Observation of co-seismic groundwater fluctuation in borehole in the north of the Hiroshima Prefecture

Kazuhiro Tanaka[1], Norihisa Butsuen[1], Shinji Toda[2], Ken Yamamoto[3]

[1] Earth Sci., Yamaguchi Univ, [2] Active Fault Research Center, GSJ/AIST, [3] Civil Eng.,Chugoku Electric. Co

Observations of groundwater fluctuation have been carried out to predict the future's seismic activities and to secure the groundwater resources at earthquakes (Shimizu et al.,1997;Yokoyama,1998;Tsukuda, 2000;Akita et at.,2001;Matsumoto et al.,2001).

We collected the information about the hot spring at the Tottori-ken Seibu earthquake in 2000. As a result of hearing survey, the temporary depletion was observed at the Hita hot spring in the Shimane Prefecture that is located in the expansion area estimated by the strain analysis.

Also, we analyzed the continuous fluctuation data of groundwater level obtained in the borehole 100 m deep drilled in the Cretaceous granite in the north of Hiroshima Prefecture. The earth tide was observed in the fluctuation profile of groundwater level in the borehole. Therefore, the borehole is very sensitive to the change of earth strain. After the correction by the atmospheric pressure that shows negative relationship to groundwater, the co-seismic fluctuation of groundwater at the Tottori-ken Seibu earthquake is investigated and it is concluded that the vibration at the earthquake 30cm in amplitude, rapid descent of 63 cm and the gentle rise of 3.5 m recorded 45 days after the earthquake were observed respectively. The groundwater level were affected by 10 earthquakes in last 7 years that caused the change of volumetric strain more than 10-8 estimated by the relationship between Mw and distance from the seismic center. The result shows the good agreement with the previous works.