



Rock specific hydraulic properties of fractured hard rocks considering internal fault zones in crystalline rocks of the Lower Austro-Alpine nappes

G. Winkler (1), P. Reichl (2)

(1) Institute of Earth Sciences, Karl-Franzens University, Graz, Austria, (2) Joanneum Research Forschungsgesellschaft mbH, Graz, Austria

Within an investigation program in the north east of Styria numerous single and double packer tests were processed in boreholes with a maximum depth of 300 m below surface. The investigation area belongs to the Semmering- and Wechsel-crystalline of the Lower Austro-Alpine.

The hydraulic properties of different lithological units were determined by various different packer test sequences and then characterized to determine hydrogeological units. Several packer tests were also focused on faults and fault zones within these units to compare the hydraulic properties of these sections with the properties of the host rock. Another aim of the testing program was to figure out, if the hydraulic properties of the lithological units change with depth down to 300 m below surface.

The hydraulic properties of a fractured aquifer are strongly influenced by the hydraulic behaviour of the fracture network of the hard rock and very often by the hydraulic properties of faults and fault zones within the unit. So a hydrogeological system consists of subzones with different hydraulic properties. The hydraulic properties transmissivity /conductivity and storativity of the subzones have to be considered and characterized to understand the hydrogeological system and its water flow. Hydraulic packer tests in open boreholes afford the quantification of the hydraulic properties of discrete borehole sections and can be focused on fault zones and highly fractured sections of the formation. Depending on the tasks different types of packer tests like pulse, slug or drillstem test can be used individually or as a combined test sequence. The specific data acquisition of discrete borehole sections enables to compare data from different developed subzones like faults, brittle fractured sections and

the hydraulic properties of the host rock.