Geophysical Research Abstracts, Vol. 9, 04631, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-04631

Cluster analysis as a tool for automatic processing of arrival times and event location

B. Schurr

Comprehensive Nuclear-Test-Ban Treaty Organization, Austria

(bernd.schurr@ctbto.org / Fax: +43 1 26030 5874 / Phone: +43 1 26030 6442)

Bursts of high seismicity as in aftershock sequences following large earthquakes or extreme swarm activity accompanying thermal events are particularly stressful for any automatic and interactive analysis system used for timely, routine bulletin production. Events in such sequences are closely co-located relative to the global, sparse International Monitoring System (IMS) network and often have similar source mechanisms resulting in similar waveforms at remotely observing seismic stations. This property can be exploited to categorize event groups into clusters based on their waveforms and automatically determine precise intra-cluster relative arrival times through cross-correlation. Such cluster analysis not only unburdens human analysts but may also lead to more precise event locations or even produce additional input for event characterization used in event screening. We explore the feasibility of such processing by analyzing two exemplary event sequences: (1) The 2005 Da'Ure, Ethiopia, volcanic rifting sequence that produced some 230 events of moderate magnitude (mb 3.5-4.8) in the Reviewed Event Bulletin (REB); a majority of these events occurred within a few days. (2) The aftershock series following the large Mw 7.0 Mozambique earthquake of February 2006, amounting to roughly 100 REB events (mb 3.4-5.1). The majority of the IMS data used in the analysis of both sequences is from teleseismic distances.

To obtain a more global perspective on the frequency and distribution of repeating events, we also search the International Data Centre's database for co-located events with highly correlating waveforms at single IMS stations.