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Application of the loss estimation tool QLARM in Algeria

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During the last six years, WAPMERR has used Quakeloss for real-time loss estimation for more than 440 earthquakes worldwide. Loss reports, posted with an average delay of 30 minutes, include a map showing the average degree of damage in settlements near the epicenter, the total number of fatalities, the total number of injured, and a detailed list of casualties and damage rates in these settlements. After the M6.7 Boumerdes earthquake in 2003, we reported 1690-3660 fatalities. The official death toll was around 2270.
Since the El Asnam earthquake, seismic events in Algeria have killed about 6,000 people, injured more than 20,000 and left more than 300,000 homeless. On average, one earthquake with the potential to kill people (M>5.4) happens every three years in Algeria.
In the frame of a collaborative project between WAPMERR and CRAAG, we propose to calibrate our new loss estimation tool QLARM (qlarm.ethz.ch) and estimate human losses for future likely earthquakes in Algeria. The parameters needed for this calculation are the following. (1) Ground motion relation and soil amplification factors (2) distribution of building stock and population into vulnerability classes of the European Macroseismic Scale (EMS-98) as given in the PAGER database and (3) population by settlement. Considering the resolution of the available data, we construct 1) point city models for cases where only summary data for the city are available and, 2) discrete city models when data regarding city districts are available.
Damage and losses are calculated using: (a) vulnerability models pertinent to EMS-98 vulnerability classes previously validated with the existing ones in Algeria (Tipaza and Chlef) (b) building collapse models pertinent to Algeria as given in the World Housing Encyclopedia and, (c) casualty matrices pertinent to EMS-98 vulnerability classes assembled from HAZUS casualty rates. As a first trial, we simulated the 2003 Boumerdes earthquake to check the validity of the proposed models. Values of reported fatalities and injured were within the range of the calculated ones.
We propose to perform an overall tool calibration by simulating other past events in Algeria in the period 1990-2003. Then, we will generate earthquake loss scenarios by including discrete city models for the largest cities in the Northern part of Algeria.