	Precipitation...	QPE_to_MAP	minimum	0,000	0,000	0,000
BIGT1	Big Sandy at...	Precip	MAP	Precipitation...	QPE_to_MAP	minimum	0,000	0,000	0,000
BRDG1	Blue Ridge D...	Precip	MAP	Precipitation...	QPE_to_MAP	minimum	0,000	0,000	0,000
BNAA1	Big Nance C...	Precip	MAP	Precipitation...	QPE_to_MAP	maximum	13,598	5,817	0,256
BIGT1	Big Sandy at...	Precip	MAP	Precipitation...	QPE_to_MAP	maximum	5,110	9,401	0,184
BRDG1	Blue Ridge D...	Precip	MAP	Precipitation...	QPE_to_MAP	maximum	13,271	8,976	7,222
BNAA1	Big Nance C...	Precip	MAP	Precipitation...	QPE_to_MAP	mean	0,258	0,039	0,009
BIGT1	Big Sandy at...	Precip	MAP	Precipitation...	QPE_to_MAP	mean	0,156	0,086	0,007
BRDG1	Blue Ridge D...	Precip	MAP	Precipitation...	QPE_to_MAP	mean	0,169	0,195	0,794

The rows can be ordered by clicking on the table header, for example Location Id:



29 System Wide Thresholds Display

- System Wide Thresholds Display
 - Activate Display
 - Configure Display
 - ThresholdValueSets - EventTimeViewPeriod
 - ThresholdValueSets - Visible
 - TimeSeriesDisplayConfig - ThresholdDisplayConfig
 - Filtering
 - Event Time
 - Event Value
 - Acknowledging Events

System Wide Thresholds Display

This display provides users with a system wide overview of all threshold crossing events. This display does not require any additional configuration files. It makes use of the already existing threshold configuration in the 'thresholdValueSets.xsd' and the 'thresholdDisplayConfig' that is available in the 'timeSeriesDisplayConfig.xsd'.

Threshold Id	Module Instance	Location Id	Location Name	Parameter Id	Parameter Name	Unit	Time Step	Event Time	Event Value	Time till Crossing	Warning Action	Acknowledged By	Acknowledge Time
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	19-10-2016 07:30:00	-999,00017d 16h 30m	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	20-10-2016 12:00:00	14,40018d 21h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	22-10-2016 19:00:00	14,40021d 4h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	10-11-2016 18:30:00	-999,00040d 4h 30m	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	12-11-2016 04:00:00	14,40041d 14h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	12-11-2016 14:00:00	14,40042d	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	13-11-2016 12:30:00	-999,00042d 22h 30m	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	13-11-2016 18:30:00	-999,00043d 4h 30m	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	14-11-2016 06:30:00	-999,00043d 16h 30m	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	14-11-2016 12:30:00	-999,00043d 22h 30m	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	14-11-2016 18:30:00	-999,00044d 4h 30m	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	15-11-2016 00:30:00	-999,00044d 10h 30m	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	15-11-2016 05:00:00	14,40044d 15h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	15-11-2016 06:30:00	-999,00044d 16h 30m	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	15-11-2016 12:30:00	-999,00044d 19h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	15-11-2016 18:30:00	-999,00044d 4h 30m	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	15-11-2016 19:00:00	14,40045d 5h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	16-11-2016 01:00:00	14,40045d 11h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	16-11-2016 02:00:00	14,40045d 12h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	16-11-2016 03:00:00	14,40045d 13h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	16-11-2016 06:30:00	-999,00045d 16h 30m	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	16-11-2016 11:00:00	14,40045d 21h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	16-11-2016 13:00:00	14,40045d 23h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	16-11-2016 15:00:00	14,40046d 1h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	16-11-2016 16:00:00	14,40046d 2h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	16-11-2016 18:30:00	-999,00046d 4h 30m	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	16-11-2016 19:00:00	14,40046d 5h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	16-11-2016 19:00:00	14,40046d 5h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	16-11-2016 21:00:00	14,40046d 7h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	17-11-2016 00:00:00	14,40046d 10h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	17-11-2016 00:30:00	-999,00046d 10h 30m	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	17-11-2016 02:00:00	14,40046d 12h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	17-11-2016 04:00:00	14,40046d 14h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	17-11-2016 06:00:00	14,40046d 16h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	17-11-2016 06:00:00	14,40046d 16h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	17-11-2016 06:30:00	-999,00046d 16h 30m	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	17-11-2016 07:00:00	14,40046d 17h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	17-11-2016 10:00:00	14,40046d 20h	H 074:			
AlarmFase1	ARMA_Regge_Forecast	WST_2102	074-Middensloot Weerselo	H.updated.voorsp	Gesimuleerde voorspelde waterstand (A...	m	hour	17-11-2016 12:00:00	14,40046d 22h	H 074:			

Activate Display

The thresholds display can be activated by adding the following explorer task in the Explorer.xml file:

```

<explorerTask name="Events">
  <iconFile>table.png</iconFile>
  <mnemonic>T</mnemonic>

  <taskClass>nl.wldelft.fews.gui.plugin.thresholdeventsviewer.ThresholdEvent
  sTableView</taskClass>
  <toolbarTask>>true</toolbarTask>
  <menubarTask>>true</menubarTask>
  <allowMultipleInstances>>false</allowMultipleInstances>
  <accelerator>ctrl T</accelerator>
  <loadAtStartup>>false</loadAtStartup>
</explorerTask>

```

Configure Display

The thresholds display does not require a display configurations file. It obtains all information for thresholds configuration that is already available in the ThresholdValueSets.xml file and also in the TimeSeriesDisplayConfig.xml file.

