

Groundwater changes in Taiwan related to the 1999 Chi-Chi Earthquake

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The 1999 Chi-Chi Earthquake (M7.7), an inter-plate earthquake between the Eurasian Plate and the Philippine Sea Plate, is similar to the impending Tokai, Tonankai and Nankan earthquakes and caused serious damage in Taiwan. As a result, after the 1999 Chi-Chi earthquake, a national earthquake prediction research project was started in Taiwan. Hydrological and geochemical research projects for earthquake prediction are among the national projects initiated in July 2001. The host is the Disaster Prevention Research Center, National Cheng Kung University, with support from the Water Resources Bureau, Ministry of Economic Affairs, Taiwan. The Institute of Geoscience, Geological Survey of Japan, AIST and the U.S.Geological Survey also provide assistance in the form of scientific collaboration.

Since the Bureau supports the project, we can use and analyze huge data set of groundwater in Taiwan. There are water-level records at more than 150 wells in the immediate vicinity of the source region of the 1999 Chi-Chi Earthquake. This is probably the first time that such densely-spaced groundwater records have been obtained in the neighborhood of the source region of an interplate earthquake of magnitude nearly 8. The data set shows groundwater-level changes greater than 10 m in the source region after the 1999 Chi-Chi Earthquake. Although some reports issued immediately after the earthquake referred to large preseismic changes in groundwater level in the neighborhood of the source region, those records are now known to have had a time base problem and are believed to be either coseismic and/or postseismic changes.

In this presentation we will report on the distribution of groundwater level changes in the neighborhood of the source region of the 1999 Chi-Chi Earthquake in relation to crustal strain changes caused by the slip on the 1999 Chi-Chi Earthquake fault.