Ashfield 2021-2022 XRD analyses

Sample lists

```
## --+-- Random powder XRD sample list --+--
##           filename objectname
## 1          S14.csv        S14
## 2          S15.csv        S15
## 3          S16.csv        S16
## 4          S17.csv        S17
## 5          S22.csv        S22
## 6          S24.csv        S24
## 7          S25.csv        S25
## 8          S31.csv        S31
## 9    Sample_01.csv       S_01
## 10 Sample_3_G4.csv     S_3_G4
## 11 Sample_4_G4.csv     S_4_G4
## 12    Sample_A.csv        S_A
## 13    Sample_B.csv        S_B
## 14    Sample_D.csv        S_D
##
## --+-- Oriented clay XRD sample list --+--
##                       filename  objectname
## 1          ENVT4461 S-01 Mg.csv      S01_Mg
## 2      ENVT4461 S-01 Mg+Gly.csv  S01_Mg+Gly
## 3  ENVT4461 S-12 Heated-400.csv S12_Heat400
## 4  ENVT4461 S-12 Heated-550.csv S12_Heat550
## 5          ENVT4461 S-12 Mg.csv      S12_Mg
## 6      ENVT4461 S-12 Mg+Gly.csv  S12_Mg+Gly
## 7  ENVT4461 S-13 Heated-400.csv S13_Heat400
## 8  ENVT4461 S-13 Heated-550.csv S13_Heat550
## 9          ENVT4461 S-13 Mg.csv      S13_Mg
## 10     ENVT4461 S-13 Mg+Gly.csv  S13_Mg+Gly
## 11         ENVT4461 S-14 Mg.csv      S14_Mg
## 12     ENVT4461 S-14 Mg+Gly.csv  S14_Mg+Gly
## 13 ENVT4461 S-15 Heated-400.csv S15_Heat400
## 14 ENVT4461 S-15 Heated-550.csv S15_Heat550
## 15         ENVT4461 S-15 Mg.csv      S15_Mg
## 16     ENVT4461 S-15 Mg+Gly.csv  S15_Mg+Gly
## 17 ENVT4461 S-16 Heated-400.csv S16_Heat400
## 18 ENVT4461 S-16 Heated-550.csv S16_Heat550
## 19         ENVT4461 S-16 Mg.csv      S16_Mg
## 20     ENVT4461 S-16 Mg+Gly.csv  S16_Mg+Gly
```

Random powder data object list

```
##  [1] "S_01_pXRD"   "S_3_G4_pXRD" "S_4_G4_pXRD" "S_A_pXRD"    "S_B_pXRD"
##  [6] "S_D_pXRD"    "S14_pXRD"    "S15_pXRD"    "S16_pXRD"    "S17_pXRD"
## [11] "S22_pXRD"    "S24_pXRD"    "S25_pXRD"    "S31_pXRD"
```

