

***Interactive comment on* “Evaluation of global seismicity along Northern and Southern hemispheres” by Olaide Sakiru Hammed et al.**

Anonymous Referee #5

Received and published: 26 June 2020

The authors propose to evaluate and analyze the Gutenberg- Richter b-value parameter and the focal depth distribution with the aim of classifying which zones, between Northern and Southern hemispheres, will be more earthquake-prone. They conclude that the Southern hemisphere will result in a higher rate of earthquake occurrence, and that the lithospheric plates around the equator are unstable.

Despite the argument discussed is of wide interest, this work presents several basic problems that cast doubts upon the results obtained.

The b-value parameter estimation is subject to several sources of bias that would lead to erroneous interpretation in physical terms. For example, the completeness magnitude, the number of events and the binning of magnitudes have been proved to highly influence the estimation of this parameter (see Marzocchi et al., 2019). In the present

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paper the authors do not clearly and exhaustively discuss the b-values they obtained, neither how they would be influenced by the potential sources of bias. It would be interesting to compare the estimates presented in the paper with those obtained by the more classical and most used Aki's maximum likelihood method. A detailed discussion about the completeness magnitudes should also be included, since in the present manuscript it is not discussed at all.

The study area considered for the analysis is really very wide, and a segmentation to smaller zones could lead to different results. Furthermore, several geographical regions, scenario of very strong earthquakes, such as Japan and California, are not included. It would be interesting to repeat the analysis also for these latitudes.

The statistical methodologies applied are limited, and a cutting-edge analysis would benefit the robustness of the results obtained.

In my opinion, authors come to poor conclusions that, on their own, do not have a relevance such to justify publication. For all these reasons, I recommend rejection.

References: W. Marzocchi, I. Spassiani, A. Stallone, and M. Taroni. How to be fooled searching for significant variations of the b-value. *Geophysical Journal International*, 11 2019. ISSN 0956-540X. doi: 10.1093/gji/ggz541. URL <https://doi.org/10.1093/gji/ggz541>.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2020-128>, 2020.

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