

## Supplementary material

Here we display selected diffractograms of the identified clay species throughout the study.

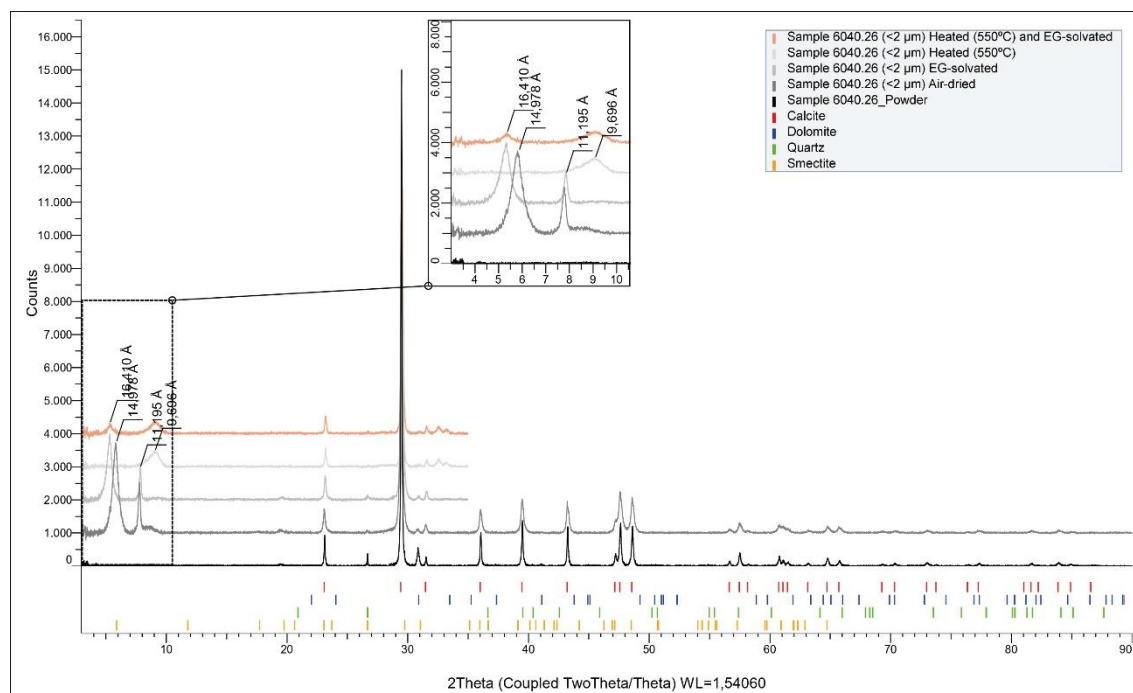


Figure S1: Diffractogram displaying the characteristic peaks of smectite with the added re-heated and EG-solvated method described by Christidis and Koutsopoulou [39] indicating little re-expansion, which suggests stevensitic composition for the clay minerals.

