

DEEP RESISTIVITY STRUCTURE IN LONGMEN SHAN AND THE WENCHUAN EARTHQUAKE IN THE EAST OF QINGHAI-TIBET PLATEAU, CHINA

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ABSTRACT

The magnitude 8.0 Ms Wenchuan earthquake of 12 May 2008 occurred along the Longmen Shan fault zone, southwest of China, is a huge hazard. Why the earthquake is happened along the NE-SW trending and in an inactive orogenic area? What is the geodynamics caused the earthquake erupting abruptly? Usage of the results of the processing and interpretation of the magnetotelluric data observed before the Wenchuan earthquake from Luqu-Zhongjiang passed through the Qinling tectonic zone, Songpan-Garze block and Longmen Shan as well as Sichuan basin, this paper reveals crustal architecture of 50 km depth of the Eastern Qinghai-Tibet plateau and Western Sichuan foreland basin and the relationship between them, with the characteristics of eastern pressing of the Qinghai-Tibet plateau forcing Songpan-Garze block thrusting upon the Yangzi continent block, later obstructing the eastern movement of the Qinghai-Tibet Plateau. The Longmen Shan is located at the joint of two block and has been found there is a west inclined low-conductivity layer in the crust of 10-20 km depth of Longmen Shan, it is deduced as the deep conductivity characteristics of thrustbelt structure in Longmen Shan. The huge earthquake has caused about 300 kilometers long rupture zone□it happened mainly in faults of Beichuan-Yingxiu and Pengxian-Guanxian of Longmen Shan faults setup, which is going down with the north-western inclined along the thrustbelt in the Longmen Shan. The two faults of Beichuan-Yingxiu and Pengxian-Guanxian seem going to converge together at the deep but they are probably separated with the Maoxian-Wenchuan fault in the Longmen Shan structure zone. There are a little different characters for the Sichuan basin and the Songpan-Garze foldbelts located at the two side of the Longmen Shan, for Sichuan basin has the characteristics of the upper thick low resistance sedimentary, and the under stable high resistance basement, while Songpan-Garze block has high resistivity cover of upper crust with continuous low resistance bed of the crust. Resulting from the Songpan-Garze block thrust upper the Sichuan Basin stability block, the Longmen Shan structure zone formed three layer of geoelectrical structure which is a high resistance in the upper and lower part of high resistance basin basement, and mingling with low resistance thrust fault zone in the middle. As explanation above, the conclusion could be focused on (1) there is a western inclined thrusting zone range from surface to depth 20km or more under Longmen Shan and Songpan Block, which caused the earthquake happen as it be activated; (2) the different action of surface breaking of Longmen Shan thrusting faults depend on the deep structure characteristics; (3)the earthquake is caused by the mutually promotive with Eurasian plate, Indian plate and Pacific plate in a broad sense. So the research on the MT profile is important for both continent dynamics in the orogenic zone and deep mechanism of Wenchuan earthquake at Longmeshan fault zone in the east of the Qinghai-Tibet plateau.

Keywords: Thrustbelt structure, Magnetotelluric sounding, Sichuan basin, Longmen Shan inghai-Tibet plateau, Wenchuan earthquake