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Comment on nhess-2022-46

Alexandra Carvalho (Referee)

Referee comment on "Quantifying the probability and uncertainty of multiple-structure rupture and recurrence intervals in Taiwan" by Chieh-Chen Chang et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2022-46-RC4>, 2022

There is a need that the fault ruptures complexities be accurately represented in hazard models, as in most PSHA studies the multiple-fault rupture is neglected.

Being so, this manuscript addresses an updated problem and a discussion theme that should be debated among the scientific community.

Nevertheless, theories or new approaches and assumptions should rely on physical processes and need to incorporate the comprehension of the reality and I have some doubts about validity of some assumptions, namely:

- what is the meaning of summing slip rates of the different faults?
- Why the distance between two faults must be less than 5 km? is there any evidence that there is no Coulomb stress transfer for distances greater than 5 km that can trigger a fault? I could recommend a little more discussion on this issue.

The title "Quantifying the probability and uncertainty" do not reflect the content of the paper, in my opinion, as it leads to an expectation of a sensitivity study on key parameters that might have impact on results. The only parameters changed were the Coulomb stress and the structure rake angle. Are there any other parameters that can affect results? Were these parameters chosen because they are the ones with the most impact? I was expecting a more exhaustive study on that.

Finally, I would suggest a different way to present so many and so similar equations, as it

become difficult and not very interesting to follow.