

PERMANENT 3-D RESISTIVITY MONITORING SYSTEM TO CONTROL NITRATE CONTAMINATION

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ABSTRACT

There are about 200 fox and mink furfarms situated above the important groundwater areas in Finland. They are serious risk for groundwater quality because they may cause a potential risk for local groundwater supplies. The objective of this paper is to present and study the possibilities to use permanent resistivity monitoring system in long-term monitoring of nitrate contamination and also to study the capabilities of the system for the potential future application to process control enhanced in situ bioremediation. Till now three monitoring surveys have been carried out during the 6 months period. The main objective was to detect through resistivity changes the natural groundwater flow and spatial changes in the nitrate-plume as function of time. In this study, we have inverted the monitoring data using the almost standard 2-D approach of constrained nonlinear inversion that incorporates Tikhonov regularization without any geological constraints. Inverted resistivity images were further studied, compared and integrated with the hydrological and chemical sample information. 2-D interpolation of groundwater sample data were calculated for groundwater electrical conductivities and nitrate concentrations. 3-D interpolation of resistivity monitoring results were compared against this information. We conclude that this kind of permanent resistivity monitoring installation combined with conventional drilling and sampling information has a great potential in the near future to process control and optimize in situ remediation activities.