ANALYSIS REPORT

August 16th 2022

Your reference: “Bijla 2021 | 02/08/22” and “Dollarddijk | 02/08/22
Our reference: 2208AF

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Date report 16/08/2022

Report prepared by
Dr. Rieko Adriaens

Table 1: Sample list with requested analyses.

Our reference	Your reference	XRD Bulk + Clay analysis	Natural cation saturation	BET-N2
2208AF01	**Bijla 2021 | 02/08/22**	X	x	X
2208AF02	**Dollarddijk | 02/08/22**	x	x	x

Table 2: Measurement characteristics of the bulk XRD analysis.

Parameter	Value
Analysis	Bulk XRD analysis
Sample preparation	Automated wet milling in alcohol and specific pretreatment to avoid preferred orientation
Diffractometer	Bruker D8 Advance, XE-T detector, Cu-Kα radiation
Data treatment methodology	In-house
Interpretation by	Dr. Rieko Adriaens
Date of measurement	09/08/2022
Date of data treatment	12/08/2022
Results	Table 6 and Figures 1-2

Table 3: Measurement characteristics of the detailed clay analysis by XRD.

Parameter	Value
Analysis	Clay extraction + XRD analysis
Sample preparation	Chemical pretreatment to remove cementing agents followed by an extraction of the <2µm fraction by sequential centrifugation.
Diffractometer	Bruker D8 Advance, XE-T detector, Cu-Kα radiation
Data treatment methodology	In-house
Interpretation by	Dr. Rieko Adriaens
Date of measurement	11/08/2022-12/08/2022
Date of data treatment	12/08/2022
Results	Table 7 and Figures 3-4

Table 4: Measurement characteristics of the BET analysis.

Parameter	Value
Analysis	Multiple point BET
Instrument	Quantachrome Autosorb
Date of analysis	11/08/2022-12/08/2022
Operator	A.A.
Sample preparation	Outgassing for 2h in 200°C under high-vaccuum
Adsorptive-gas	N_2
Temperature during analysis	77.35K (liquid nitrogen)
Results	Table 8

Table 5: Exchangeable cations composition.

Parameter	Value
Analysis	Chemical analysis of exchangeable cations
Sample preparation	Exchange by NaCl and CaCl2
Apparatus	ICP-OES
Date of measurement	17/08/2022
Results	Table 9

Table 6: Quantitative bulk mineralogical composition (in wt% of the identified minerals).

Sample	Formula	Bijla 2021 | 02/08/22	Dollarddijk | 02/08/22
NON-CLAYS			
SILCATES			
Quartz	SiO_2	39.4	33.2
Alkali feldspar	$(K,Na)Si_3AlO_8$	6.8	5.7
Plagioclase	$(Ca,Na)(Si,Al)_4O_8$	6.5	4.7
CARBONATES			
Calcite	$CaCO_3$	5.2	6.7
Dolomite/Ankerite	$Ca(Mg,Fe)(CO_3)_2$	1.7	1.3
OXIDES			
Anatase	TiO_2	0.4	0.4
Rutile	TiO_2	0.3	0.2
Goethite	$FeO(OH)$	0.2	0.3
PHOSPHATES			
Apatite	$Ca_5(PO_4)_3(F,OH,Cl)$	0.5	0.5
CLAYS			
Chlorite	$(Mg,Fe)_5Al(Si_3Al)O_{10}(OH)_8$	2.2	2.1
Kaolinite	$Al_2Si_2O_5(OH)_4$	5.0	6.3
Total 2:1 layer silicates	$(K,H_3O)(Al,Mg,Fe)_2(Si,Al)_4O_{10}[(OH)_2,(H_2O)]$	31.8	38.6

Table 7: Quantitative clay mineralogical composition <2µm of the samples (in wt%).

Mineral	Bijla 2021 | 02/08/22	Dollarddijk | 02/08/22
Kaolinite	9.2	10.8
Interstratified Illite/Smectite R0 (65/35)	40.6	39.5
Illite	25.3	22.9
Smectite	21.3	22.9
Chlorite	3.6	3.9

Table 8: Multiple point BET analysis: results.

Sample	BET (m^2/g)
Bijla 2021 | 02/08/22	16.2
Dollarddijk | 02/08/22	29.6

Table 9: Exchangeable cation analysis: results.

