Geophysical Research Abstracts,
Vol. 10, EGU2008-A-07275, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-07275
EGU General Assembly 2008

Generation of alert and shake maps from data provided by the Self-Organising Seismic Early Warning Information Network

K. Fleming (1) and the SAFER and EDIM Work groups (1,2)

(1) Section 2.1 Earthquake Risk and Early Warning, GeoForschungsZentrum Potsdam, Germany, and (2) the Department of Computer Science, Humboldt-Universität zu Berlin, Berlin, Germany (kevin@gfz-potsdam.de)

Alert maps provide predictions of peak ground motion, based on recordings by stations closest to an earthquake, for areas that have not yet been reached by the initial P waves. The predictions are made using empirical relationships between ground motion, earthquake magnitude and distance, and are updated at regular time intervals (of the order of seconds) as more stations are triggered. Their role is to provide a "predicted alert" to more distant stations, since the transmission would be faster than the seismic waves themselves, allowing extra warning or lead time. A *shake map* on the other hand describes the spatial variability of the peak ground motion that arose during an earthquake, and can only be produced once it has finished and the relevant wave phases have passed through the area of concern. While alert maps are incorporated into earthquake early warning and alert protocols (that is, they are effectively only "maps" to the seismic network), shake maps may be utilised by a variety of end users, including disaster response authorities, the media and the general public.

A Self Organising Seismic Early Warning Information Network (SOSEWIN) that consists of large numbers of low-cost sensors with the capability to automatically rearrange their communications scheme is being developed, and will include alert maps in its early warning protocols. The SOSEWIN is organised such that it is divided into clusters of sensor nodes (SN), headed by a leader node (LN). After an earthquake has been detected, its principle characteristics (location, magnitude) are estimated by the

LNs using data from the triggered sensors. Using these estimated characteristics, predictions of peak ground motion (PGA, PGV etc.) are made and the decision then taken as to weather to issue an alert to as yet untriggered areas (while taking into account issues such as surficial geology for the areas of interest).

The SNs and LNs will also produce files describing the peak ground motion, in the case of the LNs, this file will include all sensors within its influence. From these files, shake maps will be produced, in a manner that is compatible with the USGS program ShakeMap. While ShakeMap is effectively an advanced interpolation tool, the denser nature of the SOSEWIN means that there will be less dependence upon the interpolation schemes used.

SOSEWIN is being developed as part of the SAFER (Seismic eArly warning For EuRope) and EDIM (Earthquake Disaster Information systems for the Marmara Sea region, Turkey) projects.