

THE HYDROGEOLOGICAL MONITORING OF AN EXPERIMENTAL SITE IN CAMPANIA FOCUSED AT THE EVALUATION OF THE CONTAMINANTS TRANSFER FROM THE SOIL

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In the framework of the Life_Ecoremed Project, aimed at the remediation of contaminated soils, some experimental sites, including one in the town of Teverola (Campania) covering about 1900 m², have been identified and studied.

The stratigraphic succession of the site has been defined by drilling 8 boreholes, 5 of them with continuous core recovery. Groundwater has been characterized and monitored by means of periodic piezometric measures, sampling and chemical analyses, and by means of a multi-parametric probe measurements: piezometric level, temperature, electrical conductivity and TDS. These activities were especially aimed at assessing the transfer of specific pollutants (Be and Sn) from the soil toward the groundwater table.

The subsoil consists of some meters of loose pyroclastic rocks, with levels of peat, above a clayey paleosol (from 2 to 5 meters); these sediments overlay a tuff (Campanian Ignimbrite), locally unwelded. The paleosol, almost impervious, determines the presence of two aquifers; one in the pyroclastic rocks above the paleosol and the other one in the tuff. This last aquifer is confined and the groundwater level is higher (about one meter) than the level in the shallow aquifer. The groundwater flow direction in the two aquifers is quite different. The water table of the shallow aquifer is 2-3 meters below the ground level and his closeness to the ground level makes it more susceptible to contaminants transfer. The average hydraulic conductivity of this aquifer, evaluated by slug tests and pumping tests, is 5.4×10^{-4} m/s and the thickness of the saturated zone is about 7 m.

The groundwater chemical analyses have been screened, almost monthly for major ions and the contaminants present in the soil (Be and Sn). A strong nitrate contamination was identified and also a sector affected by a reducing environment was individuated. The contaminants present in soil have been found in groundwater only in low concentrations ($< 1.0 \mu\text{g/L}$), steady during the yearly monitoring, despite the low depth of the water table. The data of the multi-parametric probe were analyzed and modeled with different aims: a) groundwater levels vs rainfall for the recharge time and b) change in the chemical composition (TDS, electrical conductivity) over time to outline a hydrochemical model of the system.

