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# An empirical approach for real-time earthquake damage assessement: an alternative of shake maps

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The production of reliable shake maps in real time is not always possible, e.g. due to lack of adequate data or of trustable relations between ground acceleration and elements of the macroseismic field. Then, an alternative is proposed: the rapid production of the expected macroseismic field, within few minutes after focal parameters of an earthquake have been determined, on the basis of empirical relations between focal parameters and elements of the macroseismic field such as maximum seismic intensity, Im, and area, Si, defined by isoseismal of degree i. The purpose of this research initiative is the implementation of the results for early warning as regards the impact of strong earthquakes immediately after their occurrence. A data set of about 147 shallow, instrumental earthquakes that occurred in Greece from 1911 up to the end of 90's has been compiled and empirical relations were investigated between earthquake focal parameters on one hand and Im and Si on the other. The focal depth as well as the epicentral location are critical parameters in this procedure. However, reliable focal depth determinations are available only for the last 15 years or so. On the other hand, the geomorphological configuration of Greece makes the earthquake impact very sensitive to the epicentral distance. In fact, all the other parameters being equal the impact is quite different for inland, coastal and open-sea earthquake sources. For these reasons a simplified distance-from-the-coastline criterion is introduced and employed in order to classify the earthquakes in three distinct classes: inland, coastal and open sea, respectively. The data set compiled indicates that for strong earthquakes the meizoseismal extends at a radius of no more than 30 km from the epicentre. Therefore, the class of coastal earthquakes includes those having their epicentres at a distance of no more than 30 km from the closest coast. Then, for each one of the three classes of earthquake events simple linear regressions and multiple regressions were tested and the optimum relations were found. The best relations were validated by testing with data of the last about 15 years. A first application in historical earthquakes indicates realistic results. We show how the results could be implemented in near real-time conditions for early warning purposes. This is a contribution to the EU research project SAFER, contract n. 036935, FP6-2005-Global-4, Reduction of seismic risks.