

Evaluation Of The Hydrodynamic Behavior Of Tubular Wells Associated With Fissure-Karstic Aquifers In The EPA Karst Region Of Lagoa Santa

Rodrigues, A.S.¹; Teixeira, G.M.¹; Silva, P.H.P.¹; Barbosa, D.M.D.¹; Pena, M.A.C.¹, Amaral, D.G.P.¹, Velásquez, L.N.M.¹, Paula, R.S.¹.

¹Rodrigues, A.S.'Universidade Federal de Minas Gerais (UFMG)

Corresponding Author(s): arthurgeologia.ar@gmail.com, diogenesgeologo@gmail.com, deboradiniz01@gmail.com, rodrigo.spdm@yahoo.com.br, matheuspena8@gmail.com, phpereira.silva@gmail.com, gabrielameira1998@gmail.com, menegase@yahoo.com.br

The study area, which is located 35 km north of Belo Horizonte, extends for 505 km², includes the Environmental Protection Area (EPA) Karst of Lagoa Santa and covers part of several municipalities. This work analyzed the relationship between pluviometry and the water level (WL) variation of five tubular wells (N37, N39, N49, N6162 and N63) located in carbonate rocks in the region in order to evaluate and compare the behavior of each well, that way it is possible to evaluate more or less karstified regions. The geology of the area is characterized by a gneissic-granitic-migmatitic complex in discordant contact with the Bambuí Group's metacalcareous and metapelitic rocks, overlapped by recent unconsolidated alluvial coverings and laterite detritus. The carbonate rocks are related to impure limestones of the Pedro Leopoldo Member overlapping to pure limestones of the Lagoa Santa Member, lithotypes that accommodate fissure-karstic aquifers, where the presence of fractures and conduits, govern the hydrogeological dynamics of groundwater flow. Automatic pressure sensors, installed in the wells, were used to measure the oscillation of the WL hourly, during the month of February 2019. For each well, the standard deviation of the measurements was calculated and the difference between the maximum and minimum water level was measured. Precipitation data were provided by Hidroweb-ANA (CPRM) and refer to Pedro Leopoldo's rain station. The results obtained were: well N37 showed a variation between the maximum and minimum level of 1.34 m and standard deviation of 0.335 m, for well N39 the values were 1.04 m and 0.326 m, whereas well N49 showed 1.02 m and 0.1 m, while well N6162 showed a level variation of 0.11m and standard deviation of 0.03 m and finally the results for well N63 were 0.16 m and 0.05 m for the same parameters. How all wells are located in the same karstified area of rainfall recharge and possessing a precipitation value of 229 mm for the month of February, evaluated the variation in the underground level in each well and correlate it with the degree of karstification as below: wells N37, N39 and N49 have a response ten times greater for the analyzed parameters than wells N6162 and N69, showing the heterogeneity and anisotropy of the karst environment, as well as the association of the rapid underground response with rain events, since the level variations manifested 1 day after the first rain event. Thus, it is concluded that the wells N37, N39 and N49, for presenting a more accentuated response to precipitation and greater variation in the water level, are related to a predominantly karst aquifer, in contrast to a softer response with less level fluctuations found in wells N6162 and N63, characteristic of predominantly fissure aquifers.

KEYWORDS: Fissure-karstic aquifer, groundwater monitoring, EPA Karst Lagoa Santa.

