Evaluation of a Methodology for Multiple, Continuous Measurements of Soil Redox Potential in Soils and Sludges. (S01vanbochove172202-Poster)

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Abstract:

The redox potential (Eh) of a soil reflects the bulk potential of the redox couples (chemical reactions) with the highest exchange currents in a dynamic system. The assessment of redox potential is particularly useful for characterizing the onset of reducing conditions in a system caused by a lack of O2 and for partly interpreting the associated biogeochemical processes. In transitional systems (e.g., soils and sludges) turning from an oxidized state to a more reduced state, redox readings typically shift before stabilizing. A method for automated acquisition of multiple, continuous measurements of stabilized redox potential was developed and tested in a laboratory soil incubation using a datalogger and a stabilization interface placed between each pair of Pt microelectrode - reference electrode and the datalogger. The data obtained from the stabilized pairs of microelectrodes and reference electrodes using the interface confirmed that instantaneous logged measurements underestimated the Eh values by 140 mV in the critical and unstable range of 0 to 200 mV. A related field study evaluated the long-term viability of the Pt microelectrodes, and showed reliable Eh readings at the end of the four-month experiment. The use of the automated system and the interpretation

of continuous Eh measurements have many advantages, e.g. knowledge of the real Eh dynamics, and the possibility to characterize brief and fast Eh variations in correlation with other parameters. This will be illustrated from anaerobic incubations of soil and mining sludge.

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