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On the Linkage of the Western Boundary Faults of the South China Sea

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There are two pending key problems in research on western boundary faults (WBF) of South China Sea (SCS). One is itself structural-geometric linkage of the WBF of the SCS, that is whether there is a united dynamic boundary along the WBF of the SCS. The other one is dynamic consanguinity with Ailaoshan-Red River tectonic belt and Lupar line in region, that is, as a dynamic boundary, between which blocks the united dynamic boundary exists. For the sake of these two problems, the authors comparatively analyzed the structural geometry and structural kinetics of the major sections of the WBF, such as the Ailao-Red River (ARR)—East Vietnam (EV)—Wan'na (WN)-Lupar line (AEWL for short), based on the comprehensive analyses of geological, geophysical and geochemical data of the western margin area of the SCS. The AEWL is considered a mutual structural-geometric link-up system of strike-slip faults. The AEWL can be divided into three first-order segments: northern segment i. e. the ARR strike-slip fault zone; middle segment from mouth of Red river to the southwestern end of Southwest sub-basin of the SCS, through the EV, characterised by strike-slip and pull-apart; and southern segment along the east boundary fault of Wan'an Basin and southward linking with Lupar line in northwestern Kalimantan Island, characterised by a extension-contract-type dextral strike-slip duplex system. Each first-order segment can be further divided into several second-order segments. Then combined with comparatively analyses on geological evolution history of blocks in the region and the analyses on the Cenozoic spreading model of the SCS lithosphere, a dynamic model of the WBF of the SCS during the formation process of the SCS was instituted, and a geological model, which suggest the ARR ran along the No. 1 Fault of eastern boundary fault of Yinggehai Basin after entering the SCS, through Zhongjian ridge—EV—WN—Lupar line, and stopped at the west end of Bacu subduction-collision zone which result from southward subduction of paleo-SCS, was proposed. The reasonableness of the geological model was examined through the results of elasticity-medium-model numerical simulation.