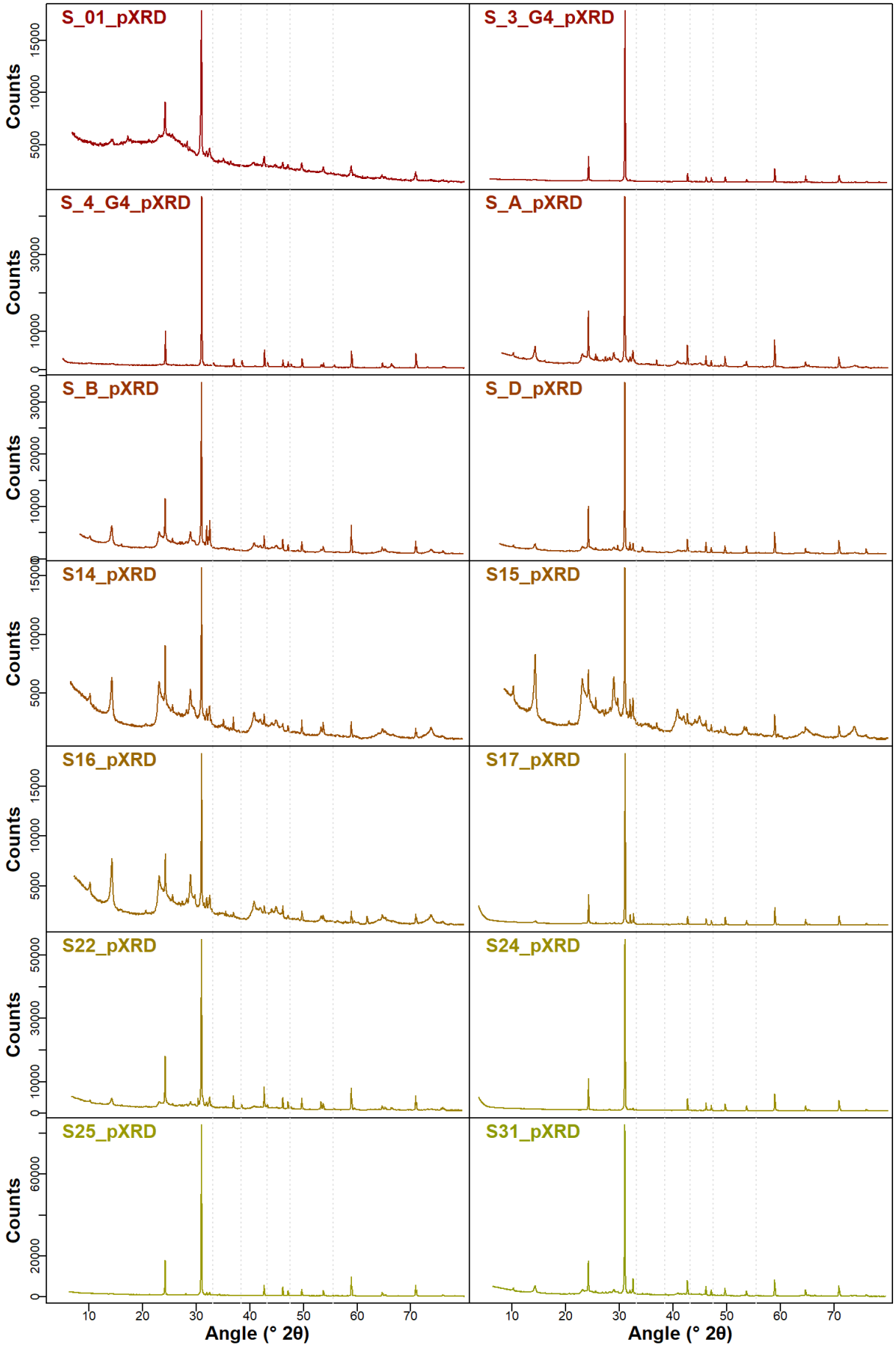

Figure 1: Random powder XRD patterns for selected Ashfield Flats samples. [Samples containing pyrite: S_4_G4, S22, and S31; vertical dotted lines are main pyrite peak angles with Co K-α1 x-rays.]

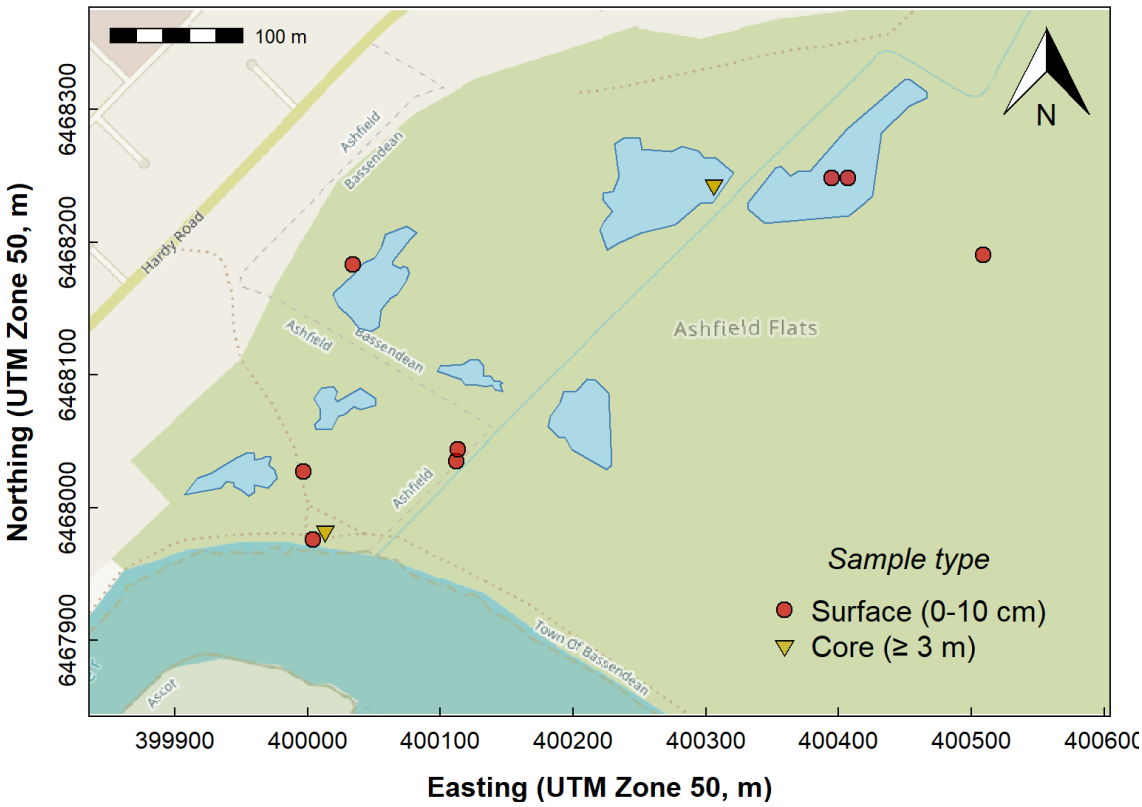

Figure 2: Map of locations for samples containing pyrite detectable by XRD at Ashfield Flats 2021-2022

