



Meso-Cenozoic Deformation and Dynamic Mechanism of the Ocean-continent Transitional Zone in the East China Sea Shelf Basin

YANG Chuansheng^{1, 2, 3, *}, YANG Changqing^{1, 3}, YANG Yanqiu^{1, 3}, SHANG Luning^{1, 2, 3} and SUN Jing^{1, 3}

¹ Qingdao Institute of Marine Geology, China Geology Survey, Qingdao, Shandong 266071

² Shandong Provincial Key Laboratory of Depositional Mineralization & Sedimentary Mineral, Shandong University of Science and Technology, Qingdao, Shandong 266590

³ Laboratory for Marine Mineral Resources, Pilot National Laboratory for Marine Science and Technology (Qingdao), Qingdao, Shandong 266237

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Abstract: Continent-ocean transition zone (COT) is the key to our understanding of geodynamic process and mechanism between ocean and continent, contains typical active continental subduction zone and passive continental margin COT and has long been one of the leading issues in international geoscience research (Li Sanzhong et al., 2017; Zhang Guowei et al., 2013). The East China Sea Shelf Basin (ECSSB) and Zhejiang, Fujian and Guangdong regions, locate at the eastern South China block, suffer the western subduction of the Izanagi Plate and Pacific Plate and the far-field effect of the collision of the Indian Plate and the Eurasian Plate since the early Mesozoic, and completely record tectonic deformation and COT interaction information in this period. Synthesizing Meso-Cenozoic research results acquired over the last 5 years and comparing land with ocean, this paper discusses Meso-Cenozoic tectonic deformation and dynamic mechanism of the ECSSB and its adjacent area, and the detailed results involved in this paper include the following: (1) Based on drilling data and 2D seismic profile interpretation, we divide the Meso-Cenozoic seismic sequence and tectonic layer, establish a unified stratigraphic framework and summarize 5 types of tectonic styles and 12 tectonic combinations in detail. According to seismic profiles analysis, this paper proposes that the Western Depression of the ECSSB is different from the adjacent secondary tectonic units on basin structure. (2) This paper proposes that faults mainly trend NE~NNE and a few small-scale ones trend EW in the ECSSB and its adjacent secondary tectonic units, based on the faults and magmatic rocks maps. Magmatic rocks are mainly formed during the Yanshanian and Himalayan periods and display a spatially regular migration from west to east. In addition, faults are closely related with magmatic rocks on development and distribution (Yang Changqing et al., 2016). (3) Meanwhile, several numerical and physical models are established by designing different parameters, and the simulation results show that slow-stretching model is consistent with the Mesozoic tectonic setting and submerged mantle melting due to plate subduction may be the main reason for the formation of the magmatic rocks in the study

area. In the early-stage tectonic evolution of the basin, the western part of the ECSSB is characterized by dispersed Cretaceous sags (e.g. the Oujiang Sag), while the eastern part of the ECSSB is characterized by the widely distributed Mesozoic strata, increasing in thickness eastward (e.g. the Minjiang Sag). (4) Based on regional tectonic analysis, balanced cross-section and numerical and physical simulation, synthesizing previous research results, the Meso-Cenozoic tectonic evolution of the ECSSB is divided into 4 phases as follows: continental margin depression from the Late Triassic (?) to the Middle Jurassic, initial stage of basin formation from the Late Jurassic to the early stage of the Early Cretaceous, continental margin post-arc extension basin stage from the late stage of the Early Cretaceous to the Late Cretaceous and active continental margin strike-slip basin stage from the end of the Late Cretaceous to the Cenozoic.

Key words: deformation, dynamic mechanism, Meso-Cenozoic, East China Sea Shelf Basin, ocean-continent transitional zone

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References

- Li Sanzhong, Jahn Bor-ming, Zhao Shujuan, Dai Liming, Li Xiyao, Suo Yanhui, Guo Lingli, Wang Yongming, Liu Xiaochun, Lan Haoyuan, Zhou Zaizheng, Zheng Qiliang, and Wang Pengcheng, 2017. Triassic southeastward subduction of North China Block to South China Block: Insights from new geological, geophysical and geochemical data. *Earth-Science Reviews*, 166: 270–285.
- Yang Changqing, Yang Yanqiu, Li Gang, Yang Chuansheng and Yang Jinyu, 2016. The Mesozoic Basin-Mountain coupling process of the Southern East China Sea Shelf Basin and its adjacent land area. *Acta Geologica Sinica* (English Edition), 90(3): 1051–1052.
- Zhang Guowei, Guo Anling, Wang Yuejun, Li Sanzhong, Dong Yunpeng, Liu Shaofeng, He Dengfa, Cheng Shunyou, Lu Rukui and Yao Anping, 2013. Tectonics of South China Continent and its implications. *Science China: Earth Sciences*, 56(11): 1804–1828.

* Corresponding author. E-mail: ychuansheng@mail.cgs.gov.cn

About the first author and corresponding author

YANG Chuansheng, male, born in 1984 in Xintai City, Shandong Province; doctor; graduated from Ocean University of China; senior engineer of Qingdao Institute of Marine Geology, China Geological Survey. He is now interested in the study on continental margin structures and basin analysis, and marine petroleum geological survey. Email: ychuansheng@mail.cgs.gov.cn; phone: 0532-85755844, 18563917857.