



Meso-Cenozoic deformation and dynamic mechanism of the ocean-continent transitional zone in the East China Sea Shelf Basin

Chuansheng Yang, Changqing Yang, Gang Li, Yanqiu Yang, and Jing Sun

Qingdao Institute of Marine Geology, Hydrocarbon and Mineral Geology Division, Qingdao, China (284310845@qq.com)

Continent-ocean transition zone (COT) is a key place 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. 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 Mesozoic, and completely records 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 Western Depression 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 Western Depression 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.

(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 analyzed, especially about the Western Depression and its adjacent areas, and 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.