



## **A large-scale transfer zone reveals new insights into the geodynamic evolution of the South China Sea**

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Multi-beam bathymetric, seismic and borehole data are used to investigate a major fault zone (Baiyun-Liwan Fault Zone) on the northern South China Sea. The Baiyun-Liwan Fault Zone, striking obliquely to the northern continental margin of the South China Sea, comprises a first-order strike-slip fault zone whose prolongation to the south fits the defined Zhongnan Fault Zone on oceanic crust. Our work shows that the Baiyun-Liwan Fault Zone accommodated significant intra-plate deformation during diachronous continental rifting and ocean spreading, and was accompanied by important magmatism. The geometry of faults and strata within the Baiyun-Liwan Fault Zone reveal the generation of a pull-apart basin, which imposed a significant syn-tectonic control on deposition during the Paleocene-Early Miocene. In addition, the distinct crustal architectures on each flank of the fault zone suggest that the Baiyun-Liwan Fault Zone was formed along inherited Mesozoic basement structures, which were reactivated during Cenozoic extension. At present, the extensive region of strain accommodation comprising the Baiyun-Liwan Fault Zone is incised by the Pearl River Canyon and eroded by recurrent landslides, forming a major area of sediment bypass towards the abyssal plain. This work shows that the Baiyun-Liwan Fault Zone bounds distinct crustal segments in the South China Sea, and has played a significant role in margin segmentation and reflects progressive rifting and continental breakup. We suggest the recognition of this transfer zone to have profound implications for palaeogeographic reconstructions in the South China Sea.