



Exploring the link between magnetic signature and physical/chemical parameters of anaerobic soils

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Anaerobic soils are characterized by the presence of specific soil conditions (for example high water table, underlying horizon of high clay content, surface water logging, etc.), which favor the establishment of reductomorphic features in soils. These have well distinguished magnetic signature due to the fact that anaerobic conditions often cause depletion of strongly magnetic iron oxides and their subsequent translocation in depth. Along with the above mentioned features, grain size and concentration of ferrimagnetic fraction is also dependent on soil texture, pH, content of organic carbon, etc. Sixty samples from different soil types with anaerobic conditions (Vertisols, Planosols, Gley soil) were characterized by magnetic measurements (magnetic susceptibility (X) and its frequency dependence ($X_{fd}\%$), isothermal (IRM) and anhysteretic (ARM) remanences, S-ratio), grain size distribution (relative contribution of clay, silt and sand fractions) and soil pH. These parameters were used to infer statistically the presence of significant relationships between magnetic parameters and soil physical properties. Good linear correlation is found between the ratio ARM/X and soil reaction pH, as well as between $X_{fd}\%$ and sand fraction. Possible causes for the observed links among various parameters will be discussed.