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Seismological and early warning activities of the SOSEWIN

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The Self-Organizing Seismic Early Warning Information Network (SOSEWIN) represents a new approach for Earthquake Early Warning Systems (EEWS) consisting of a dense mesh low-cost sensor network. In fact, this project can be considered to be the first attempt made by the early warning seismological community in taking advantage of novel wireless communication technologies, and to overcome problems of insufficient node density which typically affects present EEWS. The present contribution aims to introduce the seismological and early warning activities of SOSEWIN.

Ground motion is continuously monitored by conventional accelerometers (3-component) and geophones and analyzed using robust signal analysis methods by each sensing node of the network. The incoming signals are pre-processed by bandpass filtering and the detection processing is performed using an automatic STA/LTA trigger algorithm.

Signal attributes are iteratively estimated from the P-wave part of the recordings (e.g. PGAP, PGVP, PGDP and Cumulative Absolute Velocity) to determine if the earthquake is of sufficient magnitude to be of concern to issue a system alarm.

Differently from most of the existing EEWS where the alarming system relies on estimates provided by only a few seismic stations, the SOSEWIN is specifically designed to take advantage during the “event detection” and “appropriate issuing of alarms” stages of the redundancy of real time ground motion information available, thanks to the dense wireless mesh network. All these strategies are devoted to minimize the

occurrence of false alarms while maximizing the early warning time.

Finally, a procedure for an almost real-time event localization, based on the implementation of standard array-seismological analysis, is proposed. This step in the real time analysis will provide important information for the subsequent alert and shake maps computation.