Wavelet Epicentral Estimation (WEpE) : a real time location estimation using two station subarray

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Traditional approaches to standard earthquake location performed when all the phase arrival times (P and S mainly) for an event are available. The goal for an Earthquake Early Warning System (EEWS) is the use of a reliable method which can extract result as early is possible. For this reason the majority of the modern epicentral location methods focus on a solution that can be derived using only the P arrivals and if possible without waiting for triggering from three stations. A typical example is the application of Equal Differential Time formulation (EDT) among with the information from not yet arrived data to constrain hyperbolic surfaces on which the event can be located.

The aforementioned methods showed that it is possible to estimate epicentral location with accepted accuracy for an EEWS by using two stations and waiting the third in order to refine the result. Two problems that still are under investigation from the above methods are: (a) what is the time difference that the EEWS surcharged when one or more stations of the seismological network are not operational and (b) is it possible to increase the accuracy of the estimated by two stations epicentral ? For answering these problems we propose the use of WEpE which is a new method based on the combination of wavelet azimuth estimation and two stations subarray method.