



Paleo-environments of Late Pliocene to Early Pleistocene Foreland-Basin Deposits in the Western Foothills of South-Central Taiwan

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Lithofacies and paleo-environmental analyses of the Pliocene-Pleistocene deposits of Taiwan provide a framework to understand the stratigraphic development of foreland basin to the west of the orogenic belt. In this study, we performed lithofacies analyses and biostratigraphic studies on calcareous nannofossils in two areas in south-central Taiwan, the Jhuoshuei River, and the Hushan Reservoir, respectively. The studied lithostratigraphic units are the Chinshui Shale, the Cholan Formation, and the Toukoshan Formation, in an ascending order, with a total stratigraphic thickness more than 3500 m in central Taiwan. Sixteen lithofacies and four lithofacies associations are identified, pertaining to tide-dominated deltaic systems bordering a shallow marine setting in the foreland basin. A few wide-spread layers of thickly-bedded sandstones featuring ball-and-pillow structures are interpreted as resulting from earthquake shaking (i.e. seismites). In addition, the vertical facies change shows a coarsening and shallowing-upward succession, indicating the gradually filling up of the foreland basin by sediment progradation. The progradation is interpreted to result from westward migrating orogenic belt and an increase in sediment supply. The top 2000-m thick foreland succession (i.e. the uppermost part of the Cholan Formation, and the Toukoshan Formation) is dominantly fluvial deposits with occasional intercalations of shoreface sediments, indicating an extremely rapid and balanced rate of basin subsidence and sediment supply for the past ~1.5 Ma. Vertebrate fossils of deer and elephants are identified in the upper Cholan Formation deposited in coastal to fluvial settings.

Keywords: Pliocene-Pleistocene Epoch, lithofacies, foreland basin, Taiwan