

-Time Source-Specific Station Correction Improves Location Accuracy

Accurate earthquake locations are crucial for investigating seismogenic processes, as well as for applications like verifying compliance to the Comprehensive Test Ban Treaty (CTBT). It is known that modeling errors of calculated travel times may have the effect of shifting the computed epicenters far from the real locations by a distance even larger than the size of the statistical error ellipses. The consequences of large mislocations of seismic events in the context of the CTBT verification is particularly critical in order to trigger a possible On Site Inspection (OSI). In this study, we develop a method of source-specific travel times corrections based on a set of well located events recorded by national seismic networks in two seismically active regions (Italy and Iran). We show that mislocations of the order of 10-20 km affecting the epicenters, and even larger mislocations in hypocentral depths, calculated from a global seismic network and using the standard IASPEI91 travel times can be effectively removed by applying source-specific station corrections. In addition to that, we also show that the application of source-specific station corrections reduces significantly the sensitivity of the location algorithm to the inclusion or exclusion of critical stations in the data set used.

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Track Classification: Theme 1: The Earth as a Complex System