

HIDROGEOLOGY OF IGNEOUS AND METAMORPHIC ROCKS FROM TUA RIVER BASIN (NORTH PORTUGAL)

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Tua river basin (North Portugal) is covered mainly by Paleozoic metamorphic rocks - schist and quartzite -, and some granitic rocks of Hercinian age. The basin occupies an area of 3900 km² and the precipitation has a mean value of 935mm/year. In order to evaluate the recharge, several methods were applied. Four small basins were analyzed by hydrograph separation method. Chloride balance and depletion spring curves methods were also applied for recharge evaluation. All methods led to mean values for recharge higher than 20% of total precipitation. The evaluated annual groundwater resources for the Tua watershed are 6 L/s/km². The statistical analysis of well yields led to the conclusion that granites are the less productive (0 to 1 L/s) and that the most common yields in schist are similar to those in quartzite (0,3 to 2,6 L/s). The occurrence of quartz veins increases the well yield in all studied lithologies. The weathered rock thickness, the topographic location and the depth of wells, do not have a significant influence in the yield. Pumping test analysis showed a typical behavior of double porosity media with fracture transmissivities between 3,5 and 36m²/day and blocks storage coefficient between 0,001 and 8,6%. Two different hydrogeochemical units were defined using chemical data from 45 water samples: the Igneous Unit (which includes two mica granites) - characterized by a mean conductivity of 93µS/cm and sodium bicarbonate facies; and the Metamorphic Unit (which includes schist's and quartzite's) - with a higher conductivity (306µS/cm) and calcium bicarbonate facies.