Distinct soil organic matter properties across a Fe and rainfall gradient

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This study aimed to compare soil properties across a topo sequence with precipitation and iron gradients to better understand the influence of soil mineralogy and weathering on soil organic matter (SOM) protection through organo-mineral associations at the micro-scale. Different SOM fractionation methods were tested to explore such interactions. Overall, we have observed distinct properties from two contrasting locations, through solid-state ^{13}C NMR spectroscopy (Figure 1). Pre-dispersion treatment with NaCl saturation did not influence the C distribution along the fractions as well as SOM composition revealed by NMR spectroscopy. However, the use of sodium polytungstate allowed the observation of distinct SOM composition in the occluded particulate organic matter (oPOM) fraction between the different soils.

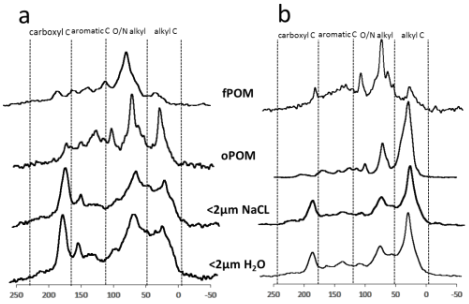

Figure 1: ^{13}C NMR spectra from SOM fractions in two contrasting soils with annual rainfall of 1784 (a) and 2886 mm (b).

Higher SOM contents in the fine fraction were associated with higher contents of Fe extracted by dithionite citrate and oxalacetate. Our results suggest that differences in soil mineralogy associated with distinct weathering conditions can play a key-role in SOM protection through organo-mineral interactions.