PRECISE RELOCATION OF RECENT SEISMIC SEQUENCES IN THE APENNINES (ITALY) USING CROSS-CORRELATION PROCEDURES

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A relative earthquake location procedure is used to image aftershocks distribution of seismic sequences occurred recently in Italy and recorded by dense temporary seismic networks. Cross-correlation techniques provide both identification of similar event families and precise differential phase arrivals picks. We applied the method on large datasets of 3-components seismic recordings of mainshocks-aftershocks sequences (Reggio Emilia 1996 Mw=5.4, Colfiorito 1997 Mw=6.0). The spatio-temporal evolution of seismicity during both sequences shows clustering of aftershocks outside mainshocks rupture extension, spurring to better investigate the relation between main faults and aftershocks through an accurate event relocation. The method provides the degree of similarity within clusters, checking for families of doublets (multiplets), taking also into account site effects at different stations. High precision relative picking for each pair of similar event is subsequently estimated. Relative earthquake location procedures are then performed to obtain fine scale resolution of structures. We obtain picking precision ranging from ±2ms to ±10 ms, whereas accuracy strongly depends from cross-correlation value of doublets. Relative relocation of clusters reduces both vertical and horizontal errors to 10-100 meters. We show that relocated hypocenters enlighten a high degree of geometric complexity, where differently oriented fault planes are observed.