Firstly the most information is retrieved from the ThresholdValueSets file. Here is where all threshold levels are configured and how they relate to timeseries sets. For the purpose of the Thresholds Display some configuration options have been added to this file to control the view period and visibility of the threshold events.

ThresholdValueSets - EventTimeViewPeriod

This configuration option consists of a relative view period that controls which threshold events are shown in the display by default. The relative period is converted to an absolute period based on the current system time. Only threshold events will be shown if their Event Time lies within the configured period. Changing the System Time is one way to change the view period the events. The other way to change the view period is described in the section on filtering.

Each thresholdValueSet file can contain a single EventTimeViewPeriod element. When multiple thresholdValueSet files are configured and they each have their own relative period then the overall view period is an extension of all the individual view periods.

```

<?xml version="1.0" encoding="UTF-8"?>
<thresholdValueSets xmlns="http://www.wldelft.nl/fews"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.wldelft.nl/fews
http://fews.wldelft.nl/schemas/version1.0/thresholdValueSets.xsd">
  <thresholdValueSet id="010H" name="H 010">
    ...
  </thresholdValueSet>
  <eventTimeViewPeriod start="0" end="7" unit="day"/>
</thresholdValueSets>

```

ThresholdValueSets - Visible

This configuration options allows you to control the visibility of threshold values. The 'visible' field can be set for each threshold value separately. By default all threshold values are visible. To hide none interesting threshold values from being shown in the display, they must have their visible value set to 'false'.

```

<thresholdValueSet id="013H" name="H 013">
  <levelThresholdValue>
    <levelThresholdId>Alarm</levelThresholdId>
    <value>8.10</value>
    <visible>>false</visible>
  </levelThresholdValue>
  ...

```

TimeSeriesDisplayConfig - ThresholdDisplayConfig

The second place the the thresholds displays retrieves configuration information is in the TimSeriesDisplayConfig file. This file already contains an element that allows you to control the colors of the threshold values shown in the TimeSeries dialog. This section is also used by the thresholds display to color the text in the Threshold Id column.

```

<thresholdDisplayConfig>
  <thresholdDisplayOptions id="Alarm">
    <color>orange</color>
  </thresholdDisplayOptions>
  <thresholdDisplayOptions id="AlarmFase1">
    <color>orange red</color>
  </thresholdDisplayOptions>
  <thresholdDisplayOptions id="AlarmFase2">
    <color>red</color>
  </thresholdDisplayOptions>
  <thresholdDisplayOptions id="AlarmFase3">
    <color>indian red</color>
  </thresholdDisplayOptions>
</thresholdDisplayConfig>

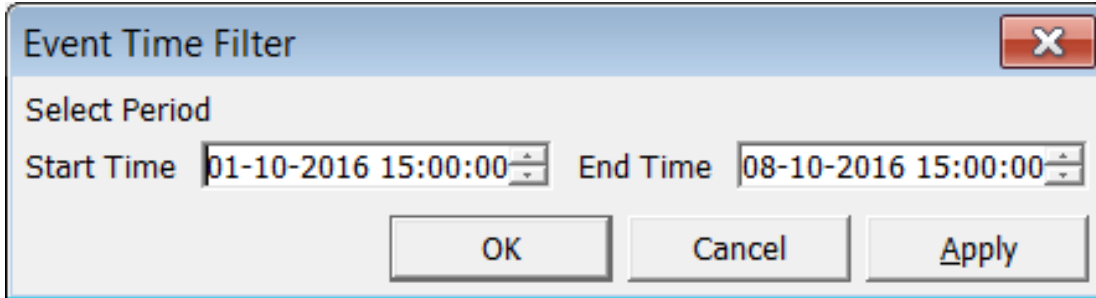
```

Filtering

The functionality of the Thresholds Display closely resembles that of the 'Database Viewer'. By clicking on a value in one of the columns the table will be filtered for that value. By clicking again on the same column the filter is removed. The Thresholds Display offers two special filter options; Event Time and Event Value

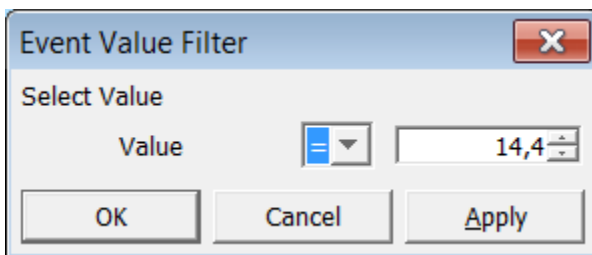
Event Time

When filtering the Event Time column a pop-up display appears allowing the user the overrule and extend the default view period that is controlled by the EventTimeViewPeriod. In the pop-up the user can explicitly select a start and end time for displaying event times.



Event Value

When filtering the Event Value column a pop-up display appears allowing the user to choose how to filter the value column. Options are equal to ('='), greater than ('>') or less than ('<') the entered value.



Acknowledging Events

The Thresholds Display offers the user the ability to 'acknowledge' events. By acknowledging an event a user indicates that a Threshold Event has been seen and the required actions have been taken. On acknowledgement of events the time of acknowledgement and the user that acknowledged the event are registered. This information is stored together with the event data in the ThresholdEvents table.

Events can either be acknowledged by selection or all none-acknowledged events can be acknowledged in one single action. Acknowledging of events can be done by clicking the right-mouse button and selecting the Acknowledge options in the pop-up menu.

