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Automated Determination of P-Wave Arrival Times Using Higher Order Statistics

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Due to the continuously increasing amount of digital, seismological data, automatic localication of seismic events becomes more and more important. The main difficulty is the automatic identification and precise determination of P- and S-wave arrival times. Here we present an algorithm based on higher order statistics for the automated determination of P-onsets of local and regional seismic events. Using the 4th central moment, a characteristic function is calculated, on which the ”picker” is applied. Important is the automatic estimation of the quality of the P-onset. In order to get rid off false P-readings, several algorithms are applied to single station as well as to the finishing multy station processing.

The robustness and reliability of the automatic has been tested on a very heterogeneous data set of the temporary, regional seismological network EGELADOS, using manual P-readings, which serve as reference picks, as well as by a comparison with the Allen- and the Baer- & Kradolfer-picker. The accuracy and the speed of the presented automatic makes this processing scheme to an option for the implementation into a near-real time processing, e.g. for earthquake early-warning systems.