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Systematic study of shallow crustal anisotropy for west Taiwan: a case study in the proximity of convergent deformation front

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In this study, we take advantage of a high-density accelerometric instrumentation to investigate local variation of shear-wave splitting at west Taiwan. The orogeny of Taiwan is considered to be caused by the platesąę collision occurred in the east and propagates from east to west in direction of plates convergence. In terms of faultsąę development, the crustal deformation at west Taiwan is dominated by a horizontal shortening, and convergent stress/strain is no doubt influencing through the whole composite layers in that area. This contributes a good instance to study seismic anisotropy in crustal layers before highly deformed. We analyze the shear-wave time delays and the fast polarization direction in a high-quality accelerometric dataset triggered by local earthquakes. The used events are filtered out with a threshold of magnitude larger than 3.5, to keep from the rupture directivity coming from source. The resultant shear-wave delay times are determined about 0.2 seconds in average from the accelerometric stations. A slightly variation in polarization direction is observed for the northern and southern portions of the studied area, which are separated by a tectonic basement, the Peikang High, at center-west Taiwan. Moreover, measured time delays exhibit a distinct change at depth about 15 km at southwest Taiwan. Further study on local seismicity provides an important clue for determining the thrusting process and deformation mechanism in shallow crust. By means of all these features, we can obtain a better comprehension of crustal lithologic strength as function of depth.