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Structure and stratigraphic framework of the basins along the Chinese Continental Margins: new constraints on the Cenozoic plates' reorganization in Eastern and Southeastern Asia

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Bohai Bay, East China Sea and South China Sea are three of the largest-scale Cenozoic petroleum-rich sedimentary basins along the Chinese continental margin. For the past decades, the wealth of geological and geophysical data was acquired by the petroleum industries, which provide an opportunity to have a synthetic study on these basins.

(1) Structure and stratigraphic framework for the Cenozoic basins in the Bohai Bay, the East China Sea and the South China Sea are revealed to be different. The Bohai Bay basin was imaged to be a pull-apart basin, through which a regional-scale strike-slip fault went. The South China Sea was controlled by extension, which generated a serial of deepwater basins on the hyper-extended crust adjacent to the oceanic crust, most of which was controlled by the detachment faults. Between the Bohai Bay basin and East China Sea is the East China Sea, at the deep level of which a serial of thrust faults occurred. It indicated the regional compression from the Pacific plate toward the East China.

(2) Based on the different structure and stratigraphic sequence in the basins along the Chinese continental margin, the basins evolutions were reconstructed. In Late Paleocene to Middle Eocene, distributed faulting occurred along the Chinese continental margin. Subsequently, in Late Eocene the evolution of these three basins were observed to be different. The Bohai Bay Basin was strongly influenced by the oblique strike-slip faulting, and lasted to the latest Late Oligocene, followed by the thermal subsidence in Miocene and a pulse of acceleration subsidence since Pliocene. In contrast to Bohai Bay basin, the continental shelf basin of the East China Sea experienced a long-time compression in the context of back-arc setting, and subsequently has a regional subsidence since Early Pliocene. The continental crust of the South China Sea was thinned since Late Eocene and eventually broke apart in Oligocene to form oceanic crust, where detachment faults bounded a serial of deepwater basins.

The different in basin structures and evolutions since Late Eocene was consistent with the event of plate organization in the western Pacific at that time. Before the event, Chinese continental margin was influenced by the interaction of Eurasian and Pacific plates, e.g. double-plate system. The subduction and related retreat of Pacific plate led to the back-arc extension of the Chinese

continental margin, generating widely distributed grabens and half grabens filled with sediments. After this event, the Chinese continental margin was deformed by the interaction between India, Eurasian, Pacific and Philippine Sea plates, e.g. multi-plate system. In this context, several dynamic forces affected the evolution of the Chinese continental margins was observed, e.g. the collision between India and Eurasia, the change of the subduction direction of the Pacific plate, the subduction collision of the proto-South China Sea, the northward movement of the Philippine Sea plate. These complex plate reorganizations lead to the different genetic type of basins in Chinese continental margin.