Sample	Na (meq/100g)	Ca (meq/100g)	K (meq/100g)	Mg (meq/100g)
Bijla 2021 | 02/08/22	0.9	12.6	<0.1	0.9
Dollarddijk | 02/08/22	1.7	15.2	<0.1	1.2

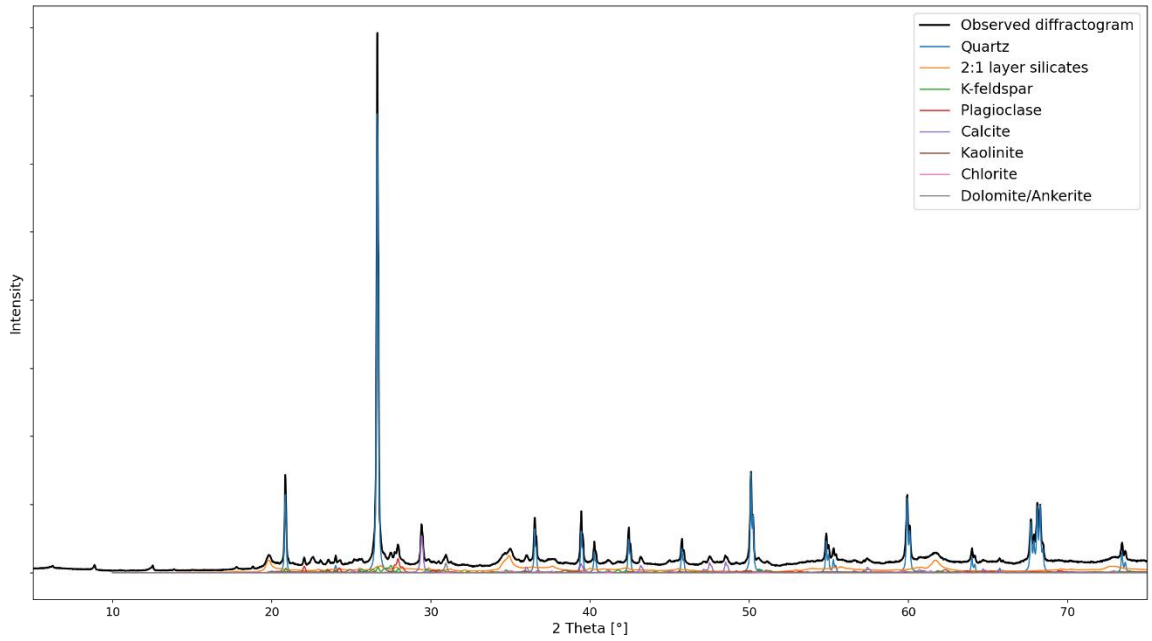

Figure 1: Diffraction pattern of the sample "Bijla 2021 | 02/08/22". The main minerals that contribute to the most important reflections are indicated.

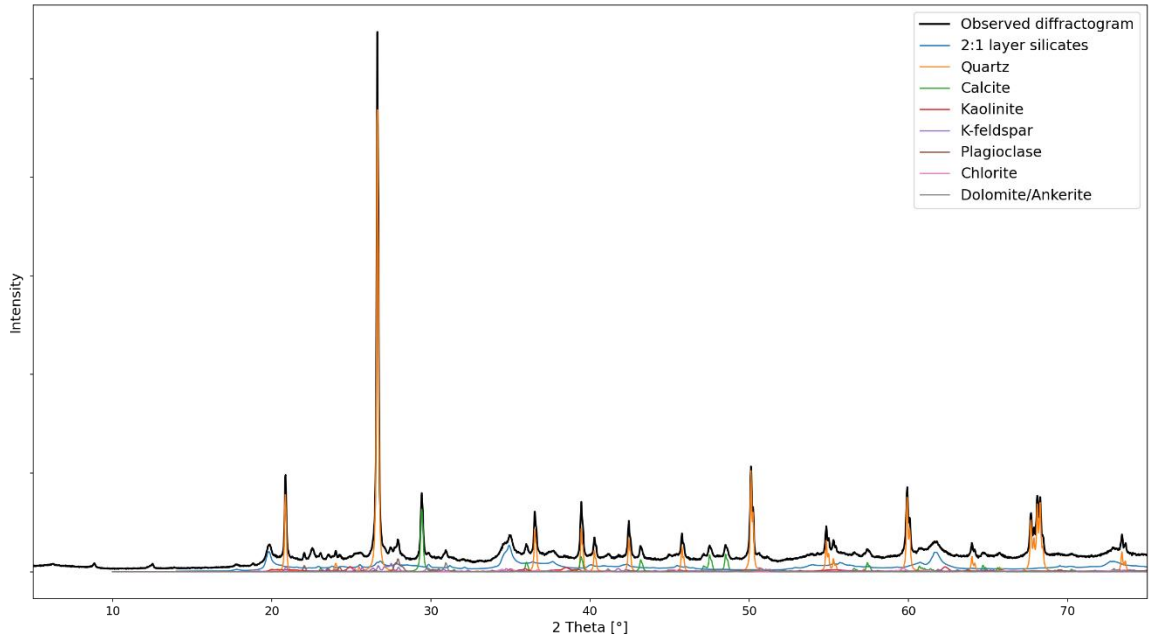

Figure2: Diffractionpattern ofthe sample "Dollarddijk | 02/08/22".Themainminerals that contribute to themost important reflections are indicated.

