

2009年4月6日意大利拉奎拉(L'Aquila)  $M_w$ 6.3地震的破裂过程——视震源反演方法比较

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Rupture process of 6 April 2009 L'Aquila, Italy,  $M_w$ 6.3 earthquake between [JP2] apparent source time function method and direct wave inversion method

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摘要

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## 摘要

通过对视震源时间函数方法和直接波形反演方法在意大利拉奎拉(L'Aquila)  $M_w$ 6.3地震破裂过程反演中的应用, 分析比较了两种方法的特点. 视震源时间函数结果表明, 这次地震的破裂过程由两次子事件组成, 其中第二次子事件的多普勒效应显著, 表明破裂在东南方向传播. 分别采用视震源时间函数方法和滑动角固定以及滑动角可变的直接波形反演方法对拉奎拉地震时空破裂过程反演所得到的结果一致表明: 断层面上有两块滑动量集中的区域, 分别位于震源处和沿走向(132°)方向距震源5~10 km. 滑动量分别约为1.2 m和1.0 m. 破裂持续时间约为9.5 s. 最大滑动速率达0.6~0.7 m/s, 快速的破裂和上盘一下盘效应导致该城的严重破坏.

关键词: 视震源时间函数 地震破裂过程 拉奎拉(L'Aquila)地震

## Abstract:

The characteristics of apparent source time function (ASTF) method and direct wave inversion method are discussed and the spatio-temporal rupture process was investigated by application of the two methods to the 2009 L'Aquila earthquake. ASTF results show that there were two sub-events in this earthquake and the rupture propagated southeastwards as indicated by the obvious seismic Doppler effect of the second sub-event. The spatio-temporal rupture processes obtained by the ASTF method, direct wave inversion method with fixed rake and direct wave inversion method with variable rake consistently show that there were two slip-concentrated patches which were located at the hypocenter and 5~10 km along strike direction and have the maximum slip of 1.2 m and 1.0 m, respectively. The rupture duration time is about 9.5 s and the maximum slip-rate is about 0.6~0.7 m/s. The hanging wall /foot wall effect were responsible for the tremendous damage in L'Aquilacity.

Keywords: Apparent source time function (ASTF) Earthquake rupture process L'Aquila earthquake

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