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# The structure of the south Taiwan fold-and-thrust belt

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The structure of the south Taiwan fold-and-thrust belt (FTB) comprises a roughly N-S striking, west-verging imbricate thrust system that has been developing since the Late Miocene. Here, we present the results of new surface geological mapping, serial balanced cross sections, long sections, and a map of the basal thrust that are combined with published borehole data and a 3D P-wave tomography model to constrain the structure at depth. The stratigraphy of the area comprises Eocene syn-rift sediments that are unconformably overlain by Oligocene through Middle Miocene shallow water post-rift sediments. These are unconformably overlain by Late Miocene through Holocene-age syn-orogenic sediments. We define the basement to these as the Mesozoic pre-rift rocks of the Eurasian margin, and assign it a P-wave velocity of > 5.2 km/s in the velocity model. The syn-orogenic sediments thicken and get progressively involved in the thrust sheets toward the south.
The south Taiwan FTB can be divided into several thrust sheets. In the northern part of the map area, the structural grain is roughly N-S striking, changing southward to become NE-SW oriented. The westernmost thrust sheets form broad, open synclines cored by Pliocene to Holocene sediments, and tight hanging wall anticlines formed by Miocene rocks. Along its eastern flank, a narrow, complexly folded anticlinorium is developed in Miocene rocks. Restoration of the cross-sections indicates about 15 to 17 km of shortening. The basal thrust deepens from the surface towards the E and SE in a staircase trajectory, with narrow ramps and wide flats, reaching up to 8 km depth in the east before ramping down into the basement. The basal thrust has two pronounced, NE-striking oblique ramps that coincide with sigmoidal changes in shape of structures in the hanging wall. These correlate with a SW-NE trending increase in the P-wave velocity that is interpreted to image a basement high. We interpret this basement high to be an inherited extensional structure of the margin, and that faults associated with it are being reactivated, causing the changes in strike of the basal thrust, as well as in the surface trace of thrust and fold axes.