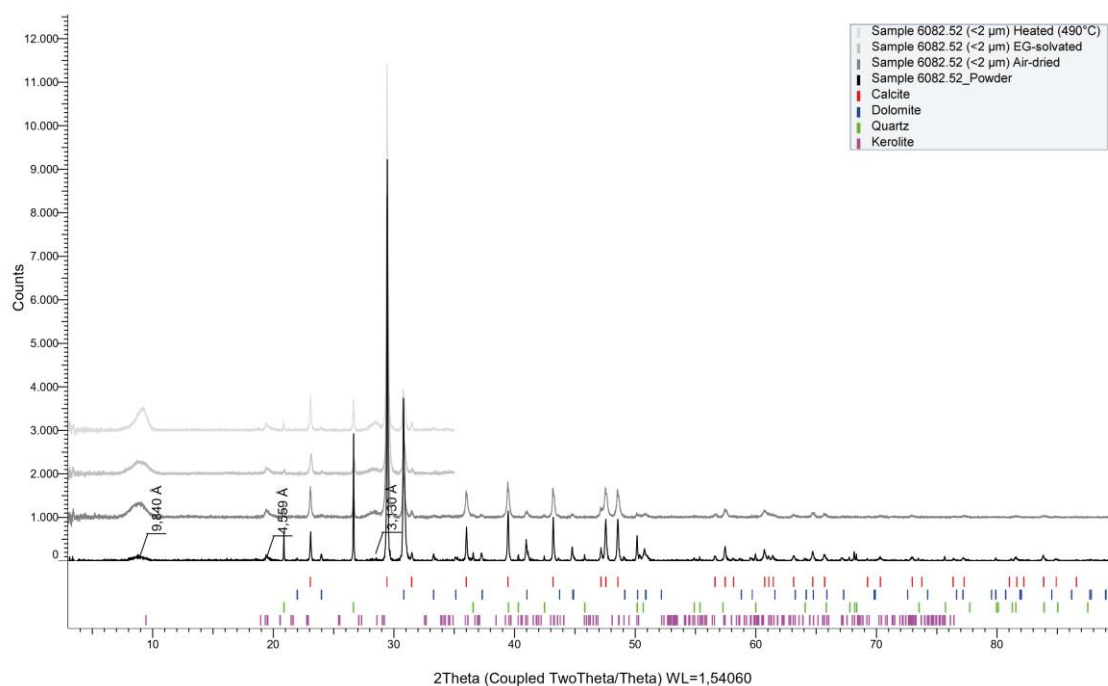


Figure S2: Diffractogram displaying the characteristic kerolite peak with no changes during expansion and heating steps.

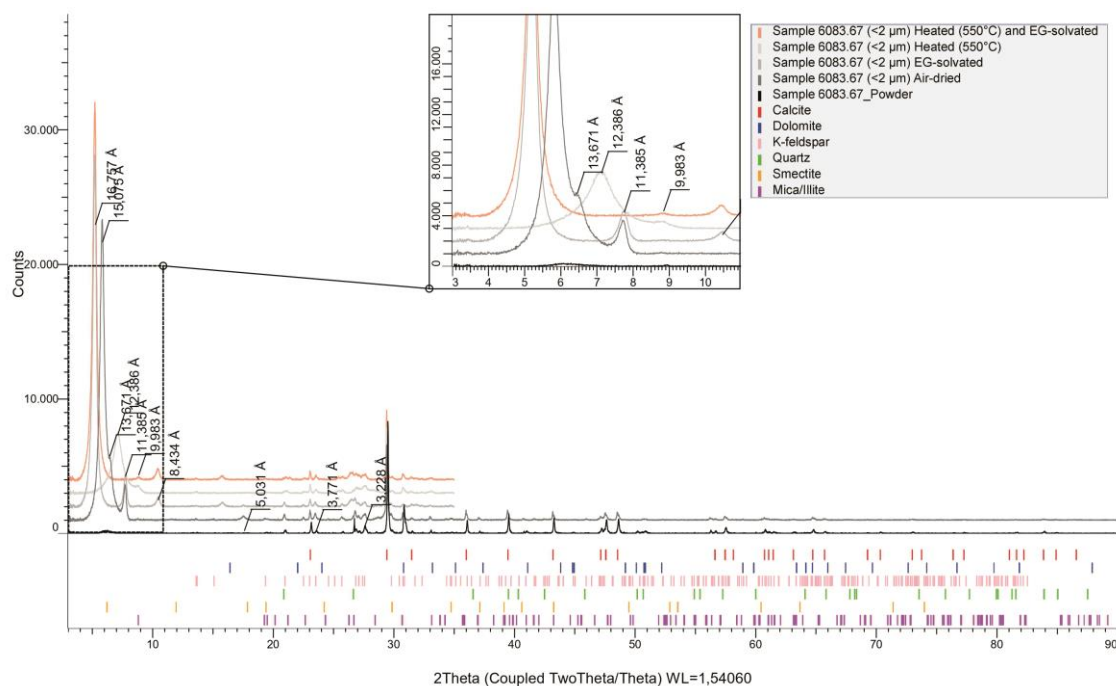


Figure S3: Diffractogram showing characteristic peaks of smectite with re-expansion in the second solvation step, which indicates saponite/hectorite composition.

