9th FTSES 2024 Penghu, Taiwan

9th France-Taiwan Symposium in Earth Sciences
Session: Marine Geology/ Underwater Geophysics

Development of geological structures between the uppermost Taitung Trough and southernmost Coastal Range, SE offshore Taiwan

Chian-Yu Huang[1], Jih-Hsin Chang[1]

[1] Institute of Oceanography, National Taiwan University

Oblique convergence between Eurasian continental margin and Luzon arc makes Taiwan one of the best natural laboratories to study transformation from subduction to collision. In SE Taiwan, the onshore southern Coastal Range and the offshore Taitung Trough are regarded as important regions to understand the initiation of arc-continent collision. To investigate the structural development between uppermost Taitung Trough and southernmost Coastal Range, we conducted onshore field work and offshore multi-channel seismic survey cruise to collect data in both terrestrial and marine domains. Our onshore work focuses on the Yungfeng fault at the southernmost end of the Coastal Range, and the Lichi fault running parallel-subparallel to Yungfeng fault to the south. The Yungfeng fault features as the contact between the Lichi Mélange to the south and Paliwan Formation to the north along the Longitudinal Valley, and is disputably interpreted to be strike-slip dominated, thrust-dominated, or depositional intertonguing at the southernmost end of the Coastal Range. According to lithology distribution revealed by our field survey, we tend to support that the Yungfeng fault trends approximately W-E and is more likely to be a structural feature. The Lichi fault is a quaternary-active structure and the main part of the Lichi Fault develops in N-S trending along the Longitudinal Valley as well. Notably, it seems to turn similarly toward southeast at the southmost end of Coastal Range. Immediately adjacent to our onshore work area, the uppermost part of the Taitung Trough features W-E striking and is the major submarine geomorphological feature. On the basis of high-resolution bathymetry data and recently collected MCS profiles, several W-E striking scarps along the orientation of the uppermost Taitung Trough are shown. Interestingly, these scarps seem to be oriented in a dextral sense. Based on our onshore investigation, we further propose that these scarps may begin at southernmost end of the Coast Range where the onshore Yungfeng fault and Lichi Fault are observed. We proposed that these scarps are fault structures and are related to seaward extension of the Yungfeng and Lichi Fault, probably representing a structural splaying system between the two boundary faults. The existence of these faults reflects the development of a transfer fault system within the N-S strike-slip plate boundary faults between Luzon Arc and Central Range. We further propose that the structural development between the uppermost Taitung Trough and southernmost Coastal Range is highly likely under the influence of the progressive closure of a forearc basin, reflecting the transformation of tectonic state from subduction to collision.

Keywords: Forearc basin; Coastal Range; Lichi Mélange; Taitung Trough