



Assessment of the fault segmentation and strain accumulation in the northern Longitudinal Valley fault of eastern Taiwan by PS-InSAR with ALOS images

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Taiwan is located at the boundary between the Eurasian Plate and the Philippine Sea Plate. The Longitudinal Valley at the eastern Taiwan is considered to be the collision boundary. There are several faults in the valley and the most famous one is the Longitudinal Valley Fault (LVF) which accommodates about one third of convergence rate between these two plates. LVF is also a seismically active fault zone which ruptured four segments of LVF in 1951 Hualien-Taitung earthquake sequences. Therefore, we want to know the spatial distribution of interseismic strain accumulation along the Longitudinal Valley to access the seismic hazard in different fault segments. To address this problem, we apply a Persistent Scatterer SAR interferometry approach (StaMPS) using L-band ALOS data in eastern Taiwan. The result shows a considerable improvement of measurement's density compared to previous studies using C-band ERS data. The high density of measurement allows us to map the faults trace accurately and get a continuous view of active deformation. The reference area we choose is located in the township of Juisui. All plots in this study are referenced to the mean value for this area.

From Hualien river mouth to Nanfu, there is no clear velocity offset along the radar line of sight (LOS) across the Linding fault. It may indicate a shallow or completely locked fault. However, the PSI result shows a local LOS velocity decrease between the latitude of 23°44' to 23°51' on both sides of the fault and on Coastal Range. Above the latitude of 23°44', the LOS velocity is distributed from 10 to -5 mm/yr. The velocity drops to 5 ~ -10 mm/yr southward and then increases to the similar value above 23°44'N.

From Nanfu to Chunri, there are two active faults, namely, the Juisui and Chimei faults. The Juisui fault is part of the LVF, and the Chimei fault is located in Coastal Range. From the PSI result, the offset of LOS velocity across the Juisui fault is not clear, too, but we detect a velocity offset (about 10 mm/yr) 2 km east of the fault trace from Central Geological Survey. The LOS velocity in Coastal Range in this area is distributed from 10 to 20 mm/yr toward the satellite which differs from the velocity along the LV and may be related to the activity of the Chimei fault. South of Chunri, the PS result shows a similar pattern to the previous paper which processes ALOS data as well.