



Propagated rifting in the Southwest Sub-basin, South China Sea: Insights from 3D analogue modeling

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Most of earth scientists agree that the South China Sea is a rifted marginal sea in the western Pacific. How and when the South China Sea rifted has long been a puzzling question and still debated, especially in the Southwest Sub-basin (SWSB). Analog modeling remains one of the useful tools for testing rift model and process. Here we present and discuss a series of analog modeling experiments designed to investigate the rifting process of the SWSB. Convincing geophysical data were compiled to provide truthful constraints to test the experimental results and interpretations. The results show that rigid tectonic blocks existed in the continental margin, such as the Zhongsha Islands and the Reed Bank, and played an important role in shaping up the continent-ocean boundary (COB) and the coupling between the crust and mantle. Our data suggest that the initial thermal condition and rheological stratification of the lithosphere under the South China Sea controlled the rifting process of the SWSB. The first-stage seafloor spreading has weakened the lithosphere surrounding the East Sub-basin, and the extension was centered on the deep troughs between the rigid blocks. Rifting began in these deep troughs in the east part of the SWSB, and the break-up occurred in localized areas between the rigid blocks. The V-shaped configuration of the SWSB also argues for a propagated rifting model.