



Rapid Earthquake Magnitude Estimation using Wavelets: Application for an Early Warning System in South Aegean

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Last years there is an increasing scientific interest for the development of efficient and reliable solution for the problem of rapid estimation of earthquake's basic characteristics such as magnitude and epicentre. Several successful approaches in many areas (California, Japan, Italy) have been announced and even if they cannot behave as universal approaches the fact is the all the involved researchers understand that this problem will have a rigid solution very soon.

Under this scope we present our approach for the estimation of earthquake's magnitude using wavelets. Since it is not a new idea our contribution to knowledge is that the proposed approach uses prototype wavelet transforms and is oriented to the Hellenic Seismological Network of Crete (HSNC) which is built and operated last 4 years by the Laboratory of Geophysics & Seismology (LGS) of TEIC.

The majority of studies for magnitude estimation based on the fact that valuable information could be 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, based on wavelet transforms (WT) decomposed each seismogram using redundant wavelet transformation in order to gain the most accurate wavelet representation. Analysis suggests that the last two scales of wavelet coefficients provide valuable data for magnitude estimation. Calculation of critical parameters for each station is performed followed by an evaluation of real time data. Also a first approach

to apply this method to a cluster-like environment in order to decrease processing time is presented.

Preliminary results of this method are very promising (i.e after Mw=6.2, 6/1/2008 Leonidio earthquake) 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 and apply distance correction.

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