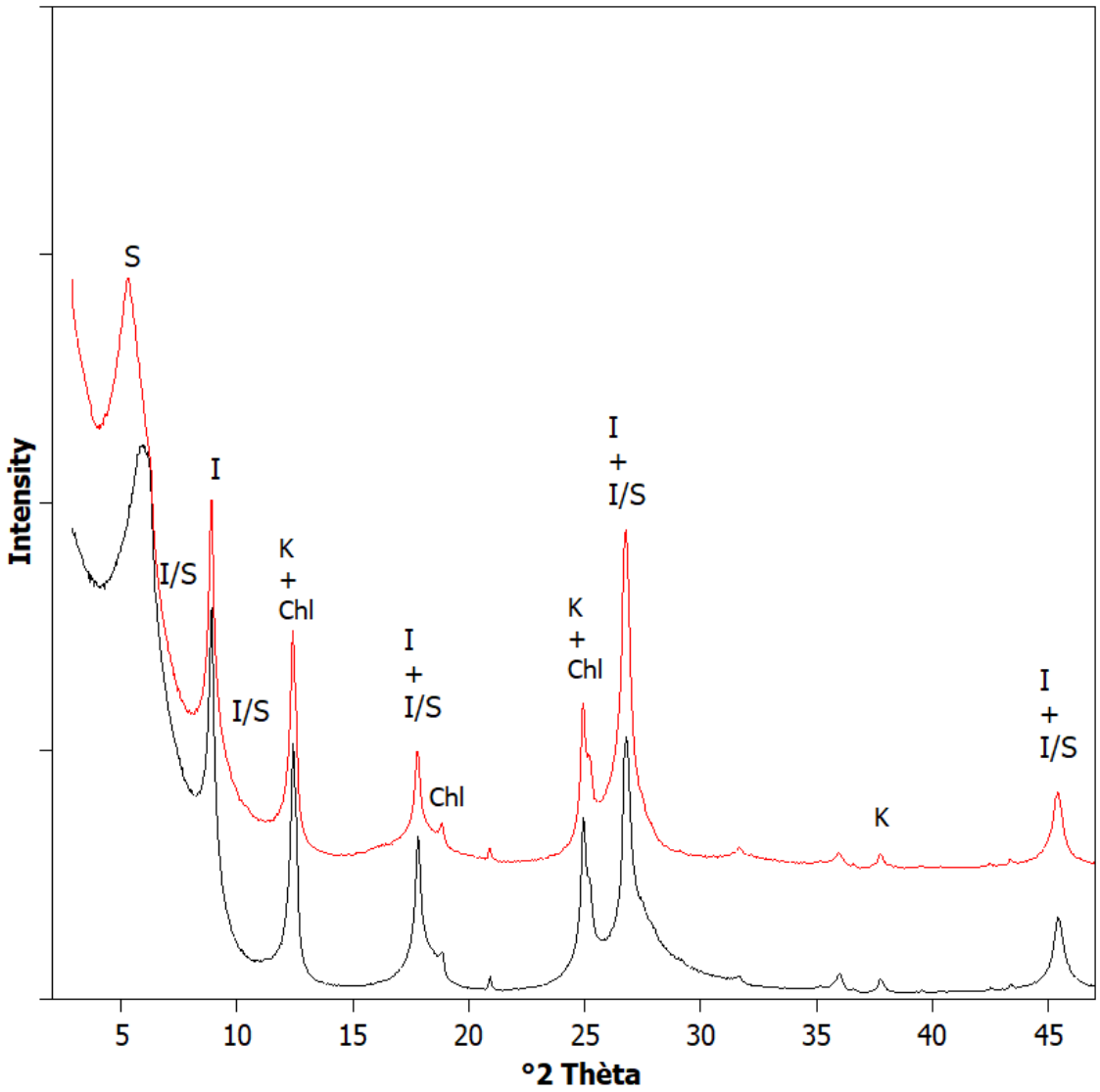

Figure 3: Diffraction patterns of the air dried (black pattern) and ethylene glycolated (red pattern) oriented clay fractions of the sample "Bijla 2021 | 02/08/22". The most important reflections are labeled: K: Kaolinite, I: Illite, I/S: interstratified Illite/Smectite; S: Smectite.

