

地球物理学报 » 2014, Vol. 57 » Issue (2) : 498-508 doi: 10.6038/cjg20140215

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引用本文(Citation):

曹敬贺, 孙金龙, 徐辉龙, 夏少红. 珠江口海域滨海断裂带的地震学特征. 地球物理学报, 2014, 57(2): 498-508, doi: 10.6038/cjg20140215

CAO Jing-He, SUN Jin-Long, XU Hui-Long, XIA Shao-Hong. Seismological features of the littoral fault zone in the Pearl River Estuary. Chinese Journal Geophysics, 2014, 57(2): 498-508, doi: 10.6038/cjg20140215

珠江口海域滨海断裂带的地震学特征

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Seismological features of the littoral fault zone in the Pearl River Estuary

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摘要

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摘要

利用2010年珠江口外海陆地地震联测数据, 探测到滨海断裂带在担杆岛外12 km处发育, 断裂带主体倾向东南、宽约20 km, 沉积层在断裂带内迅速增厚引起陆上固定地震台站的Pg震相在对应断裂带位置的走时明显滞后. 通过震相分析和走时正演拟合, 获得了滨海断裂带两侧由浅至深的纵波速度结构模型, 断裂带内部沉积层速度为1.8~3.5 km/s, 上地壳速度5.2~6.1 km/s, 下地壳速度为6.3~6.6 km/s, 莫霍面的埋深由滨海断裂带陆侧的29 km抬升至其海侧的27 km. 滨海断裂带两侧的地壳结构特征明显不同, 证实了该断裂带是华南陆区正常型陆壳与南海减薄型陆壳分界断裂的性质. 在华南沿海和海陆过渡带的下地壳顶部探测到厚约3 km、层速度为5.5~5.9 km/s的低速层, 往海域逐渐减薄尖灭. 壳内低速层是地壳中的力学软弱带, 与近似正交的NEE向滨海断裂带和NW向断裂带共同组构成了该区地震活动的孕震构造.

关键词 [珠江口](#), [滨海断裂带](#), [海陆地震联测](#), [地壳结构](#)

Abstract:

The data collected from an onshore-offshore seismic experiment off the Pearl River Estuary in 2010 reveal existence of the Littoral Fault Zone (LFZ) located about 12 km south of Dan'gan Island, which is about 20 km wide and mainly dips southeast at a high angle. The deposit thickness in the LFZ increases rapidly, which causes the travel time of seismic phase Pg of permanent stations lag obviously at the corresponding position of LFZ. By seismic phase analysis and travel time fitting, a P-wave velocity model is constructed on the both sides and within LFZ from shallow to deep. The modeling results show that the sedimentary layer in the LFZ has a velocity of 1.8~3.5 km/s, and the upper crust has a velocity of 5.2~6.1 km/s, and the lower crust has a velocity of 6.3~6.6 km/s. The Moho depth of the LFZ changes abruptly from 29 km on the landside to 27 km on the seaside. The different seismic velocity structures on the opposite sides of the LFZ certifies that this fault is the boundary between the normal continental crust of South China and the thinned continental crust of the South China Sea. The low velocity layer (LVL, 5.5~5.9 km/s) on the top of lower crust exists in South China and the onshore-offshore transitional area with about 3 km thickness, which is thinning seaward gradually to pinch-out. The LVL is a weak zone in the crust, which links the NEE-striking LFZ and NW-striking fault zone to form the seismogenic structure of the Pearl River Estuary area.

Keywords [Pearl River Estuary](#), [Littoral Fault Zone](#), [Onshore-offshore seismic experiment](#), [Crustal structure](#)

Received 2013-08-04;

Fund:

国家自然科学基金项目(91028002, 41222039, U0933006, 41006027, 41376060)资助.

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