

# Dynamic effects on coseismic groundwater level changes : Cases study of 2003~2006 $M_L \geq 6$ earthquakes in Taiwan

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## Abstract

During the period from 2001 to 2005, the Disaster Prevention Research Center (DPRC) of National Cheng-Kung University established a groundwater observation network composed of 16 stations for research of earthquake-related groundwater changes under the support of the National Science Council and Water Resources Agency, Taiwan. For the observed coseismic groundwater level changes during 2003-2006, totally 18  $M_L \geq 6$  earthquakes been check in this study.

Part of the coseismic groundwater level changes could be explained as the poroelastic responses to the earthquake-induced volumetric strain changes inferred from the fault dislocation models. But the other records can not be explained by the volumetric strain changes either in qualitative (senses of changes) or quantitative (amplitudes). This study compares the static volumetric strain by the fault dislocation and the peak ground acceleration (PGA) as the main factors to effects the coseismic groundwater level changes. The results shows the records could not be well-explained by static volumetric strain mostly with stronger PGA. That means the dynamic strains induced by ground accelerations could be another important mechanism for the coseismic groundwater level changes. They are manifest especially in lose-cemented and permeable sedimentary deposits (with high hydraulic conductivity) and shallow aquifers. Similar dynamic effects could be the puzzle of the coseismic groundwater level changes happen in 1999 ChiChi earthquake.