

# Application of slug test model to earthquake-related groundwater-level change in the Oi well Kanagawa Prefecture, Center Japan

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The sustained groundwater level changes following earthquake have been reported since the early twentieth century, and several mechanisms have been proposed for these phenomena. In this study, we applied slug test model in order to explain time constants of the sustained uplifts observed in the Ohi well, center Japan. The Ohi observation well, 300 m in depth, is one of the deep wells belonging to groundwater level monitoring system established by Hot Springs Research Institute of Kanagawa Prefecture (HSRI). The groundwater level is recorded by pressure gauge in 1 Hz sampling. In the Oi well the groundwater level changes in exponential sustained increase following earthquakes has been documented by HSRI. We selected the events in which groundwater level increased over 5 cm were observed in the period from 2011 to 2016. By fitting these changes with exponential decay function, the time constant of the Ohi well is ranging 100 to 400 s. We show, by applying slug test model, that this time constant range of the uplift of groundwater level is explained by the time constant of the system consisting of the well and the surrounding aquifer. The success of application of the slug test model strongly suggests that the pore-pressure rapidly increased just after the arrival of seismic waves. This time constant rang means the hydraulic permeability almost no change by earthquake.

Keywords: Permeability, Eearthquake, Slug test