



Automated Event and Phase Identification

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We present algorithms for automated event identification, pre-location, and P- and S-arrival time determination. Based on STA/LTA-detections of the single station trigger, theoretical relative travel times of predefined master events are compared to observed relative travel times using a grid search algorithm. The determined STA/LTA-values are weighted for epicentral distance. If a defined number of stations satisfy the theoretical conditions within a certain error tolerance, a seismic event is declared, with the pre-location taken from the master event.

Based on this pre-location the time series containing the events are cut from the continuous data stream for automatic P- and S-arrival time determination. While the P-onset is determined using the Akaike Information Criterion (AIC) and higher order statistics, the S-onset is determined using AIC and autoregressive prediction of the waveform.

The procedure is tested on a large sub-data set of the regional, temporary EGELADOS seismic network, monitoring the seismicity of the entire Hellenic subduction zone for 18 months. The results of the automated picking routines are compared to established picking algorithms to verify the robustness and reliability of the proposed routines.