



Identification of weathered structures and aquifers from resistivity observations in the Strengbach catchment (Vosges, France).

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In low mountain regions, natural water resources used for agriculture or drinking water generally come from natural sources. Management of these water resources is complex for some catchments where most of the water flows is exfiltrating from bedrock aquifers characterized by important spatial heterogeneity and different connectivity levels in space and time.

The Strengbach catchment (Vosges, North East France) is a hydro-geochemical observatory monitored for more than 25 years. The numerous geochemical studies have highlighted the existence of different lithological and structural units in the catchment constituted by different weathered granitic aquifers. Their spatial extension has been determined through the measurement of the soil electrical resistivity using 20 Electrical Resistivity Tomography (ERT) profiles. The profiles have been inverted separately with the BERT software in 2D and compared to 2.5 D inversions, where the inversion accounts for the profile crossings. The comparison between 2D and 2.5D inversion results allows validating the 2-D assumption.

The 20 profiles are distributed over the complete catchment and cover more densely the water source area of the Strengbach stream. The shallow resistivities (5-10 m) measured highlight several weathered zones possibly characterized by different porosity. A combined analysis with soil water conductivity measurements in boreholes allows proposing a map of the spatial extension of these units. The resistivity data are also used to assess the depth of the main reservoir at the scale of the catchment. The hypothesis of the existence of a deeper reservoir is brought out by Audio-Magneto Telluric (AMT) and Very Low Frequency (VLF) measurements.