Geophysical Research Abstracts
Vol. 13, EGU2011-3937, 2011
EGU General Assembly 2011

Strain changes revealed in borehole strainmeter array, eastern Taiwan

Ya-Ju Hsu
Institute of Earth Sciences, Academia Sinica, Taipei, Taiwan

Ya-Ju Hsu 1, Chi-Ching Liu 1, Yuan-Shu Chang 2, Alan T. Linde 3, and I. Selwyn Sacks 3

1. Institute of Earth Sciences, Academia Sinica, Taipei, Taiwan
2. National Taiwan University, Taipei, Taiwan
3. Department of Terrestrial Magnetism, Carnegie institution of Washington, USA

The institute of Earth Sciences, Academia Sinica, in cooperation with the Department of Terrestrial Magnetism, Carnegie institution of Washington, has deployed ten borehole strainmeters at a depth range of 170–270 m in the Longitudinal Valley and the Costal Range of eastern Taiwan. The instrumentation is designed to monitor the Longitudinal Valley Fault, a major active structure zone between the Eurasian and Philippine Sea plates. About half-amount of accumulated crustal strain in Taiwan, 30-40 mm/yr, is released on the Longitudinal Fault. We examine strainmeter data between 2004 and 2010 and remove strain changes due to fluctuations in atmospheric pressure. We find significant negative strain changes with a time interval of few hours to days associated with the low atmospheric pressure during the passage of typhoons. The observed contractional signals are opposed to the expectation that lowering air pressure corresponding to expansion. Liu et al. (2009) proposed that this phenomenon is due to slow earthquakes triggered by typhoons. Since typhoons are accompanied by heavy rainfall, we look more extensively at the relationship among strain changes, atmospheric pressure, and precipitation. We find that strain changes are better correlated with air pressure variation in time rather than precipitation although two strainmeter sites seem to be affected by heavy precipitation as well. Contractional strain changes during typhoons have been observed in most of strainmeter sites located in eastern Taiwan. This could be because the source of slip events is large or that multiple events occur on different fault segments. Further investigation is required in the future.