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The Electrical Structure of the Lithosphere beneath the Eastern Jiangnan Orogenic Belt

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Abstract: The tectonic setting of Eastern Jiangnan Orogenic Belt and its adjacent area is of great significance to the study on the evolution history and ore districts in south China. Since the electrical property may vary obviously between different tectonic units due to the special composition and structure, it is possible to obtain reliable tectonic boundary through the lithospheric electrical structure. Magnetotelluric method has an effective constraint on the vertical conductance of lithosphere. Based on the three-dimensional inversion result of magnetotelluric data and the Moho depth information from other geophysical observations (Li et al., 2018; Ouyang et al., 2014), the vertical conductance within a depth range of 50 km was calculated. The distribution of the vertical conductance shows that the southern part of the North China Block mainly have high conductivity characteristics (Fig. 1). The high resistive root underneath the Dabie Orogenic Belt (Fig. 2) indicates that the North China Block and the Yangtze Block collide and subside drasticly under the Dabie Mountain. The whole Lower Yangtze Depression present shighly conductive, while the Jiangnan Uplift Belt and Zhegan Depression only have a large range of high conductivity area to the east of Jingdezhen (Fig. 1). The highly conductive region in the eastern part of Jiangnan Uplift Belt may result from the crustal melting due to increased subduction angle of the Pacific plate. In the highly conductive Huaiyu Terrain (Fig. 1), the North-Eastern Gan fault merged downward with Jiangshao fault in the shallow crust (Fig. 2). The south-eastern dipping listric structure in this area indicates that the Cathaysia Block obducted on the Yangtze Block during the late plate collision. Similarly, the Suichuan-Fuzhou fault also shows the characteristics of south-eastern dipping (Fig. 1, Fig. 3), indicating that the Jiangshao fault zone may extend to the southwest along the Suichuan-Fuzhou fault. The Jiangle-Jianyang-Longquan fault with the mantle scale (Fig. 3) may be the tectonic boundary of the eastern Cathaysia Block and western Cathaysia Block, which is consistent with the distribution of metamorphic rocks on the two sides of this fault (Lin et al.,

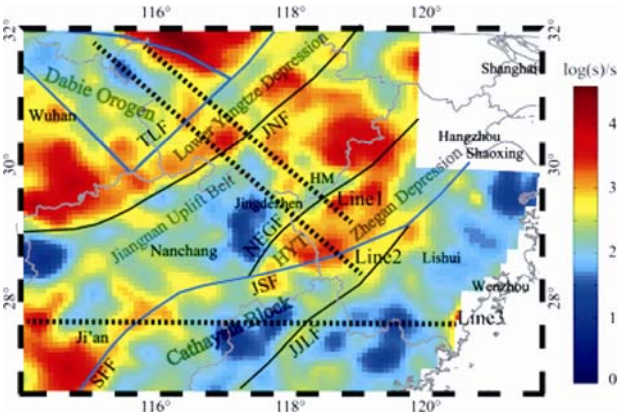

Fig. 1. The vertical conductance above the depth of 50 km (Drawn by Illustrator CS6).

HYT, Huaiyu terrain; TLF, Tanlu fault; JNF, Jiangnan fault; NEGF, North-Eastern Gan fault; JSF, Jiangshao fault; SFF, Suichuan-Fuzhou fault; JJLF, Jiangle-Jianyang-Longquan fault.

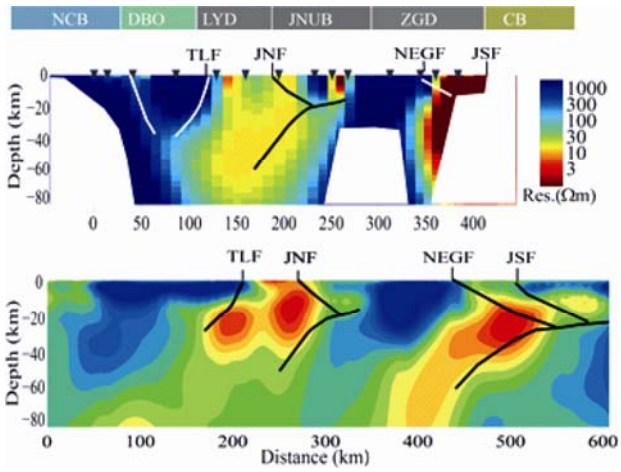

Fig. 2. 2D electrical structure (up panel) along Line1 and 3D electrical structure (lower panel) along Line2(Drawn by Illustrator CS6).

NCB, North China block; DBO, Dabie orogenic belt; LYD, Lower Yangtze depression; JNUB, Jiangnan uplift belt; ZGD, Zhegan depression; CB, Cathaysia block;TLF, Tanlu fault; JNF, Jiangnan fault; NEGF, North-Eastern Gan fault; JSF, Jiangshao fault.

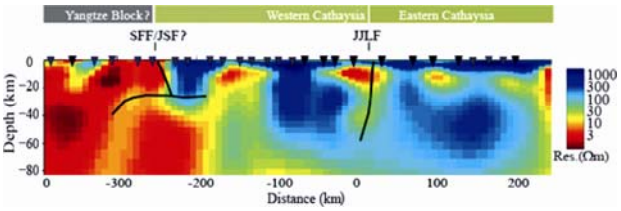

Fig. 3. 3D electrical structure along Line3(Drawn by Illustrator CS6).

SFF, Suichuan-Fuzhou fault; JSF, Jiangshao fault; JJLF, Jiangle-Jianyang -Longquan fault.

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2018). According to the electrical structure in this work (Fig. 1) and the study on the ophiolitic melange belts (Zhang et al., 2013), Jiangle-Jianyang-Longquan fault and North-Eastern Gan fault should be the same fault in early Jinning period, then were separated by the stike-slip of Jiangshao fault. The understanding of the tectonic evolution of eastern Jiangnan Orogenic Belt and adjacent area still needs further study and verification.

Key words: eastern Jiangnan orogenic belt, tectonic boundary, electrical structure, magnetotelluric,

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