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Tectonic Evolution of Mozambique Ridge in East African continental margin

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The East Africa passive continental margin is a depression area, with widely distributed sedimentary wedges from southern Mozambique to northern Somali (>6500km in length, and about 6km in thickness). It was resulted from the separation of East Gondwana, and was developed by three stages: (1) rifting in Early-Middle Jurassic; (2) spreading from Late Jurassic to Early Cretaceous; (3) drifting since the Cretaceous period. Tectonic evolution of the Mozambique continental margin is distinguished by two main settings separated by a fossil transform, the Davie Fracture Zone; (i) rifting and transform setting in the northern margin related to opening of the Somali and Rovuma basins, and (ii) rifting and volcanism setting during the opening of the Mozambique basin in the southern margin.
2D reflection seismic investigation of the crustal structure in the Zambezi Delta Depression, provided key piece of evidence for two rifting phases between Africa and Antarctica. The magma-rich Rift I phase evolved from rift-rift-rift style with remarkable emplacement of dyke swarms (between 182 and 170 Ma). Related onshore outcrops are extensively studied, the Karoo volcanics in Mozambique, Zimbabwe and South Africa, all part of the Karoo “triple-junction”. These igneous bodies flow and thicken eastwards and are now covered by up to 5 km of Cretaceous and Tertiary sediments and recorded by seismic and oil exploration wells.
Geophysical and geological data recorded during oceanographic cruises provide very controversial results regarding the nature of the Mozambique Ridge. Two conflicting opinions remains open, since the early expeditions to the Indian Ocean, postulating that its character is either magmatic (oceanic) or continental origin. We have carried out an China-Mozambique Joint Cruise(CMJC) on southern Mozambique Basin on 1st June to 23rd June,2017. The CMJC used multi-beam bathymetric, sub-bottom profiling, multi-channel reflection seismic, wide-angle refraction and Gravity to collect data. The preliminary new findings include: (1) the thick-layer sediments during Tertiary and Cretaceous; (2) the southern continental margin mainly affected by the rifting and volcanism during the stages of the Mozambique Basin formation; (3) the Cretaceous sediments located along the Mozambique Basin in both marine and continental environment.