

Supplementary figures

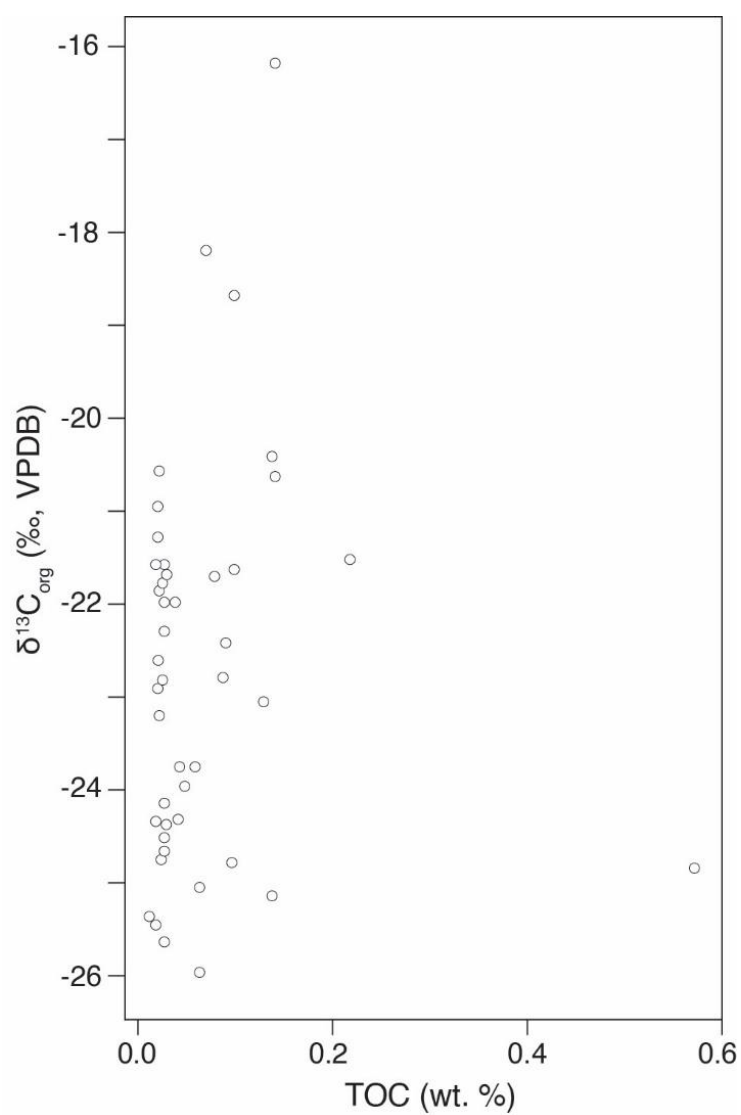


Figure S1. Assessing relationship between organic carbon isotope and preserved organic matter. Scatter plot between the Total Organic Carbon (TOC) and organic carbon isotope ($\delta^{13}\text{C}_{\text{org}}$). No significant correlation trend is observed.

