SnT 2025 8 SEPTEMBER ONLINE DAY 9 TO 12 SEPTEMBER AT HOFBURG PALACE, VIENNA & ONLINE
CTBT: SCIENCE AND TECHNOLOGY CONFERENCE

Up to date probabilistic seismic hazard assessment for North Africa zones

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INTRODUCTION AND MAIN RESULTS

This poster introduces an updated probabilistic seismic hazard model for North Africa, using an earthquake catalogue from 112 BC to 2024 AD and a seismotectonic model. Hazard is computed on a 0.5°×0.5° grid for PGA and periods (0.2s, 1.0s, 2.0s) at 475 and 2475 year return periods. The percentile hazards spectra and deaggregation charts are plotted. The highest PGA in the Gulf of Aqaba (0.27g) ,Aswan (0.18g) and Morocco (0.12g); lower in Algeria, Libya and Tunisia.

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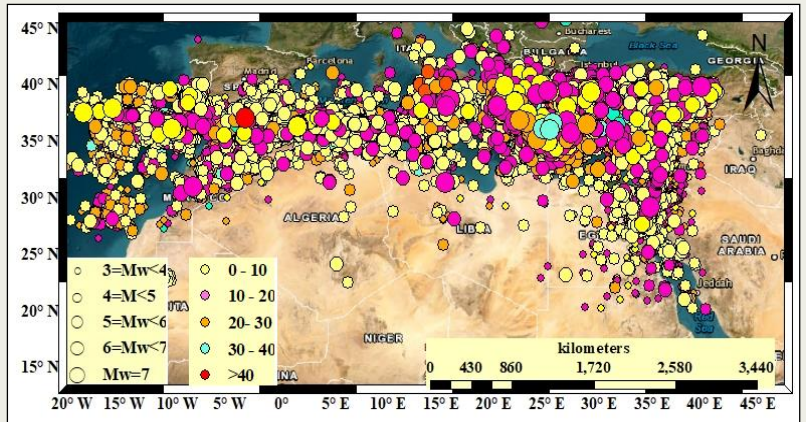
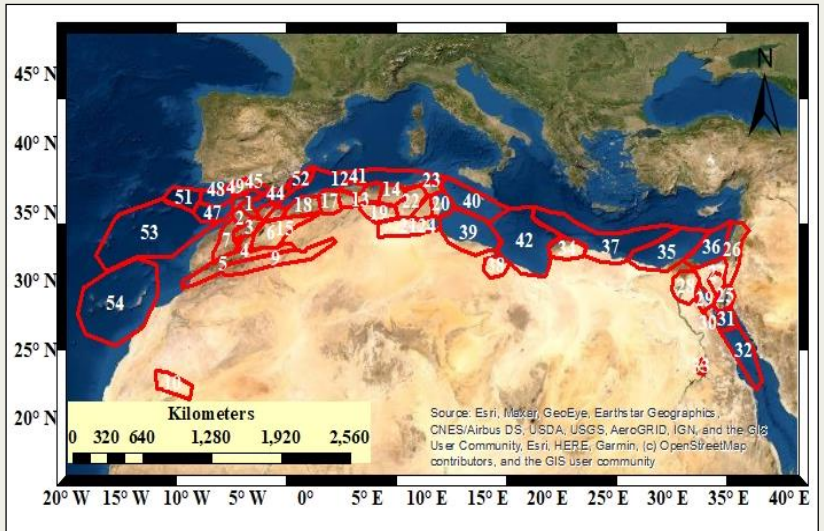
Introduction

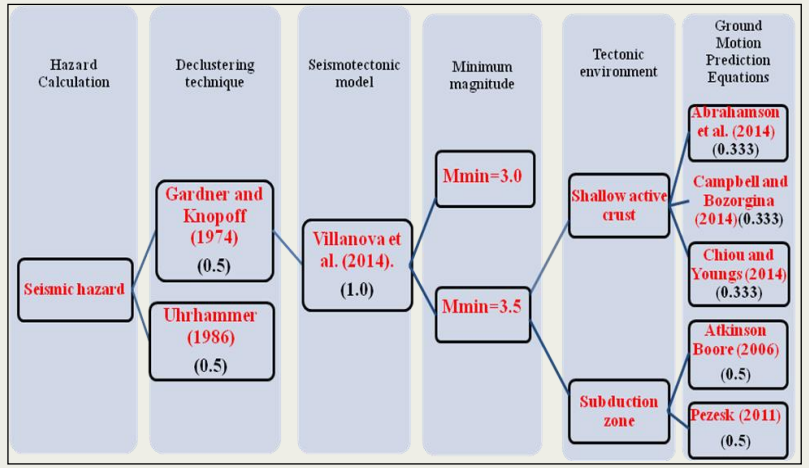
- The current analysis makes use of an accurate and realistic earthquake inventory that covers the period from 112 BC until 2024 AD. A single seismotectonic model is utilized to depict the Africa's North and its surrounding regions' seismic activity.
- An evaluation of the hazards is conducted for a (0.5x0.5) grid at 0.2, 1.0, and 2.0-s periods and PGA. For two return periods (475 and 2475 years), the hazard is investigated to be 10 and 2% probably to be exceeded in 50 years, respectively.
- The uniform percentile hazards spectra for rock sites and deaggregation charts during 10 and 2% probably to be exceeded in 50 years for the five North African capitals at various time periods are plotted. Conventional seismic hazard mapping,



