Dear Editor,

I have now completed my review of the manuscript "Correlation between the fractal of aftershock spatial distribution and active fault on Sumatra" by Bahary Setyawan and Benyamin Sapiie.

The methodologies adopted have a precedent in the scientific literature and the data can be assumed to be of sufficient quality for such an analysis however, I would like to suggest some notes to the Authors to improve the quality of the manuscript. Very important, moreover, is a necessary review of the quality of writing to achieve a level that is acceptable for publication.

I give an evaluation following the NHESS standard and guidelines for reviewing, and some points that I would like to suggest to the Authors to address in the revised version.

1) Does the paper address relevant scientific and/or technical questions within the scope of NHESS? Yes.

2) Does the paper present new data and/or novel concepts, ideas, tools, methods or results? New results.

3) Are these up to international standards? Yes.

4) Are the scientific methods and assumptions valid and outlined clearly? Scientific methods and assumptions are valid but not sufficiently clearly outlined throughout the manuscript.

5) Are the results sufficient to support the interpretations and the conclusions? The last point in the conclusions need to be explored in the discussions.

6) Does the author reach substantial conclusions? Yes

7) Is the description of the data used, the methods used, the experiments and calculations made, and the results obtained sufficiently complete and accurate to allow their reproduction by fellow scientists (traceability of results)? There are data and formula to reproduce calculations, but I think that the description of the data and some parts of the methodological section need to be rewritten to be sufficiently accurate.

8) Does the title clearly and unambiguously reflect the contents of the paper? Yes

9) Does the abstract provide a concise, complete and unambiguous summary of the work done and the results obtained? Yes.

10) Are the title and the abstract pertinent, and easy to understand to a wide and diversified audience? An explanation of fractal dimensions in the abstract is necessary to make it easy to understand to a wide and diversified audience.

11) Are mathematical formulae, symbols, abbreviations and units correctly defined and used? If the formulae, symbols or abbreviations are numerous, are there tables or appendixes listing them? Symbols need to be check.

12) Is the size, quality and readability of each figure adequate to the type and quantity of data presented? Yes.

13) Does the author give proper credit to previous and/or related work, and does he/she indicate clearly his/her own contribution? They cited the previous works, but I cannot see their individual contribution, I supposed to be equally distributed.

14) Are the number and quality of the references appropriate? References to support some statements need to be added.

15) Are the references accessible by fellow scientists? Yes

16) Is the overall presentation well structured, clear and easy to understand by a wide and general audience? No, the quality of the English, unfortunately, obscures many sentences.

17) Is the length of the paper adequate, too long or too short? I think it is adequate.

18) Is there any part of the paper (title, abstract, main text, formulae, symbols, figures and their captions, tables, list of references, appendixes) that needs to be clarified, reduced, added, combined, or eliminated? Appendix, which I think to be useful, need to be introduced in the manuscript, moreover explanations of what are figures and codes have to be given in the appendix itself.

19) Is the technical language precise and understandable by fellow scientists? Yes.

20) Is the English language of good quality, fluent, simple and easy to read and understand by a wide and diversified audience? No.

21) Is the amount and quality of supplementary material (if any) appropriate? Yes, but please introduce text to explain what is shown.

Detailed comments.

23) **Abstract**: Please, introduce a brief explanation of fractal dimensions to make it easy to understand to a wide and diversified audience.

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24) Line 18: Please specify what do you mean with "slip segmentation", it is not clear.

25) Line 20: I'd suggest to introduce here the figure1 with faults and seismicity to show the tectonics. Please, add also a wide tectonic scheme to introduce readers that are not-familiar with the region.

26) Line 21-22: Please, add the references to support this.

27) Line 25: the reference is Turcotte, 1997 (delete the name)

28) Line 28: Please, add the references to support that GR is considered as SOC.

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29) Line 4: I think it will be more clear than now if you remove ". In the same study the correlation between both fractal values is SOC, the equation being as follows" and just left ":".

30) Line 8: please specify what do you mean with "satellite faults".

31) Line 13: "This result is more affected by the large uncertainty relative to the variation of D_2.".Question1: More than what? Question2: is there a reference to support this statement? Or, if it is your idea, it has to be supported by a quantitative analysis.

32) Line 22-25: Please rephrase because it is not clear.

33) Line 25: "This catalogue has all the earthquake data with the magnitude above 4.5 M_w, starting from 1900 to 2016", Please add a reference or show a completeness analysis to support this statement.

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34) Line 2: "Active faults were identified based on morphology that had been carried out in previous studies." Please add a reference

35) Line 3: "The SFZ was divided into 42 segments, while the WAF was divided into 4 segments" Who did this segmentation? and what it is based on?

36) Line 4: Are there paleoseismological studies to support the activity of these faults?

