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Seismic stratigraphy and tectonic structure from a long multi-channel seismic profile across the southern of South China Sea

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In order to grasp the Cenozoic extension and tectonic deformation characteristics of the crust in the southern of the South China Sea, a newly acquired multi-channel seismic profile (DZ02) acrossing the conjugate continental margin of the Southwest Subbasin, Nansha block, and Nansha Trough is explained. Four stratigraphic units (syn-rift unit, drift unit1, drift unit2 and post-rift unit) were determined with six sequence boundaries (T_g , T_{70} , T_{60} , T_{40} , T_{20} , T_{10}). Based on the differences in tectonic units and the features of stratigraphic and structural in the southern of the South China Sea, it is divided into five structural belts from northwest to southeast, which are the northern continental margin extension zone, the Southwest Subbasin, the Nansha intracontinental extension zone, the Nansha forebulge zone, and the Nansha trough. The fault derived and whole crustal extension factors of the Nansha block are also calculated. The results show that in time, the Nansha block has undergone two phases of extension, namely the syn-rift period and the seafloor spreading period. The syn-rifting stage accounted for about 69% of the total extension, and the seafloor spreading stage of the South China Sea accounted for about 26%. In space, the whole crust extension factor is greater than the fault derived extension factor in most areas. By comparing with the multi-channel seismic profile of the eastern part of the Nansha block imply that the crustal extension process is synchronous, but the extent of the extension in the western of Nansha is always greater.