Scanning Electron Microscope (SEM) Images

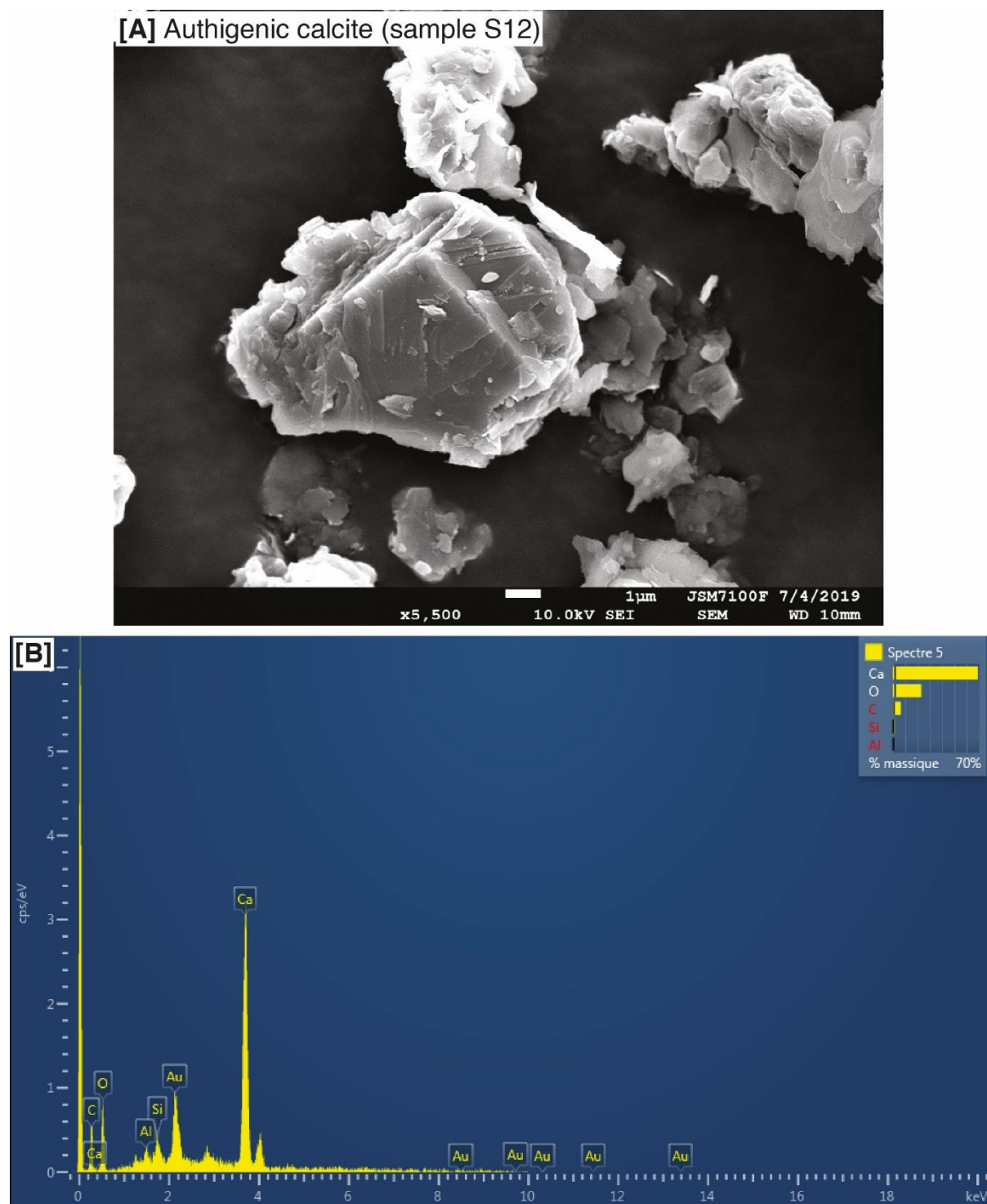


Figure S2. SEM image. SEM images show the presence of authigenic calcite in paleosol samples S12 along with an EDS showing the chemical composition of the identified mineral.

