Waveform Cross-Correlation and Relocation of Seismicity in Western Corinth Rift

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Earthquake generation with similar seismic parameters results elastic waves with similar waveforms. These earthquakes are called similar or doublets, while larger clusters are called multiplets. The occurrence of such clusters improves the study of the spatial distribution of hypocenters, as the similarity information can be used for a high-resolution hypocentral relocation. The double-difference method implemented in the algorithm HYPODD was adopted in this study. Both catalog and waveform cross-correlation data were used, resulting to the best possible relocation. Moreover, a master-event procedure, based on waveform similarity, was implemented and used for the semi-automatic correction of arrival times in data derived from an automatic picking algorithm. The double-difference method minimizes errors caused by unmodeled velocity structure and arrival time reading errors. Furthermore, wide clusters of hypocenters are grouped in separate smaller clusters of high correlated events, when cross-correlation data is used. These methods were applied in data acquired from a local seismological network in the area of the Western Corinth gulf for a time period of 4 years, where a total of 10370 events were relocated. The relocation improved the spatial distribution of the seismicity in the wider area as well as within a thick cluster of events whose epicenters were distributed in an area of 5x5km$_2$ in the vicinity of the station AIO during the time period of February-July 2001.