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Rifting processes in the South China Sea

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We interpret recently re-processed high-quality, time-migrated, 2D regional multichannel seismic (MCS) profiles that image from the surface to the Moho and are calibrated with available well data. The profiles cross the Quiondongnan Basin, and the Baiyun sag of the Pearl River Mouth Basin, extending to deep-water across the continent ocean transition of the South China Sea (SCS).
The seismic images allow detailed reconstruction of syn-rift stratigraphy, and mapping of the distribution of major rift-related unconformities and basement faulting responsible for crustal extension during rifting.
Faulting created basement block structures with two different styles. At the NE end of Quiondongnan Basin under the modern shelf-upper slope, faults dip predominantly inboard. Further NE, towards the Pearl River Mouth Basinfault blocks are cut by outward-dipping faults. The latter are responsible for the last episodes of continental extension that thinned the crust to final break up. Detailed mapping of the end-of-extension unconformities and fault cross-cutting relationships support the hypothesis that the outward dipping faults are younger than inboard dipping faults. We propose that, in contrast to current models, the basin structure developed by the interaction of two rift systems. One rift system initiated at the location of the Quiondongnan Basin and developed by inboard faulting from early Oligocene to Miocene. A second rift system initiated in the NE of the SCS and propagated towards the SW, with a fault system dominated by outward dipping faults. The final rift structure of the central region of the north SCS was formed when the southern propagation of the Pearl River rift led to cessation of Quiondongnan rift system extension.