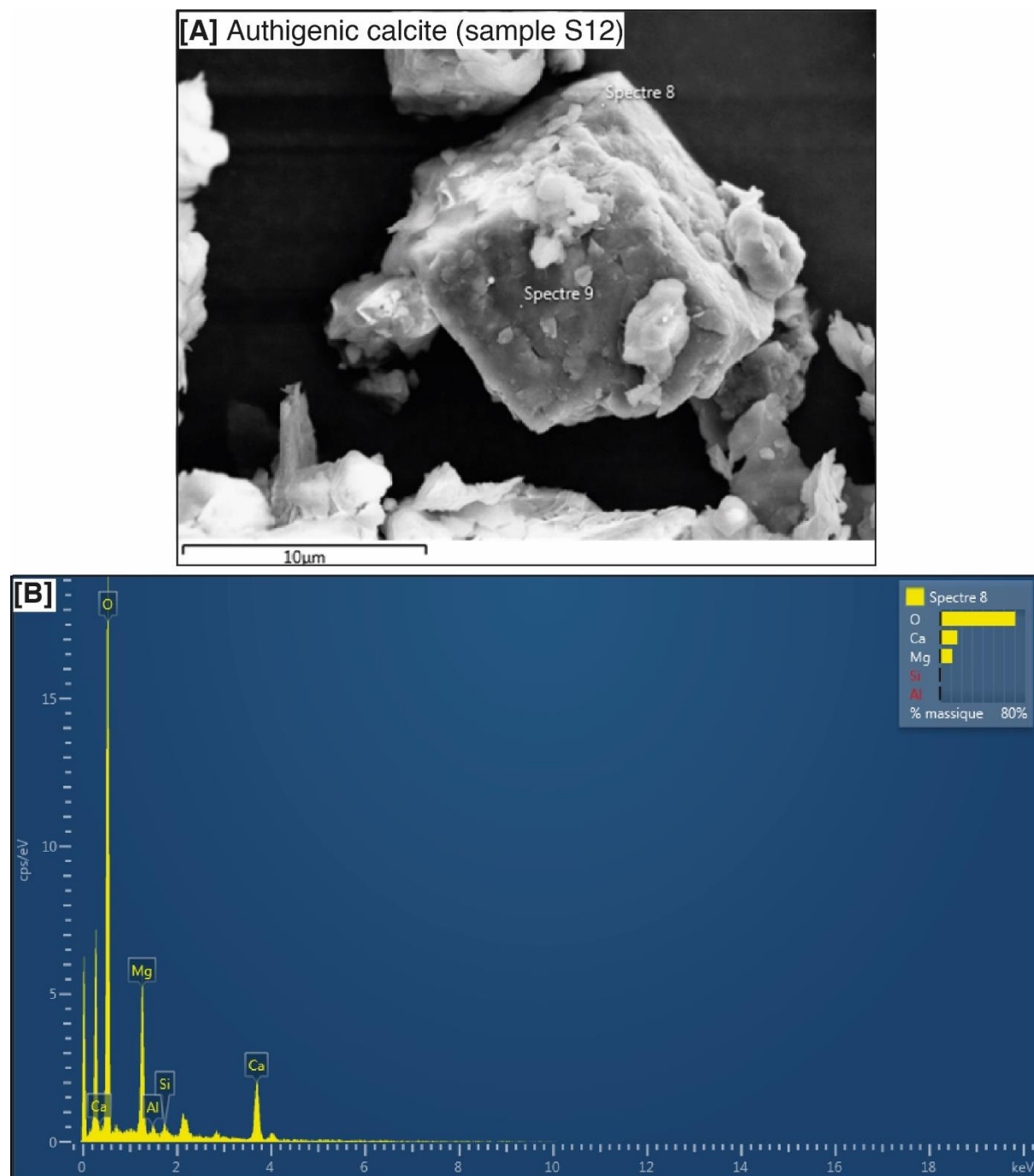


Figure S3. SEM image. SEM images show the presence of authigenic calcite in paleosol samples S12 along with an EDS showing the chemical composition of the identified mineral.

