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利用sPn震相测定芦山 $M_S7.0$ 级地震余震的震源深度

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Focal depth determination of aftershocks of Lushan $M_S7.0$ earthquake from sPn phase

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摘要

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摘要

利用南北地震带南段密集流动地震台阵的观测数据, 采用波形互相关方法拾取Pn波走时, 应用滑动时窗相关法识别sPn震相, 通过sPn与Pn震相之间的走时差测定了芦山地震序列中28个 $M_L4.0$ 级以上余震的震源深度. 结果表明, 震源深度集中在10~20 km范围内, 垂直余震带的北西—南东向震源深度剖面揭示, 余震分布表现出西深东浅的特点, 倾角大约为 39° . 这些余震在空间上具有较好的线性分布特征, 推测可能发生在与主震有关的破裂面上或邻近位置, 由此推测主震的破裂面倾角大约为 39° . 根据余震的空间分布特征, 认为芦山地震的发震断层并非双石—大川断裂, 可能是其东侧的一条隐伏断层.

关键词 芦山地震, 震源深度, 波形互相关, 滑动时窗相关法, sPn震相

Abstract:

Using the seismic waveforms recorded by the seismic array deployed in the southern section of the North-South seismic belt, the focal depths of 28 $M_L \geq 4.0$ aftershocks of the Lushan $M_S7.0$ earthquake are determined from the arrival-time differences between sPn and Pn phase. The Pn phase waves are picked by the waveform cross-correlation method, and the sPn phases are identified by using the sliding-window correlation method. The result shows that the focal depths are 10~20 km. From the NW—SE profiles perpendicular to the seismic belt, the focal depths became shallower from west to east with a dip about 39° . The aftershocks show a linear characteristic in space, implying that they may be located in or near the faults relative to the main shock, and the fault dip of the main shock may be 39° . According to the spatial distribution of aftershocks, we infer that the seismogenic fault of Lushan earthquake may be the blind thrust fault to the east of the seismic zone rather than the Shuangshi-Dachuan fault.

Keywords Lushan earthquake, Focal depth, Waveform cross-correlation, Sliding window cross-correlation, sPn phase

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