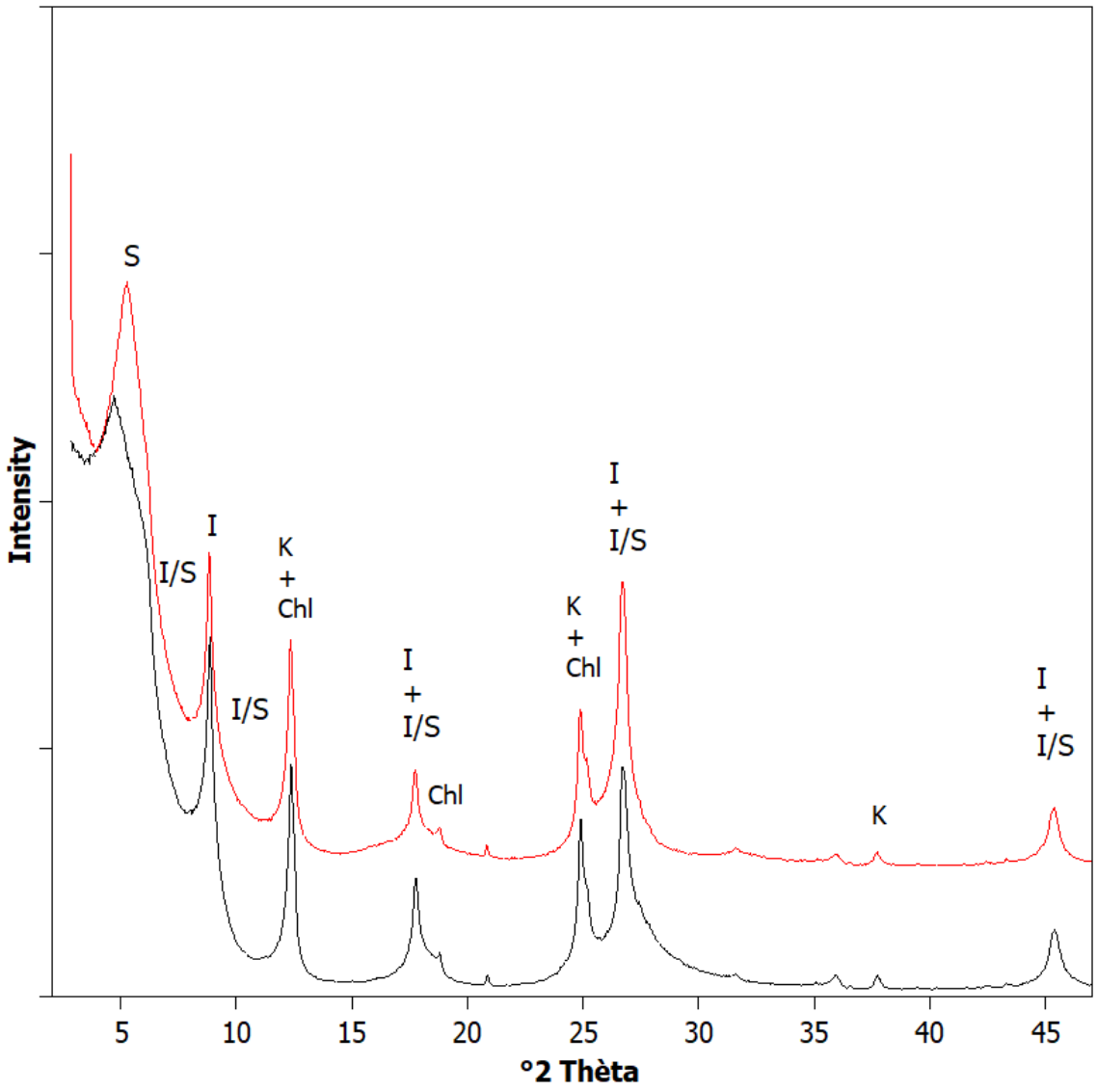

Figure 4: Diffraction patterns of the air dried (black pattern) and ethylene glycolated (red pattern) oriented clay fractions of the sample "Dollarddijk | 02/08/22". The most important reflections are labeled: K: Kaolinite, I: Illite, I/S: interstratified Illite/Smectite; S: Smectite.