Postseismic Well Water Level Changes at the Dogo Hot Spring in Japan

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The Dogo hot spring, situated in Matsuyama City, Ehime Prefecture, Japan, is one of the oldest and most famous hot springs in Japan. The well water level or discharge at the spring often decreased coseismically and increased postseismically related to the past Nankai earthquakes. We analyzed well water level data recorded at the spring immediately after the 1946 Nankai earthquake and over the period from 1985 to 2015. From this analysis, we have got five postseismic well water level increases related to the earthquakes whose seismic intensities were four or greater at Matsuyama city in JMA scale. The pattern of the five postseismic increases is very similar and shows a tendency of exponential convergence. We found that these postseismic increases can be explained by a basic equation of groundwater motion, which is a kind of diffusion equation. We also tried to detect the change in the diffusion coefficient or hydraulic diffusivity. However we did not detect it.

Keywords: Groundwater , Dogo hot spring, Diffusion equation, Seismic shaking, Nankai earthquake

