



Lateral evolution of the rift-to-drift transition in the South China Sea: Evidence from multi-channel seismic data and IODP Expeditions 367&368 drilling results

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The South China Sea margins represent a critical natural laboratory to study the processes and parameters controlling the rift-to-drift transition. With high quality seismic data and benefits from IODP Expedition 367&368 drilled in the COT (Continent-Ocean Transition), three types of basement domains have been identified according to the nature and architecture of basement, i.e. thinned continental domain, transitional domain, and steady-state oceanic domain.

Preliminary drilling results in the rift-to-drift transition zone cored MORB-type basaltic basement with no clear evidence of exhumed mantle, implying remarkable difference with the magma-poor continental margin model on the studies on Iberia-Newfoundland margins. Seismic images further indicate that this transition is composed of hyper-extended continental crust remnants associated with magmatic additions. The structure is better explained by a short-period magmatic event occurring during the latest stage of continental rifting. This magmatic phase intruded and underplated the thinned continental crust and triggered the crustal breakup and onset of steady-state seafloor spreading. Considering the absence of magmatic seaward dipping reflectors, we interpreted the continental margin of the SCS as a magma-intermediate margin. We propose that the magmatic event triggering lithospheric breakup is from the decompression melting of ascending asthenosphere. It is assumed that this event is at a geological time scale instantaneous (< 10 Ma) and was favored by a high/hot mantle temperature.