

Deformation patterns of an accretionary wedge in the transition zone from subduction to collision offshore southwestern Taiwan

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Keywords: morphotectonics, swath bathymetry, seismic reflection, deformation front, accretionary wedge, southwestern Taiwan

Abstract

Swath bathymetry data and seismic reflection profiles have been used to investigate details of the deformation pattern in the area offshore southwestern Taiwan where the Luzon subduction complex encroaches on the passive Chinese continental margin. Distinctive fold-and-thrust structures of the convergent zone and horst-and-graben structures of the passive margin are separated by a deformation front that extends NNW-ward from the eastern edge of the Manila Trench to the foot of the continental slope. This deformation front gradually turns into a NNE-SSW trending direction across the continental slope and the Kaoping Shelf, and connects to the frontal thrusts of the mountain belt on land Taiwan. However, the complex Penghu submarine canyon system blurs the exact location of the deformation front and nature of many morphotectonic features offshore SW Taiwan. We suggest that the deformation front offshore SW Taiwan does not appear as a simple structural line, but is characterized by a series of N-S trending folds and thrusts that terminate sequentially in an en-echelon pattern across the passive Chinese continental slope. A number of NE-SW trending lineaments cut across the fold-and-thrust structures of the frontal accretionary wedge and exhibit prominent dextral displacement indicative of the lateral expulsion of SW Taiwan. One of the prominent lineaments, named the Yung-An lineament, forms the southeastern boundary of the upper part of the Penghu submarine canyon, and has conspicuous influence over the drainage pattern of the canyon.