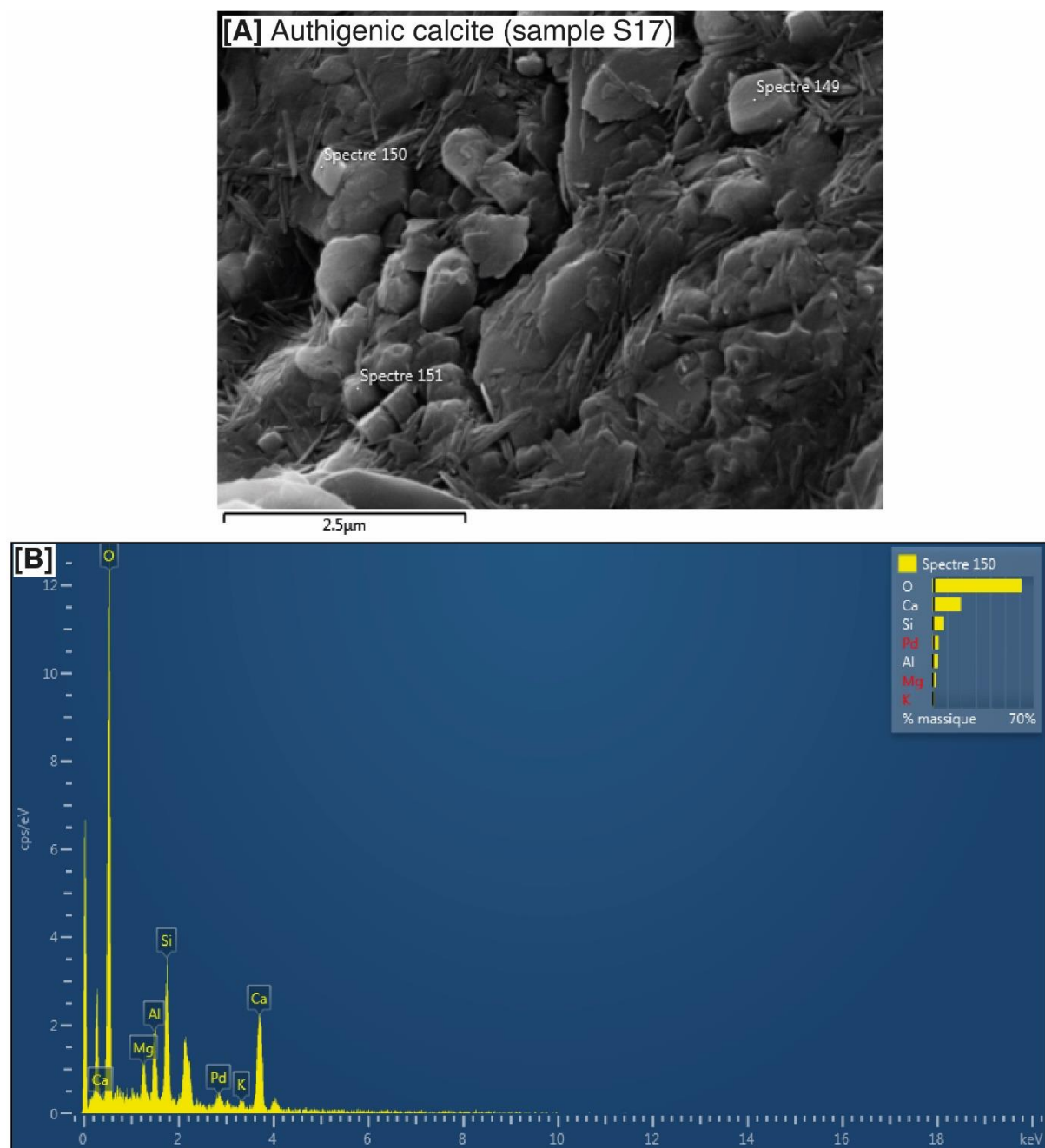


Figure S4. SEM images. SEM images show the presence of authigenic calcite in paleosol samples S17 along with an EDS showing the chemical composition of the identified mineral.

