



Meso-Cenozoic Deformation and Dynamic Mechanism of the Oujiang Sag in the East China Sea Shelf Basin

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Abstract: The East China Sea Shelf Basin (ECSSB) was successively involved in the Pacific and Tethyan tectonic evolution since the Early Mesozoic, recording the detailed tectonic evolution and transitional process among diverse continental margins within the East Asian continental margin (Yang et al., 2016). During the Late Cretaceous to Oligocene, a transition occurred in the East Asian continental margin, from an Andean-type continental margin to a Japanese-type continental margin. Note that the deformations and evolutions of the transition mentioned previously have been recorded mainly in the Oujiang Sag (OJ) and its neighbouringsags (Li et al., 2017). The OJ is located in the western ECSSB and characterized by the well-developed and widespread Meso-Cenozoic strata, which is an important tectonic unit within the ECSSB. This study aims to elucidate the deformation and dynamic mechanism of the OJ by applying interpretation and simulation to seismic profiles across the main NE-NNE trending sag, based on the seismic data acquired successively from 2012 to 2014 and reprocessed in 2018, providing more detailed constraints on tectonic analysis than the old data. The OJ is a Meso-Cenozoic superimposed basin, where the Cenozoic strata predominate and the Mesozoic strata only contain the Upper Cretaceous strata. The Meso-Cenozoic strata in the OJ trend NNE and are characterized by tilted faulted blocks, half-grabens and grabens and can be divided into two structural layers. Due to the Meso-Cenozoic multi-cycle tectonism, faults and magmatic rocks in the sag both trend NE~NNE as the same as the regional tectonic direction, representing multi-types and multi-stages faulting and magmatism. The OJ began to rift from the Late Cretaceous to the end of the Paleocene and started its postrift in the early Eocene. Compared to the faults in the eastern ECSSB, it mainly develops extensional-shear faults in the OJ. In summary, the OJ is formed in a dextral transtensional tectonic setting since the Late Cretaceous, suggesting that the westward subduction of the Pacific Plate is the key to the formation and evolution of the sag.

Therefore, study in the OJ is the key to our understanding of the tectonic evolution of the eastern South China and the subduction of the Pacific Ocean Plate. Meanwhile, results obtained in this study provide scientific data for the petroleum exploration in the ECSSB.

Key words: Late Cretaceous-Oligocene, deformation, dynamic mechanism, Oujiang Sag

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References

- Li, S.Z., Jahn B., Zhao, S.J., Dai, L.M., Li, X.Y., Suo, Y.H., Guo, L.L., Wang, Y.M., Liu, X.C., Lan, H.Y., Zhou, Z.Z., Zheng, Q.L., and Wang, P.C., 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, C.Q., Yang, Y.Q., Li, G., Yang, C.S., and Yang, J.Y., 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.

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