

地球物理学报 » 2012, Vol. 55 » Issue (11) : 3625-3633 doi: 10.6038/j.issn.0001-5733.2012.11.011

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吕坚, 曾文敬, 谢祖军, 曾新福, 张勇, 邓辉, 胡睿, 黎斌, 李雨泽. 2011年9月10日瑞昌—阳新4.6级地震的震源破裂特征与区域强震危险性. 地球物理学报, 2012,55(11): 3625-3633,doi: 10.6038/j.issn.0001-5733.2012.11.011

LV Jian, ZENG Wen-Jing, XIE Zu-Jun, ZENG Xin-Fu, ZHANG Yong, DENG Hui, HU Rui, LI Bin, LI Yu-Ze. Rupture characteristics of the M_S 4.6 Ruichang-Yangxin earthquake of Sep.10, 2011 and the strong earthquake risk in the region. Chinese J. Geophys. (in Chinese), 2012,55(11): 3625-3633,doi: 10.6038/j.issn.0001-5733.2012.11.011

2011年9月10日瑞昌—阳新4.6级地震的震源破裂特征与区域强震危险性

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Rupture characteristics of the M_S 4.6 Ruichang-Yangxin earthquake of Sep.10, 2011 and the strong earthquake risk in the region

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摘要

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摘要 基于区域数字地震台网记录,采用HYPODD方法精确定位了2011年9月10日瑞昌—阳新地震序列的震源位置,采用CAP方法反演得到了4.6级主震的震源深度和震源机制解,并结合区域深度震相sPg、PmP和sPmP对主震震源深度进行了进一步确定,随后探讨了这次地震的震源破裂特征和所在区域的强震危险性.结果显示:瑞昌—阳新4.6级地震的震源深度为 15 ± 2 km,震源机制解为节面 I 走向 30° ,倾角 86° ,滑动角 -169° ,节面 II 走向 299° ,倾角 79° ,滑动角 -4° ,发震构造为郟城—庐江断裂带往震区延伸隐伏的瑞昌—武穴断裂;本次地震发生在长江中下游断块东部,所在区域的5.5级以上地震具有明显的成组活动特征,近期显著地震集中发生在郟城—庐江断裂带南段及其分支断裂上,地震能量有加速释放的趋势,未来十年左右该区域存在发生6级左右强震的可能性.

关键词 瑞昌—阳新地震, 地震精定位, 震源机制解, 震源深度, CAP方法

Abstract: Based on the records of regional digital seismic networks, we relocated precisely the M_S 4.6 Ruichang-Yangxin earthquake sequence of Sep. 10, 2011 with the HYPODD method, and obtained the focal depth and focal mechanism of the M_S 4.6 main-shock with the "Cut and Paste" (CAP) method. In order to determine the focal depth, we combined with local depth phases like sPg, PmP, and sPmP to research it, and further discussed the rupture characteristics of the event and the strong earthquake risk in the region. Our result shows that the focal depth of the M_S 4.6 Ruichang-Yangxin earthquake is 15 ± 2 km and the best double couple solution is 30° , 86° , and -169° for strike, dip, and slip angles respectively with the other nodal plane of 299° , 79° and -4° . Combining with the rupture characteristics and the geologic settings in the region, we infer that the event is caused by the Ruichang-Wuxue fault which is the Tangcheng-Lujiang fault buried in the seismic zone. The Ruichang-Yangxin earthquake occurred in the east of the middle and lower Yangtze River fault-block, the $M_S \geq 5.5$ earthquakes in the region show the obvious features of seismic grouping activity, and the recent significant earthquakes mostly occurred on the Tangcheng-Lujiang fault or its adjacent fault, which shows the tendency of accelerating energy release. So we should pay more attention to the risk of about $M6$ earthquake in the region in the future years.

Keywords Ruichang-Yangxin earthquake, Earthquake precise relocation, Focal mechanism, Focal depth, CAP method

Received 2012-01-10;

Fund: 地震科技星火计划项目(XH12027)、地震行业科研专项(201008007)和国家自然科学基金(40973034,41174086)联合资助.

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