



Observation of non-volcanic tremor at the Longitudinal Valley in eastern Taiwan and introduction to E-TEC and observation experiment for earthquake precursors

Wen-Yen Chang

National Dong-Hwa University, Eastern-Taiwan Earthquake Research Center, Natural Resources and Environmental Studies, Hualien, Taiwan (wychang@gms.ndhu.edu.tw)

Non-volcanic tremor (NVT), which has been observed for over a decade, is a seismic signal with low amplitude, long duration, and no obvious body-wave phases. NVT is often occurred between lower crust and upper mantle beneath the locked seismogenic zone. Because most recent studies have shown that tremor activity mainly distribute along major fault interface and below the seismogenic zone where regular earthquakes occur, a systematic study of tremor can help to better understand necessary conditions related to tremor occurrence and fault mechanics at the bottom of the seismogenic layer. Taiwan is located at the subduction zone between Eurasian Plate and Philippine Sea Plate margin and the structure of the faults are rather complicated, in particular, the Longitudinal Valley Fault (LVF). Several studies focused on the southern and northern Central Range have been reported that Taiwan is also an environment with both triggered and ambient NVT. We used the seismic data of Broadband Array in Taiwan for Seismology and Central Weather Bureau Seismic Network, and found that total five NVT are triggered by teleseismic events in the LVF near the Yuli and Chihshang faults during 2005-2014. For further detailed temporal and spacial distribution of both triggered and ambient NVT, we propose to install not only regular seismic stations but also dense seismic arrays in Longitudinal Valley.

The E-TEC has been established and officially was inaugurated Sep. 24 in 2013 at Hualien County-based National Dong Hwa University, highlighting government efforts to strengthen disaster prevention and response capabilities. The center aims to provide an integrated platform for researchers and scientists to conduct the new advances and researches on earthquake precursors and early warning for seismic disaster prevention in the eastern Taiwan. There are multiple functions and important roles of this center. Eastern Taiwan is a good location for an earthquake research facility as frequent temblors are most common in the East Taiwan rift valley. The center can collect intensive real-time data and strengthen monitoring mechanisms and research on the region's seismic activity. We intend to integrate the multi-disciplinary observations and the E-TEC is equipped with stations to monitor a wide array of factors used by seismologists to detect quake precursors, including seismicity, GPS, strain-meter, ground water, geochemistry, gravity, electromagnetic and ionospheric density, infrared remote sensing, gamma radiation and thermal inferred etc. E-TEC will maximize the amount and value of the data for researches and hope that the range of monitoring equipment will enable them to predict where and when the next big earthquake will strike Taiwan, as well as determine which precursors are the most accurate to develop reliable earthquake prediction models.