

THE TRANSITION FROM AN INTRAOCEANIC SUBMARINE ACCRETIONARY PRISM TO THE ONLAND FOLD-AND-THRUST BELT IN THE TAIWAN ARC-CONTINENT COLLISION

J. Alvarez-Marron¹, D. Brown¹, J. Alcalde¹, H. Kuo-Chen²

¹ Institute of Earth Sciences, ICTJA-CSIC, 08028 Barcelona, Spain, ² Department of Earth Science, National Central University, Taoyuan City, Taiwan

The region of Taiwan is undergoing active oblique arc-continent collision between the Luzon Arc on the Philippine Sea Plate and the continental margin of Eurasia. The on land fold-and-thrust belt (FTB) in Taiwan passes southwards into a submarine accretionary wedge of the intraoceanic Manila subduction zone. In the transition area from the marine accretionary wedge ca. 21° latitude to the on land FTB, the thrust wedge is climbing up the slope of the East Asian continental margin. The deformation front is at the sea floor in a water depth of over 3 km in the south to being buried by several hundred meters of synorogenic sediments as it reaches the coast line. On land, pre-orogenic sediments of the continental margin dominate in the FTB north of ca. 23° latitude while the offshore wedge is built up dominantly by synorogenic sediments. Here we use the on land surface geology, marine reflection seismic profiles, and seismic tomography models to construct contour maps of the basal thrust and the depth to the Moho from southwest Taiwan, across a transition area from near 23° to near 21° latitude. In this zone, the deformation front draws a convex curvature as the wedge widens up to more than 100 km near 22° latitude. The basal thrust surface also curves and its dip changes from southeast near the coast line to east southward. The basal thrust on land beneath the rear of the FTB reaches over 7 km deep before ramping into the basement and merging into the Chaochou fault near 10 km depth. Offshore, it shows a gentler dip from 7 km to c. 10 km depth before getting steeper towards the east below the Hengchung Ridge. The basal thrust-cuts through the margin's sedimentary cover to incorporate preorogenic margin sediments into the hangingwall as it passes from the offshore wedge to the on land FTB.

In the transition area, the Moho (we use a V_p proxy of 7.8 km/s extracted from the 3D seismic tomography) shallows southeast in the offshore, from near 25 km depth below the shelf-slope break to less than 17 km depth below the wedge near 21.5° latitude, before it starts to deepen towards the east. The Moho dips northeast from near 25 km depth below the coast near Kaohsiung to near 40 km below the rear of the FTB at 23.5° latitude.