

特定震源台站校正定位方法及在安徽霍山地区的应用

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Earthquake relocations in Huoshan area, Anhui province, by a Specific Station Term Method

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摘要

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摘要

本文详细介绍一种地震定位方法——特定震源台站校正定位法(Source-Specific Station Term, SSST), 并应用该方法山的霍山地区1976~2008年发生的地震进行重新定位研究. 重新定位后, 原震源位置的精度得以大大提高、空间上分布也应用bootstrap法对定位偏差进行估计, 得到E-W、N-S、U-D三个方向的定位误差分别为0.4 km、0.6 km、0.9 km; 误差得以很大程度上减小, 其均值由定位前的1.34 s下降到定位后的0.11 s. 文中比较了特定震源台站校正方法与双差方法, 相对于双差方法, 特定震源台站校正法定位条件容易满足, 定位后缺失地震较少且还具有一定的绝对定位作用. 应用特定震源台站校正方法的结果对霍山区域的地震活动性进行分析, 发现重新定位后显示出3条明显的密集条带, 由此划分出3个密集区并分析其特征, 结果显示这3个密集区在深度上分布都具有较浅的特征, 但随时间分布却有所差异. 条件允许时, 将来可以结合波形互相关一步提高定位精度.

关键词: 地震相对定位 台站校正 特定震源台站校正法 双差方法 定位误差 安徽霍山地区

Abstract:

The article mainly introduces an earthquake location method—Source-Specific Station Term (SSST) and presents the application of this method to relocate earthquakes between 1976 and 2008 in the Huoshan area located in Dabie Mountain in Anhui province. After relocation, the location accuracy is significantly improved and the epicenter distribution is more compact. The location errors, estimated by using a bootstrap approach, are 0.4 km, 0.6 km, and 0.9 km in the east-west, north-south, and vertical directions, respectively. The root mean squares (RMS) of arrival time residuals have a sharp reduction after the SSST relocation from 1.34 to 0.11 s. We also make a concise comparison between the SSST method and the Double-Difference (DD) algorithm. The results show that the SSST method can easily be used, and can almost relocate all the events. In addition, it has also achieved some improvements in absolute location. After the SSST relocation, we apply the results to the analysis in the Huoshan area, there are three obvious compact stripes and we divide them into three density zones. Based on the analysis of temporal-spatial distribution characteristics, we find that the earthquakes in all three zones all have shallow focal depths, although the temporal-distributions are different. To further improve the location accuracy, the waveform cross-correlation could be combined with the SSST method when conditions permit in the future.

Keywords: [Relative earthquake relocation](#) [Station terms](#) [SSST method](#) [Double-difference algorithm](#) [Location error](#) [Huoshan area in Anhui province](#)

Received 2010-01-14;

Fund:

地震行业科研专项“历史地震资料补遗、可靠性及工程应用研究”(200708048)资助.

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