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Tectonics and stratigraphic development of a rifted continental margin: An example from the Eocene-middle Miocene, Taishi Basin, central Taiwan

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The rifting and forming age of South China Sea crust is about 58∼37 Ma, and the shallow marine sequences of South China Sea were uplifted and exposed in Taiwan mountain belt. While most strata of Backbone Range and Hsueshan Range are metamorphosed, Western Foothills are the remaining strata. As to central Taiwan, those sequences are the critical place to explore the Cenozoic history of South China Sea rifting, since the stratigraphy record includes syn-rift to post-breakup strata. This study synthesizes field survey and borehole data to draft the tectonic and geological background of northern margin of the South China Sea, and thereby establish an evolutionary model of the target basin, Taishi Basin, from late Eocene to middle Miocene.

Itemized stratigraphy strata examined from field can be nicely correlated to those of wells, and the result can be used to outline Taishi Basin. The trend shows the succession thickening toward the west and north. Most of well data shows pyroclastic deposits at bottom, succession covered on top are all sedimentary deposits. The lithology transfers from mud-dominated to sand-occupied for three times, which indicates converting of sequence. Twenty onshore and offshore exploration wells in the western Taiwan were incorporated. We identify eight types of electro-facies, which can be concluded into depositional environments. The vertical change of paleo-environments indicates different types of parasequences. By stacking individual parasequence, twelve sequences were recognized. In Western Foothills, central Taiwan, strata of more than one kilometer thickness was examined by this study, twenty-four lithofacies were discriminated, including five mudstones, three Sand-Mud laminations, seven sandstones, one conglomerate and seven types of pyroclastic deposits. Depositional environments were delivered, including (1) wave-dominated and tidal-influenced coasts, (2) wave-dominated estuary, (3) offshore continental shelf and (4) volcano apron shallow marine.

The study establishes the evolution of the basin from late syn-rift to post-breakup, and provides the regional changing of environments dispersing.