The Study of Crustal Velocity Structure Characteristics in Yangjiang Area of South China

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This paper collects 43,225 absolute first arrival P wave arrival times and 422,956 high quality relative P arrival times of 6,390 events occurred in Yangjiang and its adjacent area from Jan, 1990 to Aug, 2019, these seismic data is recorded by 49 stations from Guangdong seismic network, Guangxi seismic network and Hainan seismic network. Based on the seismic data above, we simultaneously determine the crustal 3D P wave velocity structure and the hypocenter parameters of 6255 events in Yangjiang and its adjacent area by applying Double-Difference seismic tomography. The result shows that, shallow P wave velocity in Yangjiang area is higher due to the thinner sedimentary layer and widely exposed Yanshanian granite, Indosinian granite and Cambrian metamorphic rocks. There are obvious correspondences between the distribution of shallow velocity and fault structure as well as geological structure. A wide range of low velocity anomaly exists in 20km depth, which verifies the low velocity layer in the middle crust at Yangjiang area of South China continent. The velocity image from land to ocean in 30km depth shows low velocity in NW side and high velocity in SE side, which verifies the characteristic of crust thinning in South China coastal continent. The NEE seismic belt from Yangbianhai to Pinggang is speculated to locate in a buried fault of southwest segment of Pinggang fault. The buried thrust fault is a N78°E strike fault, dip to NW with a dip angle of 85°. In addition, the buried fault locates in the abnormal junction of high velocity on the NW side and low velocity on the SE side, which reflects the tectonic activity characteristic of NW plate uplifting and SE plate declining from Miocene period. The characteristic of activity in the buried fault shows thrust movement with a small strike slip component, which is consistent with the focal mechanism of M4.9 earthquake occurred in 2004.