



## **Streamflow Changes Induced by the 1999 MW 7.6 Chi-Chi Earthquake**

Yeeping Chia, Ching-Yi Liu, and Po-Yu Chuang

Department of Geosciences, National Taiwan University, Taipei, Taiwan (ypc@ntu.edu.tw)

Anomalous streamflow changes have often been observed after strong earthquakes. These changes have been used to study crustal deformation induced by earthquakes. Previous studies indicated that co-seismic groundwater-level changes, ranging from a fall of 11.1 m to a rise of 7.42 m, were recorded in 152 monitoring wells near the seismogenic fault during the 1999 MW 7.6 Chi-Chi earthquake. Here we report anomalous streamflow changes due to the earthquake in central Taiwan. There are 32 stream gauges in the vicinity of the fault, mostly in the mountainous hanging wall area. Of those, 22 recorded anomalous streamflow increases, ranging from 60% to 732%, one to four days after the earthquake. Unlike a rapid decrease in discharge after heavy rainfall, the post-seismic increase is followed by a slow decline which may last for several months. Only one gauge recorded a sudden decrease in discharge immediately after the earthquake. Besides, the decrease was preceded by a large and abrupt streamflow increase over the four days before the earthquake. We attribute the post-seismic increase to fracturing in the mountainous area due to seismic shaking, while the decrease to co-seismic pore pressure drop induced by crustal extension. However, more evidence is needed to consider the pre-seismic streamflow changes as a potential precursory indicator of earthquakes.