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Using Seismic and GPS Data for Hazard Estimation in Some Active Regions in Egypt

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Abstract : Egypt rapidly growing development is accompanied by increasing levels of standard living particular in its urban areas. However, there is a limited experience in quantifying the sources of risk management in Egypt and in designing efficient strategies to keep away serious impacts of earthquakes. From the historical point of view and recent instrumental records, there are some seismo-active regions in Egypt, where some significant earthquakes had occurred in different places. The special tectonic features in Egypt: Aswan, Greater Cairo, Red Sea and Sinai Peninsula regions are the territories of a high seismic risk, which have to be monitored by up-to date technologies. The investigations of the seismic events and interpretations led to evaluate the seismic hazard for disaster prevention and for the safety of the dense populated regions and the vital national projects as the High Dam. In addition to the monitoring of the recent crustal movements, the most powerful technique of satellite geodesy GPS are used where geodetic networks are covering such seismo-active regions. The results from the data sets are compared and combined in order to determine the main characteristics of the deformation and hazard estimation for specified regions. The final compiled output from the seismological and geodetic analysis threw lights upon the geodynamical regime of these seismo-active regions and put Aswan and Greater Cairo under the lowest class according to horizontal crustal strains classifications. This work will serve a basis for the development of so-called catastrophic models and can be further used for catastrophic risk management. Also, this work is trying to evaluate risk of large catastrophic losses within the important regions including the High Dam, strategic buildings and archeological sites. Studies on possible scenarios of earthquakes and losses are a critical issue for decision making in insurance as a part of mitigation measures.

Keywords : b-value, Gumbel distribution, seismic and GPS data, strain parameters
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