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Faults Activities And Crustal Deformation Along The Arc-Continent Collision Boundary, Eastern Taiwan - Observed From Persistent Scatterer SAR Interferometry

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Located in the southeastern periphery of the Eurasian plate, eastern Taiwan marks the collional boundary between the Eurasian plate and the Philippine Sea plate. These two plates converge at about 8 cm/yr near Taiwan and nearly half of the shortening is consumed in eastern Taiwan. There have been many studies in this area about the dynamics of the plate convergence, however, most of the geodetic studies focused on small area (strainmeter), with very few data points (GPS), or only gather data along a specific profile (leveling).

We applied the Persistent Scatterer SAR Interferometry in the Longitudinal Valley of eastern Taiwan to observe temporally-variable processes using both ERS and Envisat data. At the same time, leveling and GPS data were measured for the auxiliary tool to verify the deformation rate in this area.

Our result indicated that although the area is under active collision, faults do not move in the same fashion along the boundary. In the very northern part of the collided arc, small subsidence has been detected, while in the north-central part very few activity is observed. In the central and southern part of the collisional boundary, patches of faults are moving as rapidly as 15 mm/yr along radar line-of-sight. In addition. between late 2004 and middle 2005 there had been an earthquake swarm consists of shallow earthquakes, which coincided with PSI observation of a large vertical displacement. The comparison between our leveling data and PS results indicated PSI is a reliable tool even in the highly vegetated area in eastern Taiwan.