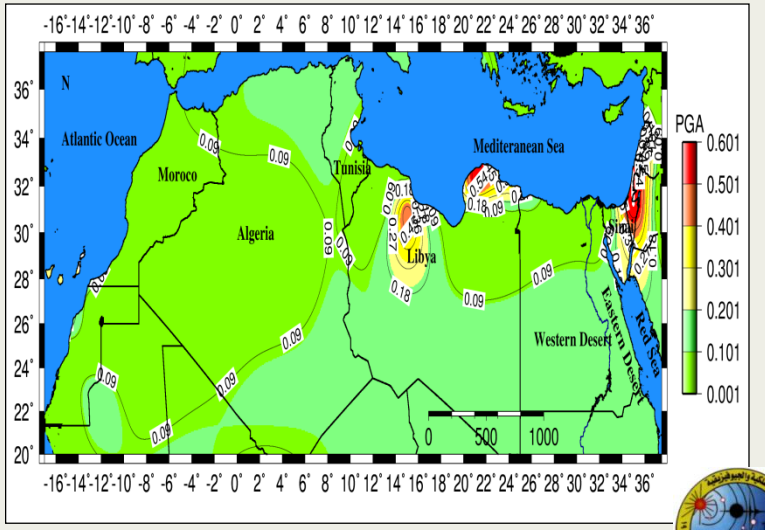
Methods/Data

- Earthquake hazard analysis has been performed for the North Africa using (PSHA). we use a catalogue, from112 BC until 2024 AD and includes all the earthquakes with M>= 3.
- One seismotectonic model is used by **Villanova et al. (2014) .**
- Different GMPEs are implemented to produce rock-site hazard for the PGA and 5% spectral acceleration at (0.2, 1.0, and 2.0 s) for return period 475 and 2475 years..
- The uniform percentile hazards spectra for rock sites and deaggregation charts during 10 and 2% probably to be exceeded in 50 years are performed.





