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Evolution of Cenozoic tectono-palaeogeography and its petroleum significance in the Pearl River Mouth Basin, South China Sea

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Based on the structure and sequence stratigraphic analyses of the Cenozoic strata in the northern continental margin of the South China Sea, this paper summarizes the regional tectonics and their influences on the basin developments. The structures seemed very complicated in the Pearl River Mouth basin, northern margin of the South China Sea. It occurred three groups of faults, including NE-NEE, NW and nearly EW orientation respectively. The South China Sea experienced four tectonic events. Correspondingly, the basin evolution could be divided into three periods: the continent marginal fault-depression in Paleocene-Middle Eocene, basin expanding in Oligocene-Early Miocene, and heat depressing since Middle Miocene.

The tectonic development of the South China Sea was the consequence of various interactions of three major plates, and may be summarized into three stages with dominating influences of, respectively, the retreat of the West Pacific subduction zone in the Late Cretaceous, the hard collision and impinging of India to Tibet since the Late Eocene, and the fast northward subduction of the Indian Ocean-Australian plate since the late Early Miocene. The filled successions in the continent marginal fault-depression were mainly terrestrial facies, such as fluvial-alluvial fan, lacustrine and marsh, as well as volcanic rocks controlled by NE-NEE and NW faults. In the period of basin expanding the small grabens-depressions combinated and became a large-scale depressions, meanwhile the paleogeographic patterns changed gradually from lacustrine-marsh to littoral and shallow marine. In the period of heat-depressing the basin developing weakened and stagnated, accompanied with stratigraphic overlap and basins combination. The petroliferous exploration revealed that there was a rich oil-gas resource in the Cenozoic strata. The study on Cenozoic lithofacies and palaeogeography framework in the northern continental margin of the South China Sea had not only a theoretical significance for regional tectonic evolution, but also a practical significance for oil-gas exploration.