

DEVELOPMENT OF A HYBRID EARTHQUAKE EARLY WARNING SYSTEM BASED ON SINGLE SENSOR TECHNIQUE

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Abstract:

There are two methods to earthquake early warning system: the method based on a network of seismic stations and the single-sensor method. Both have advantages and drawbacks. The current systems rely on high density seismic networks. Attempts at implementing techniques based on the single-station principle encounter difficulties in the identification of earthquake in noise. The noise may be very diverse, from stationary to impulsive. It seems a promising line of research to develop hybrid warning systems with single-sensors being incorporated in the overall early warning network. This will permit using all advantages and will help reduce the radius of the hazardous zone where no earthquake warning can be produced. The main problems are highlighted and the solutions of these are discussed. The system is implemented to include three detection processes in parallel. The first is based on the study of the co-occurrence matrix of the signal wavelet transform. The second consists in using the method of a change point in a random process and signal detection in a moving time window. The third uses artificial neural networks. Further, applying a decision rule out the final earthquake detection is carried out and estimate its reliability.

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