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Comparison of manual and automatic onset Time picking for local earthquake in North Eastern Italy.

D. Spallarossa (1), L. Tiberi (2), and G. Costa (2)
(1) University of Genoa, DipTeris, Genoa, Italy (daniele@dipteris.unige.it), (2) University of Trieste, DST, Trieste, Italy

Automatic estimates of earthquake parameters continues to be of considerable interest to the seismological community. The automatic processing of seismic data, whether for real-time seismic warning system or to reprocessing large amount of seismic recordings, is increasingly being demanded by seismologists. In this study is presented a new method used for automatic phase picking (P and S) which include envelope function calculation, STA/LTA detectors and AR picking algorithms based on the Akaike information criterion (AIC)
The main characteristics of the proposed picking algorithm are:
a) Pre-filtering and envelope calculation to prearrange the onset;
b) Preliminary detection of P onset using both the AIC based picker and the STA/LTA picker;
c) S/N analysis, P validation, filtering and re-picking;
d) Preliminary earthquake location;
e) Detection of S onset adopting the AIC based picker;
f) S/N analysis, S validation;
g) Earthquake location.
The algorithm is applied to a reference data composed by 200 events set with very heterogeneous qualities of P and S onsets acquired by South Eastern Alps Transfontier network from 01/01/2008 to 03/31/2008 in North Eastern Italy and surrounding regions.
These data are collected through the use of the software Antelope, an integrated collection of programs for data management and seismic data analysis.
The reliability and robustness of the proposed algorithm is tested by comparing manually derived P and S readings (determined by an experienced seismic analyst), serving as reference picks, with the corresponding automatically estimated P and S arrival times.
An additional analysis is comparing these automatic picks with the ones produced by Antelope, which used only STA/LTA detectors and finally studying the effect of these different set of arrival times in the resultant localizations for each database event.
Preliminary results indicate that seismic detectors which integrate different techniques could improve the stability of the automatic picking, compared to the traditional ones with only one method of picking detector.