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# Characteristics of thrust fault linkage and development sequence in structural transfer zone, southwestern Taiwan

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Structural transfer zones in the fold-trust belt are manifested by lateral transfer of displacement, different slip surfaces and structural styles between two adjacent segments of thrusts or thrust systems. The existence of a structural transfer zone may also shed some lights on potential lateral length and/or trend of a surface rupture of active thrusting.

There are a series of major thrust with westward vergence in the foothills of southwestern Taiwan. The previous studies have proposed variable structural geometry and features of the different segments of thrust systems in a series of balanced cross section. However, the characteristics of structural transfer zones between the thrust systems have been less addressed. The main purposes of this study are to reconstruct subsurface complex geometry of a structural transfer zone and to decipher how the different thrust systems are linked to each other in the subsurface. The formation of the structural transfer zone and its evolutionary mode was further discussed. We also addressed the reason why the structural transfer zone happened. We combined several newly built or modified balanced-cross sections, with the previously constructed ones, and seismic tomography to reconstruct 3D geometry of the transfer zone and to reveal some along-strike changes in some characteristics of structure in the study area.

On the surface, the transfer zone is characterized by a series of tear fault, though a frontal thrust diminishes across the tear fault and transfers its slip to anther frontal thrust. The tear faults cut off and offset the major thrust segments in a sinistral sense. The tear faults strike in a direction more or less parallel with that of the major thrust translation but the trend of the southernmost one changes toward that of the major thrusts and become part of them. In the structural transfer zone, tear faults play as lateral ramps of major thrust on its northern side and confine the thrust sheet translation on its southern side. 3D fault geometry shows that on both sides the decollements of the thrust system become shallower and converge toward the structural transfer zone.

Reactivated normal faults played important role in forming structural transfer zone; on one side of the zone, the reactivated normal faults form part of slip surface of frontal thrusts that ramp up to the surface, while on the other side, major thrusts form an imbricate system and are confronted by a blind thrust wedge with opposite vergence. We speculate that, because of the wedge, the imbricate system were hampered to develop forlandward and the old thrust in the hinterland part of the system was forced to reactive and became an out-of-sequence thrust. The above characteristics of thrust linkage in the transfer zone offer invaluable clues for us to establish the fault development sequence on both sides of the transfer zone.

Key words: Structural transfer zone, Balanced cross section, Tear fault, Lateral ramp, Fault development sequence, Southwestern Taiwan