Modeling of earthquake-induced coseismic and postseismic changes of ground water level using coupled analysis

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The hydrological change associated with seismicity is one of the events with the possibility to influence the hydrological field around the geological disposal system. We have developed the quantitatively solution using coupled analysis for predict the groundwater level change and continuance of the dispersal process of the amount of pore pressures displacement, in this research.

Three dimensional analyses of Ge and Stover (2000) intended for the Parkfield earthquake in 1994 is known to be corresponding to the observation result well about the dispersal process of pore pressure after the earthquake.The solution that Ge and Stover (2000) uses calculates the re-distribution of the strain of postseismic after the Okada model (Okada, 1992), and calculates the change in the pore pressure according to the distortion distribution under non-drain condition. However, because the amount of groundwater level change in the Parkfield earthquake in 1994 is an amount of displacement, that can be explained from the calculation result based on the response sensitivity in the earth tide from the strain (strain model), the solution of Ge and Stover (2000) cannot be applied to all field cases. It is known that a lot of cases exist that the groundwater level chages with seismicity cannot explain by 'strain model' (e.g. JNC, 2005). Then, we have simulated the cases besides 'strain model', for instance, the case that the hydraulic conductivity the fault which was the other fault caused earthquake changed.