



Clay minerals and its influence on soil respiration in southern Brazil

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Carbon dioxide is the greenhouse gas with the highest concentration increases in the last century caused by human activities. Despite all the efforts, new investigations should be conducted in order to understand how agricultural management and its variations would impact on soil respiration and consequently in soils potential for carbon sequestration. Soil iron content is an important aspect of tropical soils, especially in sugarcane fields, that are located in regions where iron content in soil is among the highest concentrations in world. In this work we show that as iron content increases and changes its constitution FCO₂ decreases monotonically. A transect was established on an acid oxisol in a direction where soil color changed from a yellow (10 YR), passing to a red (5 YR) and finishing with a dark red latosol (2.5 YR), in just 420 meters. Soil respiration was taken each 10 meters (42 points) while soil samples were extracted (0-20 cm) in each point for further soil property analysis. X-ray analysis shows that the goethite per hematite ratio and kaolinite per gibbsite ratio are directly related to soil respiration rates, and this is confirmed by spectroreflectance analysis performed in the same samples. Also, soils with iron clay minerals having lower degree of cristalinity were the ones having the higher soil respirations. Our study suggests a more complex relationship between clay minerals and biological activity, including soil iron level as an important factor in order to infer the ecological impact of tropical soil management in the biosphere. Due to the distinguishable characteristics of the Brazilian soils in terms of iron level, new experiments are needed to elucidate the relationship of iron content and CO₂ loss in different classes of soils.