

## P03

### 4D-High resolution ERT for monitoring the nutrient infiltration in biostimulation

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Contamination of the vadose zone by petroleum hydrocarbons (PHC) can be remediated by biostimulation. In biostimulation a nutrient solution containing nitrogen and phosphorus salts is added to the soil to stimulate PHC-degradation by present microorganisms. A homogenous infiltration of the nutrient solution is crucial to reach an optimal degradation of the contaminants. For this purpose one of the 6 existing plots that were established in the project BIOSAN at the "Petroleumhof" (Vienna) for investigation of biostimulation and bioventing was chosen. The test site consisted of an irrigation system 3x3m in size, located around a shallow borehole. Within 120 hours 5 irrigation cycles were conducted with 55mm precipitation depth each, summing up to 275mm in total (comparison: annual precipitation in Vienna 600-900mm). To obtain full depth penetration of the whole investigation site down to a depth of 6m (estimated groundwater level) the ERT survey grid was extended to 9x9m. Choosing a dense network of 1m electrode spacing 100 electrodes were deployed and measurement using the Pole-Pole method were carried out. For the duration of the experiment the ERT system was permanently installed in the field and several measurement cycles in 48h time steps were conducted. The changes and distribution of the resistivity values from time-lapse measurements clearly showed the migration of the infiltrating solution which could be traced with depth in time. In detail a horizon of significantly reduced resistivities (30-50 ohm.m, depending on the permeability of the underlying layer) was mapped which migrated approximately 1m in depth every 48 hours. The results showed that the infiltration front of the nutrient reached a depth of 4 m within the measurement period of 6 days.