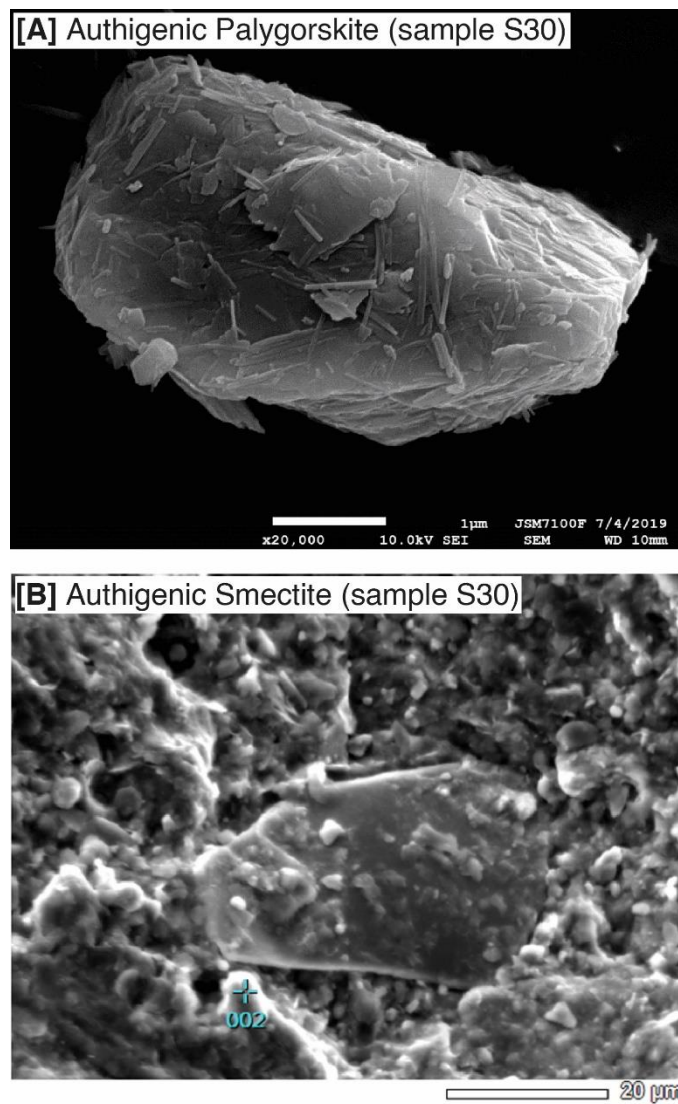


Figure S5. SEM images. SEM images show the presence of authigenic palygorskite and smectite in paleosol sample S30.

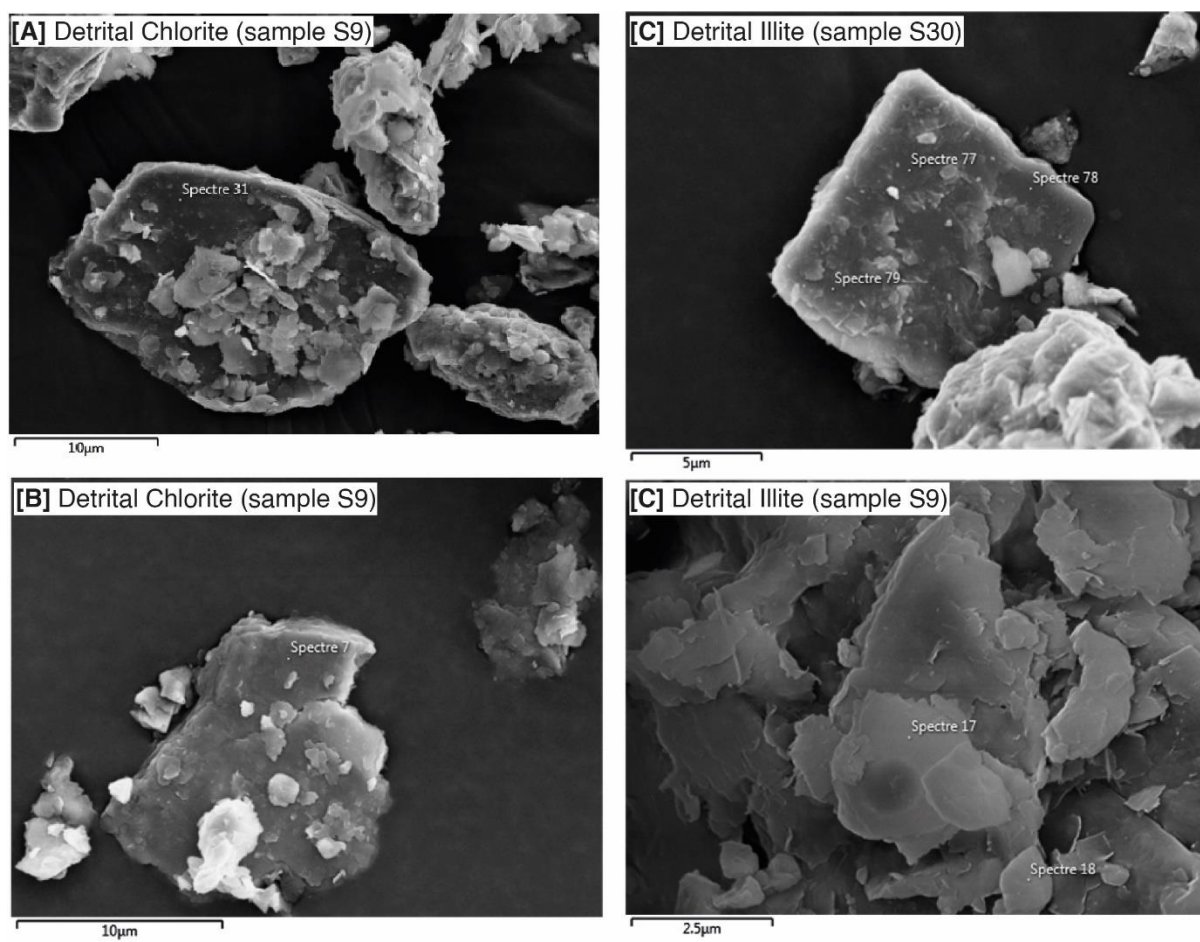


Figure S6. SEM images. SEM images show the presence of detrital chlorite and illite in paleosol samples S9 and S30.