List of clay plate data objects

```
##  [1] "CP_S01_Mg"      "CP_S01_Mg+Gly"  "CP_S12_Heat400" "CP_S12_Heat550"
##  [5] "CP_S12_Mg"      "CP_S12_Mg+Gly"  "CP_S13_Heat400" "CP_S13_Heat550"
##  [9] "CP_S13_Mg"      "CP_S13_Mg+Gly"  "CP_S14_Mg"      "CP_S14_Mg+Gly"
## [13] "CP_S15_Heat400" "CP_S15_Heat550" "CP_S15_Mg"      "CP_S15_Mg+Gly"
## [17] "CP_S16_Heat400" "CP_S16_Heat550" "CP_S16_Mg"      "CP_S16_Mg+Gly"
```

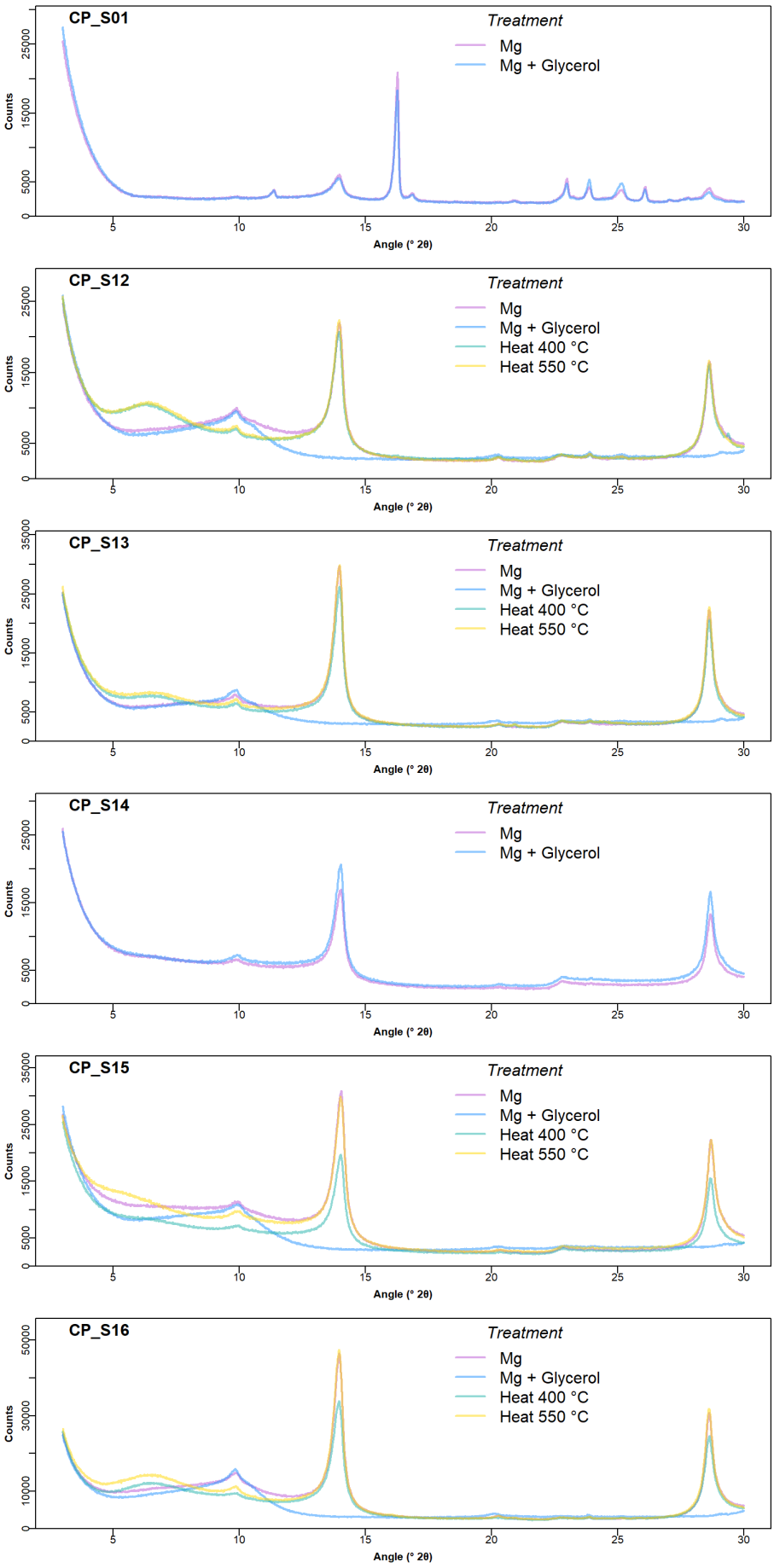

Figure 3: Oriented clay plate XRD patterns for selected samples from Ashfield Flats 2022, showing changes with standard sample treatments.

Table 1: Summary of clay plate XRD for Ashfield Flats samples 2022. (S = strong, M = medium, W = weak, p = possible, - = absent)

Sample	Kaolinite	Illite	Vermiculite	Smectite	Boehmite	Gibbsite	Jarosite	Quartz	Heulandite	Calcite	Albite
S12	S	S	S	-	-	-	-	-	-	-	-
S13	S	S	M	-	-	-	-	-	-	-	-
S14	S	M	-	-	-	-	-	-	-	-	-
S15	S	S	M	M	-	-	-	-	-	-	-
S16	S	S	S	-	-	-	-	-	-	-	-
S17	S	W	M	-	-	-	-	-	-	-	-
S22	S	S	-	-	-	-	-	-	-	-	-
S23	S	M	p	-	-	-	-	-	-	-	-
S24	S	W	-	-	M	M	M	S	M	-	-
S25	W	-	-	-	S	W	-	M	M	M	W
S26	S	M	-	p	-	-	-	-	-	-	-
S01	M	W	-	-	S	W	-	W	M	W	-
S29	S	S	p	-	S	M	-	-	-	-	-
S30	W	-	-	-	-	-	-	-	-	-	-
S31	S	S	S	-	-	-	-	-	-	-	-
