



## **Laboratory monitoring of self-potential (SP) variations during bacterial activity**

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During the twenty last years, self-potential (SP) monitoring has been proved to be a useful tool for the hydrological and environmental surveys. Indeed, as SP results from pressure, concentration and temperature gradients, it can be used for the detection and quantification of changes occurring in fluid flow, chemistry or temperature.

Measurements of SP fields over waste disposals have suggested that SP could also be triggered by the bacterial activity. But the involved mechanisms are not fully understood to date. Such SP anomalies can be produced by the resulting i) variations in fluid composition and concentration, ii) alteration of mineral surfaces, or iii) transfer of electrons through the biofilms.

Here we present some observations got from sandbox experiments carried out to investigate the relationship between bacterial activity and self-potentials. The effects of the degradation of urea by *Bacillus pasteurii*, which produces ammonium, were studied at different room temperatures. SP correlates with the ammonium concentration. Therefore, SP can be used to localize areas where active bacteria are present, and even quantify their activity, whatever the bio-chemical processes may be. These experiments are preliminary to similar ones, but with urea solutions containing calcium chloride, dedicated to the study of the SP response when biologically-induced precipitation of calcite occurs.