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Along–strike changes in the structure, seismicity, and topography of the south-central Taiwan fold-and-thrust belt inherited from the Eurasian margin

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Studies of mountain belts worldwide show that along-strike changes are common in their foreland fold-and-thrust belts. These are typically caused by processes related to fault reactivation and/or fault focusing along changes in sedimentary sequences. The study of active orogens, like Taiwan, can also provide insights into how these processes influence transient features such as seismicity and topography. In this paper, we trace regional-scale features from the Eurasian continental margin in the Taiwan Strait into the south-central Taiwan fold-and-thrust belt. We then present newly mapped surface geology, P-wave velocity maps and sections, seismicity, and topography to test the hypothesis of whether or not these regional-scale features of the margin are contributing to along-strike changes in structural style, seismicity, and topography in this part of the Taiwan fold-and-thrust belt. These data show that the most important along-strike change takes place at the eastward prolongation of the upper part of the margins necking zone, where there is a causal link between fault reactivation, involvement of basement in the thrusting, concentration of seismicity, and the formation of high topography. On the area correlated with the necking zone, the strike-slip reactivation of east-northeast striking extensional faults is causing sigmoidal offset of structures and topography along two main zones. Here, basement is not involvement in the thrusting, there is weak focusing of seismicity, and localized development of topography. We also show that there are important differences in structure, seismicity, and topography between the margins shelf and its necking zone.