

Estimation of barometric responses of groundwater levels at observation stations of the Geological Survey of Japan, AIST

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Abstract

AIST has been measuring the groundwater levels of wells in order to detect crustal movements. I analyzed the barometric responses of the groundwater levels to understand the hydraulic characteristics of the well and stratum. These information are useful to exactly evaluate detection capability of the crustal movements. The groundwater levels have been measured at 26 wells of 21 observation stations in and around the Kinki district mainly since 1996. I describe the three phenomena, which affect the barometric responses of the groundwater levels, and the characteristics of frequency dependence caused by each phenomenon. I calculated the frequency dependence of the barometric response of the groundwater level for each AIST observation well. From the characteristics at each well, I estimated what phenomena affected the groundwater level. I calculated the tidal responses of the groundwater levels and estimated the strain sensitivities of the groundwater levels. At several wells, based on the barometric and tidal responses of the groundwater levels, the parameters of hydraulic characteristics of the well and stratum were estimated. The theoretical frequency dependence of barometric responses and strain sensitivities were calculated from the parameters.