Paper Number: 1113

The tectonic features of the west Pacific margin and the formation of South China Sea

Li Xuejie, Yao Yongjian, Gao Hongfang, Yang Chupeng

Guangzhou Marine Geological Survey, CHINA, xuejieli@yeah.net

As a biggest marginal sea in the west Pacific margin, the South China Sea (SCS) locates at the junction of two marginal sea chains. One ranges at NE, including, from north to south, Okhotsk Sea, Japan Sea, Okinawa Trough and SCS, and the other ranges at NNW-SSE, including SCS, Sulu Sea, Celebes Sea and Banda Sea.

It has been paid closely attention to formation of SCS and its revolution and many models have been suggested for it. Of which, the most influential ones would be the extrusion model and slab-pull of proto-SCS model. But no one is perfect and the formation is still controversial.

The west Pacific margin underwent a series of subduction and collision, rift and sea floor spreading in Cenozoic time, and formation of typical plate margin with marginal seas, island arc and seduction zone.

The structures of the west Pacific margin differentiate obviously, and can be divided into 3 sections at least, from the north to the south. The first section, north of Taiwan, arranging at NE, is typical of trough-arc-basin system. The NW subduction of Pacific plate and Philippine Sea plate resulted in the formation of Kuril Basin, Japan Sea and Okinawa Trough by back arc spreading. Taiwan orogeny, which is resulted from arc-continent collision, is junction of 2 sections continental margin. The second one, Philippine Arc, from Taiwan to Molucca Strait, arranging at NNW, is double subduction, in which Philippine Sea Plate subducted in the east side and the SCS Plate subducted in the west side. Due to its complicated evolution and superimpose of younger tectonic, much debase remain for the formation of SCS, Sulu Sea and Celebes Sea. Molucca Strait, in which the oceanic lithosphere plate has been subducted beneath both sides, is another junction of the marginal structure. Southeast of the strait, it is New Guinea arc which arranges at NNW, is characterizes with complicated subduction, shearing and spreading.

The region, from eastern Sundaland to South China, underwent quite complicated evolution in Cenozoic time, including the following phases: 1) Late Cretaceous to Paleocene, the stress was dominant by compression and paleo-Pacific suduction of Andean-type systems. 2) Early Eocene to Oligocene, development of widespread rift basins, including Beibu Bay Basin, Pearl River Mouth Basin and Palawan Trough. 3) Late Oligocene to Early Miocene, rifting ceased and inversion began in many basins. 4) Mid-Miocene to Present, dominated by thermal subsidence.

It is certain that the formation of SCS was related with the revolution of west Pacific margin, Indochina escape by the collision of India and Eurasia, moving north of Australia and closure of proto-SCS. However, the formation and revolution of Philippine Sea would be crucial to understand the formation of SCS, even the evolution of west Pacific Margin. Based on research of palaeomagnetism, Hall et al. (2001) reconstructed history of the Philippine Sea revolution. It is possible that the formation of SCS related with the cease of Philippine Sea plate rotation and the stress relaxation.