Results



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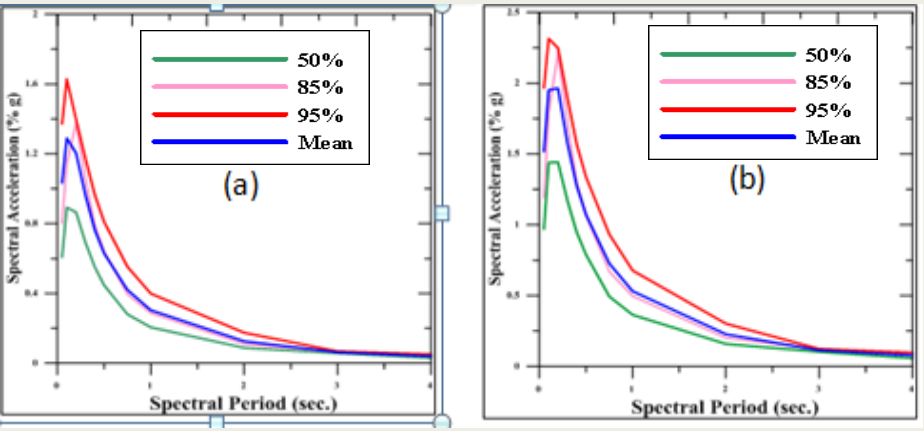
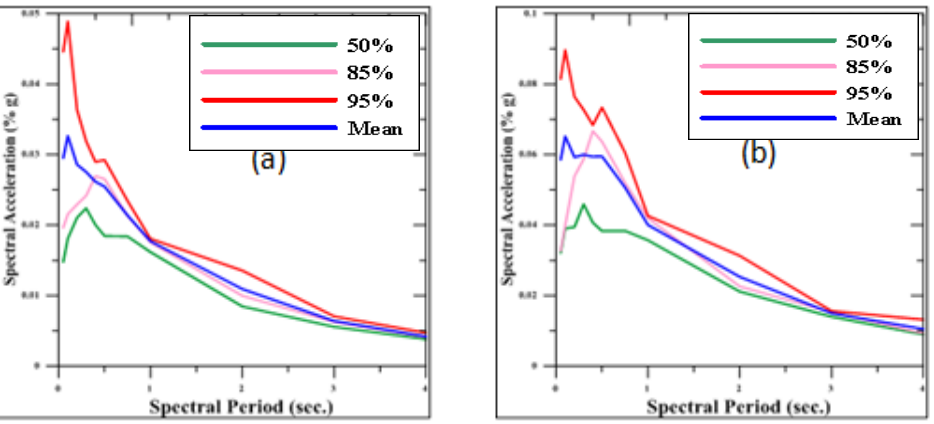
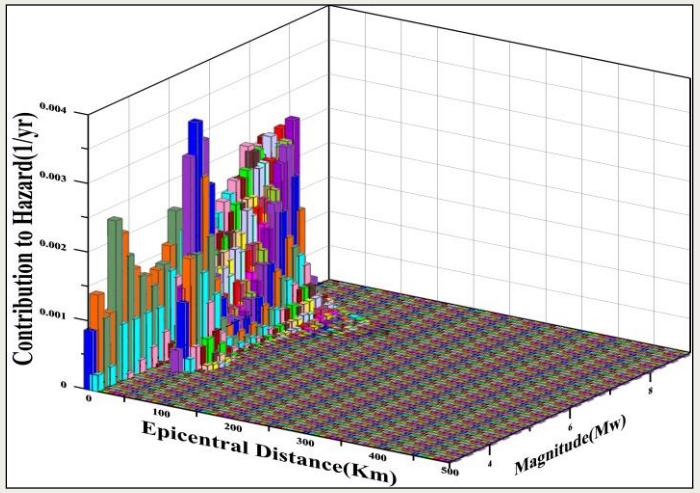
Result



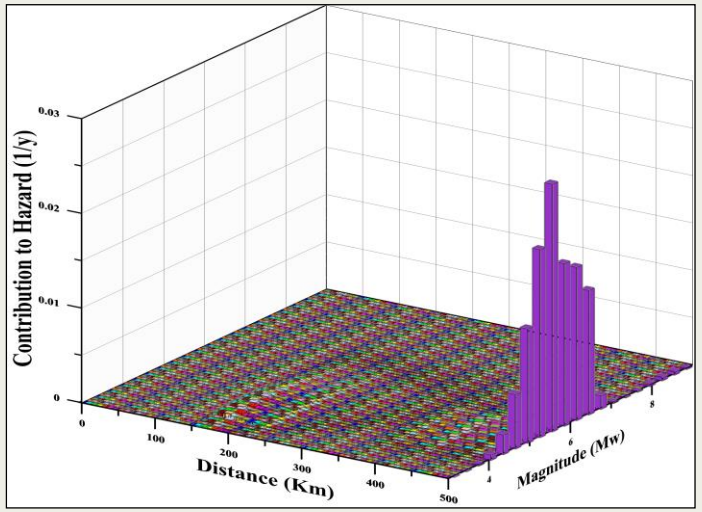
Percentile distribution in Algeria for (a) 475 , (b) 2475 years return period



Percentile distribution in Morocco for (a) 475 , (b) 2475 years return period



Deaggregation of Algeria at PGA 475



Deaggregation of Morocco at PGA 475

Conclusion

- Earthquake hazard assessment plays the most interesting role in minimize earthquake risks and to help the future safe improvement of cities. Each building code of any area must be upon on an earthquake hazard analysis that involves the seismic zoning maps and the ground motion design values.
- Based on the iso-acceleration contour maps, the Northern eastern region of North Africa has the greatest ground motion values, while the western and southern regions have the lowest values. For engineers and investors, these hazard contour maps are critical since they serve as the foundation for designing structures that capable of withstanding earthquakes, such as nuclear power plants, dams, waste disposal depositories, etc.
- The PGA map is only taken into account for 475 years by the Egyptian Building Code. It is noted that the PGA values for 475 years calculated in this research for the Gulf of Aqaba's western coast are comparatively greater than the 0.05g levels listed in the Egyptian Building Code. We argue these differences to the Egyptian Building Code and other to utilize of recent GMPEs which were developed in 2014.