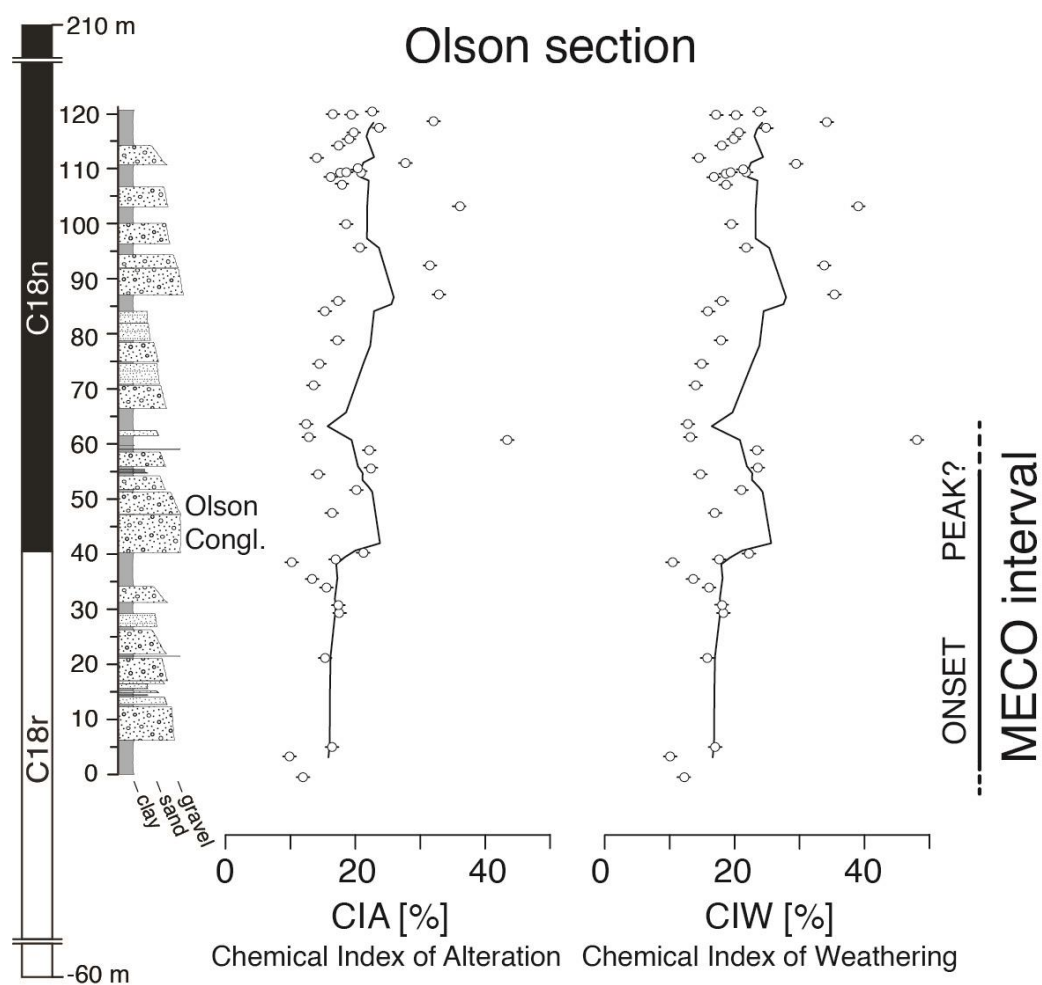


Figure S7. Comparison between values of the Chemical Index of Alteration (CIA) and the Chemical Index of Weathering (CIW) and associated standard error. Both datasets are displayed with a 7-point moving average to quantify chemical weathering in the Escanilla Fm at Olson.