

Analysis of the aquiferous productivity of hydrogeological units from specific capacity of wells in the karstic region north of Belo Horizonte, MG

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The area of study has approximately 500 km², encompassing the hydrogeologically relevant Lagoa Santa Karst Environmental Protective Area. Located nearly 35 km from Belo Horizonte, the area includes Lagoa Santa, Confins, Pedro Leopoldo, Matozinhos, Vespasiano, Funilândia and Prudente de Morais counties. This work aims the analysis of deep tubular wells and hydrogeological units, justified by the scientific interest in the region and subterranean water use by population, agriculture and industry. The area is engulfed by the São Francisco Basin, including the Belo Horizonte Complex, the basal portion of the Bambuí Group and cenozoic covers. The Pedro Leopoldo and Lagoa Santa members, of Sete Lagoas Formation, presents limestones whereas Serra de Santa Helena Formation presents siltites. The area divides itself into four hydrostratigraphic units, corresponding to basement poor fissural aquifer, Sete Lagoas karstic-fissural aquifer, Serra de Santa Helena aquitard and the covers granular aquifer. The main water courses flows to Velhas river. Specific capacity, lithology and water entrance data have been obtained in Subterranean Water Information System (SIAGAS), Minas Gerais Sanitation Company (COPASA), Water Management Mineiro Institute (IGAM) and Environment Regional Superintendence (SUPRAM). Wells with common information have been selected for statistic treatment in specific capacity values, presented in m³/h/m, evaluating units productivity. Of 77 analyzed wells, 10 corresponds to fissural aquifer, 50 to Sete Lagoas aquifer, 7 to Serra de Santa Helena aquitard, 3 to cover aquifer and 7 to mixed aquifers. The Belo Horizonte Complex aquifer presents specific capacities with 0.7 mean and 0.4 median, the Sete Lagoas aquifer presents 8.7 mean and 5.6 median. The Serra de Santa Helena aquitard possesses 2.3 mean and 0.6 median and the granular aquifer presents 2.6 mean and 2.7 median. For the karstic Sete Lagoas aquifer, most productive, productivities have been evaluated in ten meters intervals, from 600 to 769 meters. Two more relevant zones from 670 to 699 and 730 to 749 were observed, presenting a total of 16 and 6 wells with means of 21.2 and 21.1 and medians of 10.2 and 21.2, respectively, pointing more karstificated regions of the aquifer. The Belo Horizonte Complex unit, although presenting low mean and median with small difference in each other, can be classified as an isotropic poor fissural aquifer because of local fractures in more productive areas. The Sete Lagoas unit is the one with greatest mean and median, with high anisotropy, behaving as a powerful aquifer with two more productive zones. The Serra de Santa Helena unit is classified as aquitard, due it's low values. It possesses, however, high anisotropy related to vertical fractures probably indicating recharging zones. The covers are classified as porous isotropic aquifer of good productivity, as showed by the relation between mean and median.