Geophysical Research Abstracts, Vol. 9, 09796, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-09796

Rapid Wavelet Estimation of Earthquake Magnitude for Seismic Early Warning

F. Vallianatos (1), G. Hloupis (1,2), J.Stonham (2)

(1) Laboratory of Geophysics & Seismology, Technological Educational Institute of Crete,Romanou 3, Chalepa, 73133, Chania, Crete, Greece, (2) Department of Electronic and Computer Engineering, Brunel University, Uxbridge, UB83PH,UK

(fvallian@chania.teicrete.gr / Fax: +302821023005 / Phone: +302821023016)

Nowadays Earthquake Early Earning Systems (EEWS) provide us a valuable field-piece in the arsenal of earthquake mitigation. An EEWS must rapidly detect the earthquake initiation producing alert before the forthcoming ground shaking. The basic attribute that must be calculated is the magnitude. Many researchers developed efficient methods on magnitude estimation based on information derived from P-waves usually by calculating the predominant frequency of the examined portion of the seismogram (several seconds after P-wave arrival).

Our proposal, altered from the prementioned, based on wavelet transforms (WT). We decomposed each seismogram using redundant wavelet transformation in order to gain the most accurate wavelet representation. From the components at each wavelet scale we calculated a characteristic value and this one correlated with the local magnitude by using least square fitting of regression lines. Two points that enrich our approach is the use of time-invariant WT (in order to eliminate the uncertainty of P-wave arrival) and the parallelism of the WT (in order to counterbalance the extra processing time from redundant WT).

Preliminary results of this method are very promising when we discriminate the earthquakes with epicenters upwards and under the Benioff zone since the majority of the stations that used in our analysis installed at Crete Island.

This work is partially supported by the project TALOS in the framework of the Crete Regional Operational Programme