

Crustal deformation and the earthquake potential in SW Taiwan from block modeling and geodetic observations

Speaker: Chiou-Shiang Lee **Advisor:** Wu-Lung Chang

Abstract

The GPS velocity field in SW Taiwan provides an opportunity to better recognize the contemporary crustal deformation under escaping tectonics. Horizontal velocities from 1995 to 2005 relative to the Chinese continental margin from east to west rotate counterclockwise from 42.0 mm/yr to 13.0 mm/yr along azimuths from 246° to 265° across SW Taiwan. The NE-SW-striking Chishan fault acts as reverse faulting with dextral motion, the N-S-trending Chaochou fault as nearly pure reverse faulting, and the Fengshan transfer fault zone as left-lateral shearing. The stress regime of E-W shortening and N-S lengthening in SW Taiwan are induced by plate convergence and the lateral spreading of mountain belt.

To evaluate the potential for large earthquakes, we developed the block modeling by computing tectonic block motions and fault slip rates. The principal strain rate orientations and the striking faults imply that there are two different kinematic block domains in Southern Taiwan, which are deforming and quasi-rigid block domains. The higher slip rates of Meilin fault and Fongshan transfer fault zone may be related to the presence of onshore mud diapir with apparent vertical uplift. Without destructive earthquakes over the last 100 years imply that the faults within the mudstone area are probably creeping.

References

1. Ching, K. E., Rau, R. J., Lee, J. C., & Hu, J. C. (2007). Contemporary deformation of tectonic escape in SW Taiwan from GPS observations, 1995–2005. *Earth and Planetary Science Letters*, 262(3), 601-619.
2. Ching, K. E., Rau, R. J., Johnson, K. M., Lee, J. C., & Hu, J. C. (2011). Present-day kinematics of active mountain building in Taiwan from GPS observations during 1995–2005. *Journal of Geophysical Research: Solid Earth (1978–2012)*, 116(B9).
3. Ching, K. E., Gourley, J. R., Lee, Y. H., Hsu, S. C., Chen, K. H., & Chen, C. L. (2015). Rapid deformation rates due to development of diapiric anticline in southwestern Taiwan from geodetic observations. *Tectonophysics*.