



## **State of the art development of a real time system for earthquake emergency management in Romania**

Constantin Ionescu, Alexandru Marmureanu, and Liviu Manea  
National Institute for Earth Physics (NIEP), Bucharest, Romania

Earthquake represents a major natural disaster. The main problem after the occurrence of a strong earthquake is to minimize the total number of fatalities. As a consequence, a rapid early warning system was developed in Romania that provides a 25-32 seconds warning time to Bucharest facilities for Vrancea earthquakes.

The Rapid Earthquake Warning System (REWS) was developed for Southern part of Romania and for Northern part of Bulgaria. A Rapid Earthquake Warning System provides few to tens of seconds of advanced warning time of impending ground motions, allowing mitigation actions to be taken in the short term, immediately after the strong motion occurs. The information is the key point in the disaster management, and the communication system is one of the most important component. After a strong earthquake is detected in the epicenter area, REWS (Romanian Earthquake Early Warning System) will generate an alarm notification, AlertMap, computation of the parameters of earthquakes, ShakeMap and loss estimation. All these are generated by the Romanian and Bulgarian data centers, in parallel. Warning message containing the necessary parameters are sent to local emergency centers via a software module for notifications.

The above mentioned module provides notifications for all the existing subscribers related to the seismic events detected by the acquisition and evaluation modules. In the first step, the user notification message center module uses the computed real-time parameters of the detected events and a set of customizable rules to generate messages that contains the parameters of the events. Then the messages are sent by using specific channels of communication, in order to be received by the user.

The system produces different types of notifications: visual, audible, SMS, email and web page content customized for the user. All notifications are issued based on predefined conditions such as recipient's needs and are based on user's criteria. All notifications that are sent by the system are logged in order to maintain their traceability.