HYDROGEOLOGICAL INVESTIGATIONS IN SOUTH-EASTERN BUCKLIGE WELT, LOWER AUSTRIA

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The study describes the hydrogeological situation of the Bucklige Welt region in south-eastern Lower Austria. This included the assessment of yield and dynamics of shallow aquifers as well as the quantification of hydro-chemical and isotope-hydrological parameters. Sedimentological and geochemical studies accompanied the investigation. Results provide the basis for future water supply and management actions in the region.

The study area represents a low mountain range with high plains used for agriculture and valleys mostly covered by forests. Average annual precipitation ranges between 820 and 990 mm, linearly proportional to the altitude. Hydrogeologically, the area is dominated by gneisses and schists which represent fracture aquifers of low yield (6−8 l/s/km²). Locally, quartzites and calc-schists show higher groundwater yield (10−12 l/s/km²) while mica schists and phyllites yield less groundwater (< 4 l/s/km²). The tectonic basin of Krumbach is filled with fine-grained Neogene sediments which constitute porous aquifers with 5 l/s/km² yield on average. More productive aquifers occur in alluvial valley fills.

Fracture aquifers usually exhibit small catchment areas fed by rainwater and interflow. This results in a strong dependency on weather conditions and sporadic supply shortages during dry seasons. After rain events, spring discharge can rise 2- to 4-fold within 1−3 days, going back to base flow after 2−5 days. 18O−data indicate mean groundwater residence times between 0,5−2 years (1,5 years on average).

The amounts of total dissolved solids in groundwater range between 3−5 meq/l for most rock types. Groundwater in some Neogene sediments show values of ≤ 2 meq/l, in calc-schists and marble 8−12 meq/l. After rain events, these values can drop by 12%. Heavy metal concentrations mostly lie below geogenic background values, only aluminium, iron and manganese contents occasionally exceed limits for drinking water.

Soils and weathering zones are generally ≤ 2 m thick with low storage capacity and high permeability. Only soils in valleys or weathering zones overlying paragneiss can be more fine-grained and retain more water. Thus, the aquifers are generally not covered by protective surface layers. In this context, the ubiquitous illegal deposits of household waste in creeks are cause for concern.