S_A	S	M	-	-	-	-	-	-	-	-	-
S_B	S	M	-	-	-	-	-	-	-	-	-
S_C	S	M	-	p	-	-	-	-	-	-	-
S_D	S	M	M	-	W	-	W	-	-	-	-
S_E	S	S	S	-	-	-	-	-	-	-	-

Table 2: Summary of random powder XRD for Ashfield Flats samples 2022. (Y = present, t = trace, - = absent)

Sample	Type	Depth_top	Depth_bot	Quartz	Halite	Kaolinite	Albite	Sanidine	Microcline	Muscovite	Gypsum	Pyrite	Jarosite	Illite	Calcite	Palygorskite	Halloysite	Hornblende
2022_G1	Surface	0	10	Y	t	Y	Y	-	-	-	t	-	-	Y	-	-	-	-
2022_G2	Surface	0	10	Y	Y	Y	Y	Y	-	Y	t	t	-	-	t	-	-	-
2022_G7	Surface	0	10	Y	Y	Y	Y	-	-	Y	t	-	-	-	-	-	-	-
2022_G8	Surface	0	10	Y	Y	Y	t	-	-	Y	t	-	-	-	-	-	-	-
2022_G9	Surface	0	10	Y	Y	Y	-	-	-	Y	t	-	-	-	-	-	-	-
2022_G10	Surface	0	10	Y	t	Y	t	-	-	Y	Y	t	-	-	-	-	-	-
2022_G11	Surface	0	10	Y	Y	Y	Y	-	-	Y	Y	Y	-	-	-	-	-	-
B03_1.5m_H2	Core	150	200	Y	Y	Y	Y	-	-	-	t	-	-	Y	-	-	-	-
B03_4.5m_H1	Core	450	500	Y	Y	Y	Y	-	Y	-	t	Y	Y	Y	-	Y	Y	-
B03_7.5m_H1	Core	750	800	Y	-	Y	Y	-	Y	-	-	-	-	Y	-	Y	-	Y
B13_3.0m_H3	Core	400	450	Y	t	Y	Y	-	-	-	t	-	-	Y	-	-	-	Y
B13_4.5m_H1	Core	450	500	Y	-	Y	Y	-	-	-	Y	-	-	Y	-	-	-	t
B13_4.5m_H2	Core	500	550	Y	-	Y	Y	-	Y	-	t	-	Y	Y	-	-	-	Y
B13_4.5m_H3	Core	550	600	Y	-	Y	Y	-	Y	-	Y	-	Y	Y	-	-	-	t
B13_6.0_h1	Core	600	650	Y	-	Y	Y	-	Y	-	Y	-	-	Y	-	-	-	T

That’s it so far