



Sandstone petrography and evidences for provenance changes in Miaoli area from late Pliocene to early Pleistocene, northwestern Taiwan

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The Miaoli area is located in the outer Western Foothills in the northwestern Taiwan, and between the Peikang Basement High and the Taihsi Basin. Based on the wellbore data, outcrop investigation, and petrofacies analysis of the sediments within the proximal to distal parts of the foreland basin in the Miaoli area, we revealed the evolutionary relationship between orogen and basin and the inference to the results from foreland basin on orogenic development of Taiwan. This work mainly composed of sedimentary facies analysis, sedimentary environments interpretations, and petrofacies analysis of sandstones. Upon aforementioned results, we discussed tectonic evolution of the orogenic belt and petrofacies variation of the sedimentary basin.

The results contains two parts: 1) investigation of outcropped profiles from the outer Western Foothills to the Coastal Plain for reconstructing evolution of ancient sedimentary environments, and 2) petrofacies analysis of lithic debris of wellbores and sandstone samples in the field for revealing the variation of sediment sources between the proximal and distal parts of the foreland basin.

Our research represented that 1) the foreland basin was in deeper sedimentary environment and the sediments derived from both the continental block and recycled orogen during depositing of the Chinshui Shale; 2) percentage of metamorphosed lithics increased in the proximal part of the basin during depositing of the Cholan Formation, indicating that sediments derived mainly from the orogenic belts, and the underfilled basin became to be overfilled; and 3) large amount of coarse sediments entered the basin during depositing of the Toukoshan Formation, sedimentary environments were from shore semi-closed shallow sea to terrestrial braided river, indicating that the Taiwan Orogen had been completely exposed.