



Active lateral escape and extrusion at tips of a collision belt: the Ilan and Pingtung Plains, Taiwan

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To investigate the geometrical and mechanical relationships between the Taiwan collision belt and the adjacent subduction zones, two areas are crucial: the Pingtung Plain of SW Taiwan and the Ilan Plain of NE Taiwan. Both these areas show significant deviations of displacement vectors revealed by GPS studies, compatible with trend changes of principal stresses revealed by inversion of subsets of focal mechanisms of earthquakes.

In and around the Pingtung Plain of SW Taiwan, the trends of horizontal velocity vectors are consistent with small circles (anticlockwise rotation). However, the assumption of rigid rotation is unacceptable considering the distribution of velocities. The displacement pattern rather resembles a flow of particles towards an open edge to the SW.

The pattern of displacement vectors in and around the Ilan Plain of NE Taiwan is also compatible with small circles (clockwise rotation). Again, the distribution of displacement velocities precludes any hypothesis in terms of rigid rotation and suggests a particle flow moving towards an open edge to the SE.

In both these cases, the displacement trends contrast with the movement towards the NW that prevails at the front of the Taiwan collision belt. These conclusions are consistent with determination of deformation tensors from GPS displacement data, indi-

cating trends of compression and extension as well as transition from compression (near collision belt) to extension (near subduction zones).

These patterns of displacement and deformation support the interpretation in terms of lateral extrusion and escape occurring in the transition domains between the collision zone of Taiwan and adjacent subduction zones (Manila for Pingtung, Ryukyu for Ilan). Both patterns mimic particle flows moving toward a mechanically weak domain, related to the Manila accretionary prism to the south and the western tip of the back-arc Okinawa Trough to the north.