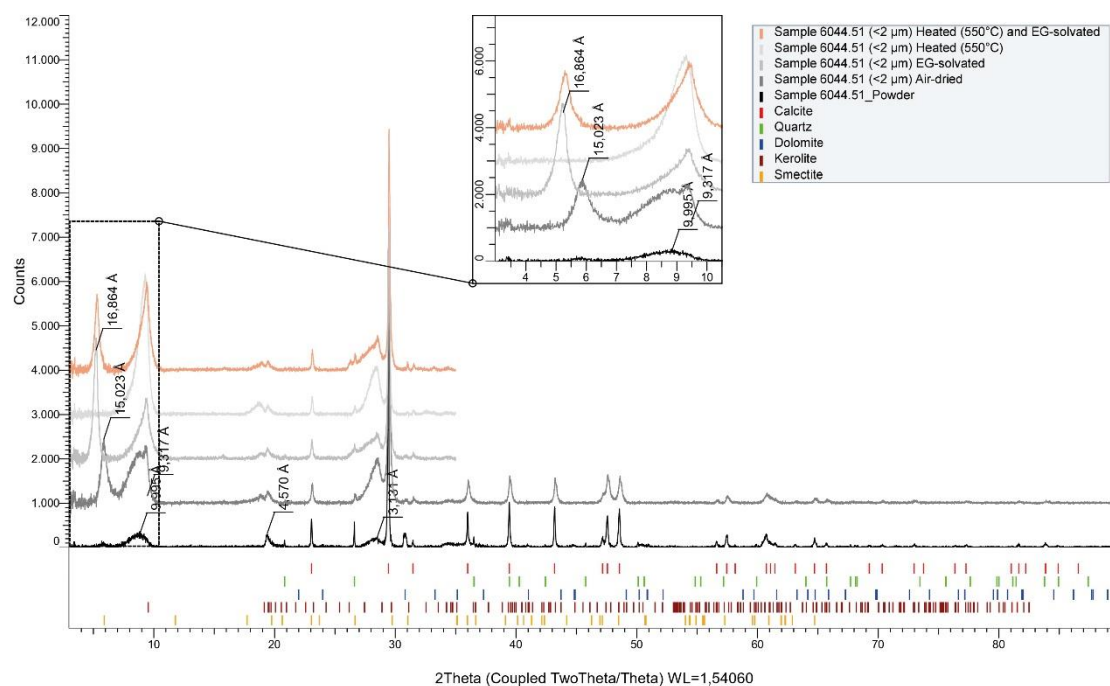


Figure S4: Diffractogram showing the characteristic behaviour of smectites together with the characteristic peak of kerolite. The broad shoulder associated to kerolite in this sample indicates a kerolite-smectite interstratification.

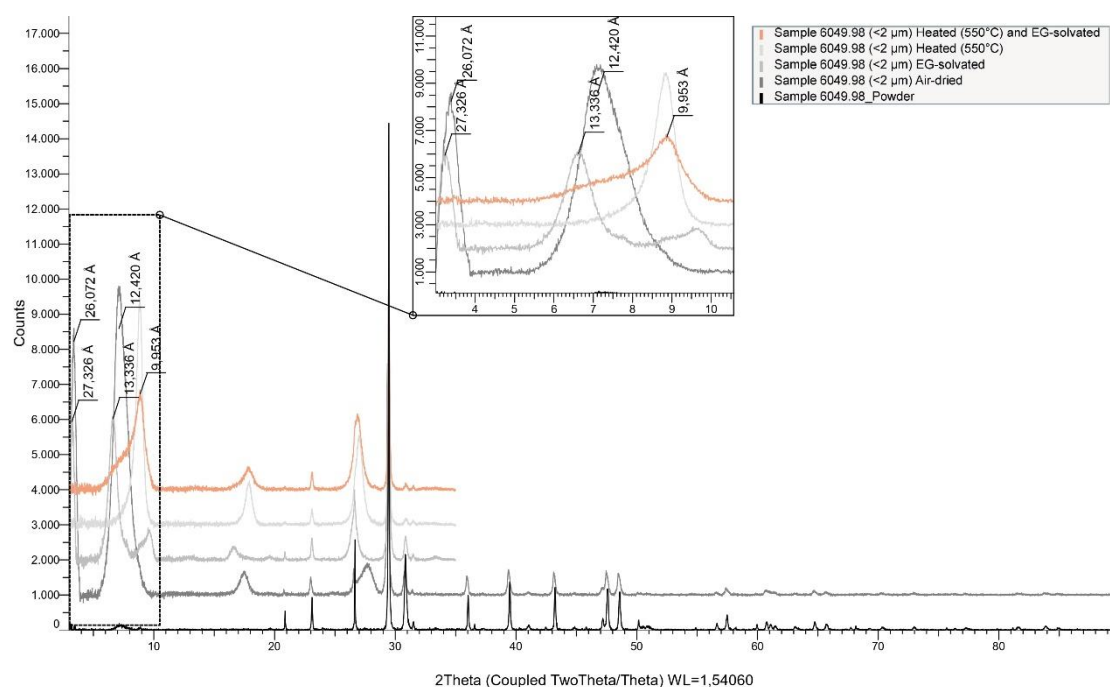


Figure S5: Diffractogram displaying the characteristic mica/illite peak together with smectite peaks, most likely constituting illite-smectite interstratifications.