37) Line 5: can you be sure this is not a bias due to the seismic network configuration? How did you select the aftershock? Is a time-radius magnitude dependent approach?

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38) Regarding the mainshocks shown in the Table 1. You stated that "This catalogue has all the earthquake data with the magnitude above 4.5 M_W, starting from 1900 to 2016", but there are only earthquakes after the 1967 (I suppose this is the beginning of the instrumental period). So, this table is a selection of events? And if so, please specify the reasons. Or these are just the earthquakes with a correlation? And in this case you should show all the results.

39) At line 3 you wrote : "Tab. 1 is a tabulation of the results of the identified aftershocks and the correlation result". It is not clear if Tab 1 list the mainshocks. Please, specify how you build this table.

40) Finally, please use the dot for decimals.

41) Eq2 and later: Please use the same letter for distance R or r. Or are them different?

42) Line 11-13: Please rephrase because, I think a verb is missing. It is not clear here, how D2 was estimated. Please consider to explain variables in the order they are presented.

43) Line 6: "Conversely, a small D2 value indicates a tight earthquake distribution.", please specify what do you mean with a tight earthquake distribution. It is not clear if you are referring to the epicentral distribution or something else.

44) Line 6: delete "Donald L. "

45) Line 7: The box-counting method is to make boxes in the aftershock cluster , please rephrase, because it is not clear.

46) Line 9: "length of the box (r)". This is the first time you mentioned length of box. Define all the parameters you are using to do your calculations.

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47) Line 6: please correct in: "Figure 2 shows". Specify that this is an example.

48) The C(r) value calculation was conducted by using Python 3.7 Python is a language, what do you mean? Is there a specific function that you used?

49) D_2 estimation has a fairly high level of biases due a lack of complete catalogue or limited number of data points. (Padhy et al., 2013). Can you give a quantitative analysis of this?

50) Line 8-9: "The estimations were performed multiple times in several points to find a lower error value as done by Nanjo & Nagahama (2004)", please specify lower than what.

51) Here you are introducing "points" for the first time. What are them? They are numbered, but you do not specify what is the range. Please specify what these points are and, if possible, add them in figures.

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52) Line 10: "We found three correlations and two earthquake occurrences that did not follow the three correlations (Tab. 1 and Fig. 4)", do you mean that "Basing on values of slopes and intercepts of Do versus D2, we identified 3 groups of D2-D0. For the first group, we calculated a correlation with a slope greater or equal than 1.6 and an intercept of X.X. For the second group, we calculated a correlation with a slope greater or equal than xxx and an intercept of X.X.....? Please, rephrase this sentence because it is not very clear.

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53) Line 7: However, that study was outside of our scope. What do you mean?

54) Line 8: "The results obtained are relatively similar, but there is a significance difference in Oreng and Aceh-Center segment. It is due to differences in the morphological interpretation of active faults in that segments. Please, discuss in detail what are the reasons for such a differences, and how you define if they are significant or not.

55) Line 13: "The third and the first correlation show a nearly identical value with only 0.06 differences". Please specify which value, I think it is the slope, but you should be clear.

56) Line 13: " A significant difference in the intercept shows the scale variation". What do you mean with scale variation?

57) Line 15: We estimated b-value variation for both correlation 1 and 3 to find out whether there was an influence of the value (Tab. 2). How do you calculate the b? in table 2 you show b value much higher than 1-1.2, this is quite strange and needs to be explained in detail. Is that the b- of the sequence? Please specify in detail your computation

58) Line 18: "Different catalogue also did not show significant differences." For example, b-value moves from to 2 to 1.3, is that not significant?

59) Line 18-21: The number of the aftershock looked quite significant. In correlation 1, the number of aftershocks was above 18, whereas in the third the opposite occurred. However

this result also cannot strongly explained why there was a scale difference in the number of aftershocks generated. Please rephrase this sentence because it is not clear. What do you mean with "opposite" and "aftershocks generated" ?

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60) Line 10: correct in 0.4

61) I'd suggest to add a column in the table with the difference in the occurrence between mainshock and largest aftershock (in years).

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62) Line 5-9. This paragraph should be completely re-written, it is not clear.

63) In the discussions, there are no clues about the possible effect of completeness of the fault database and earthquake catalog on estimations of D2 ad Do and their correlation. Do the correlations show a spatial significance or not?

64) The last conclusion, "Finally, this study can be used as a model to predict the spatial distribution of aftershocks with variations of general earthquakes, doublet earthquakes and scales", it is not discussed in the manuscript before. If number of aftershock impact the b-value, and the correlations are done on basing on the observed number of aftershock, how is it possible predict spatial distributions? What do you mean with general earthquakes? Scales? Please, discuss this point in the discussion before state it in the conclusion.

Sincerely,
Francesco Visini