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Caves intercepting groundwater: special sites to investigate underground water resources

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A very high percentage of outcropping soluble rocks characterize the Apulia Region of Southern Italy. As a consequence, remarkable karst phenomena are widespread in the territory, making this area one of the most interesting as regards karst processes in the Mediterranean Basin. The spatial anisotropy and inhomogeneity of subsurface make hydrogeological studies very complex. In Apulia, two important karst sites are considered extraordinary natural hydrogeological laboratories because they allow cavers to directly reach the groundwater.
Vora Bosco, in Salento Peninsula (Southern Apulia), reaches water table at a depth of about 60 m from topographic surface (elevation of cave entrance: 64 m a.s.l.); Inghiottitoio di Masseria Rotolo (within the polje of Canale di Pirro, central Apulia) is the deepest cave in the region, reaching groundwater at a depth of about 260 m below the ground (elevation of cave entrance: 300 m a.s.l.). At this latter site, scuba-divers explorations brought the total depth of the cave system to 324 m.
Within the framework of a project funded by Apulia Region, several monitoring actions have been started at the two caves. In detail, multiparameter probes have been installed inside the caves to collect continuous series of data like groundwater level, temperature and conductivity. Further, cavers and researchers have performed biospeleological surveys, taking samplings to detect some chemical and microbiological groundwater parameters. In addition, cave temperature and humidity have been recorded by means of HOBO sensors, positioned along the caves pathway, at different depths and locations. The combined analyses of monitoring data will be very useful to increase the regional hydrogeological knowledge, with particular reference to the responses of the karst systems to meteorological events. Chemical and microbiological analyses, together with the biospeleological data, will indicate the status of groundwater health in order to determine threshold values of groundwater base parameters, certifying the absence of anthropogenic contamination, and to promote actions for freshwater resource safeguard and protection.
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