



Ways to increase the reliability of earthquake loss estimations in emergency mode

Nina Frolova (1), Jean Bonnin (2), Valeri Larionov (3), and Aleksander Ugarov (4)

(1) RAS, Seismological Center of IGE, Moscow, Russian Federation (frolova@escr.ru), (2) Institut de Physique du Globe, University of Strasbourg, Strasbourg, France, (3) Extreme Situations Research Center, Moscow, Russia, (4) Extreme Situations Research Center, Moscow, Russia

The lessons of earthquake disasters in Nepal, China, Indonesia, India, Haiti, Turkey and many others show that authorities in charge of emergency response are most often lacking prompt and reliable information on the disaster itself and its secondary effects. Timely and adequate action just after a strong earthquake can result in significant benefits in saving lives and other benefits, especially, in densely populated areas with high level of industrialization.

The reliability of rough and rapid information provided by “global systems” (i.e. systems operated without consideration on wherever the earthquake has occurred), in emergency mode is strongly dependent on many factors dealt with input data and simulation models used in such systems.

The paper analyses the different factors contribution to the total “error” of fatality estimation in emergency mode. Examples of four strong events in Nepal, Italy, China, Italy allowed to make a conclusion that the reliability of loss estimations is first of all influenced by the uncertainties in event parameters determination (coordinates, magnitude, source depth); this factors’ group rating is the highest; as the degree of influence on reliability of loss estimations is equal to about 50%. The second place is taken by the factors’ group responsible for macroseismic field simulation; the degree of influence of the group errors is about 30%. The last place is taken by group of factors, which describes the built environment distribution and regional vulnerability functions; the factors’ group contributes about 20% to the error of loss estimation.

Ways to minimize the influence of different factors on the reliability of loss assessment in near real time are proposed. The first one is to determine the rating of seismological surveys for different zones in attempting to decrease uncertainties in the earthquake parameters input determination in emergency mode. The second one is to “calibrate” the “global systems” drawing advantage from knowledge bases on past events in order to minimize the influence of other two factors’ groups “field” and “vulnerability”.