

Interactive comment on “Distributed faulting following normal earthquakes: reassessment and updating of scaling relations” by Maria Francesca Ferrario and Franz Livio

Anonymous Referee #1

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This manuscript provides updated the conditional probability of the distributed rupture of the PFDHA model with compiled the distributed ruptures of the global normal faulting data. The PFDHA model of Youngs et al. (2003), which was based on the normal fault in the US has been used for the normal faulting PFDHA. The developments of normal faulting PFDHA model are required by new data set. The descriptions of the principal and distributed faults, and detailed distributed fault data, which are provided in this manuscript, are good references for the future development of the normal faulting PFDHA model, although the distributed fault displacement attenuation equation and PFDHA evaluations based on new compiled data are not available. This manuscript focused on the probability condition of distributed rupture. The processes of construct-

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ing the conditional probability, difference from previous models and possible reasons for differences. I would like the authors to several explanations.

Please see comments for detail. I hope these comments will be helpful.

Here are the comments that I would like the authors to explain for readers with interest of PFDHA.

1. The conditional probability of the distributed rupture

1-1. Why did the authors update only the conditional probability, not distributed fault displacement attenuation relation? 1-2. Petersen et al. (2011), who uses the power function, used linear interpolation as mentioned (l. 185-186). On the other hand, Youngs et al. (2003) and Takao et al. (2013), who use the exponential function used same to this paper, do not exclude the near range from the principal fault. Why do the authors need to exclude the range of 0-1km from the principal fault?

1-3. If your conditional probability excludes the distance range of 0-1km from the principal fault, I would like the authors to describe the calculation of the probability in this vicinity as Petersen et al. (2011).

2. As the authors mentioned (l. 217-220), conditional probability is obtained from the global data set. Is this the reason for the greater probability than that of Youngs et al. (2003)? In other words, is Youngs et al. (2003) used for the US PFDHA and is the conditional probability of this study used for the non-US PFDHA?

Here are the minor comments.

3. Title

It is difficult to understand the detail contents from the title. 'normal earthquake' is expressions that is rarely seen for me. Does 'scaling relation' mean a conditional probability?

4. Typo?

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FDHA -> PFDHA? (l. 63)

5. Caption of Table 1

22 earthquakes may be 21 earthquakes.

5. Eq.1 (l. 112)

Please add unit of x.

6. Figure 6(a)

Why is the yellow-colored range near the main fault in the figure different between the hanging wall and foot wall sides?

Interactive comment on Solid Earth Discuss., <https://doi.org/10.5194/se-2020-212>, 2020.