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Evaluation of seismic hazard at the northeastern part of Algeria

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The objective of this paper is to analyze the seismic activity and the statistical treatment of seismicity catalog the Constantine region between 1357 and 2014 with 7007 seismic event. Our research is a contribution to improving the seismic risk management by evaluating the seismic hazard in the North-East Algeria. In the present study, Earthquake hazard maps for the Constantine region are calculated. Those maps are estimated in term of spectral acceleration (SA), at periods of 0.1, 0.2, 0.3, 0.4, 0.5, 1.0, 1.5 and 2.0 sec. We proposed five sismotectonique zones. Four steps are necessary: (i) identification of potential sources of future earthquakes, (ii) assessment of their geological, geophysical and geometric, (iii) identification of the attenuation pattern of seismic motion, (iv) calculation of the hazard at a site and finally (v) hazard mapping for a region. In this study, the procedure of the earthquake hazard evaluation recently developed by Kijko and Sellevoll (1992) is used to estimate seismic hazard parameters in the northern part of Algeria. The new method differs from the conventional one because it incorporates the uncertainty of earthquake magnitude, and accepts mixed data containing large historical events and recent complete catalogue. The importance of the method lies in its ability to estimate from incomplete and uncertain data files the parameter b of the Gutenberg-Richter relationship, the annual activity rate I of event and the maximum possible magnitude m_{max} . In this method, the earthquake process is considered to be of the Poisson type with an annual activity rate I , and with a doubly truncated exponential distribution of earthquake magnitude with parameter b . To realize and visualize the modeling of seismic input in Urban Areas, assessment of seismic hazard and the Establishment of a Northeast Algerian seismicity catalog, graphs and maps were designed using a geographic information system (GIS), the Z-map code version 6 and Crisis software 2007 version.

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