Resistivity profiling of soils in the forest-savanna boundary of eastern Amazonia: a method to study soil-water-vegetation interactions. (S07-solorzano155153-Oral)

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Abstract:

Resistivity profiling is a geophysical technique widely in use for geological exploration, which has not yet been applied to ecological studies up to now. We use a novel combination of field soil electric resistivity profiling (RP), time domain reflectometry (TDR) and lab measurements to analyze soil-vegetation interactions across forest-savanna boundaries of eastern Amazonia. RP is a useful tool to visualize the bellow ground environment of ecosystems from scales of centimeters to hundreds of meters and to quantify important ecological parameters. RP methods make possible two-dimensional mapping of soil structural properties including an accurate detection of the depth of the water table, changes in texture, presence of laterites and amount of water in soils. We found significant and consistent correlations between the geophysical spatial patterns of the below ground environment (up to 30 meters depth) and the structure of the vegetation developing on top. Calibration of RP with TDR allowed us to measure soil water conditions in ecosystems and to establish mechanistic links between the spatial heterogeneity of the belowground environment and the functional responses of vegetation.

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