

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC1
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Comment on nhess-2021-3

Anonymous Referee #1

Referee comment on "Spatiotemporal heterogeneity of b values revealed by a data-driven approach for the 17 June 2019 $M_S \approx 6.0$ Changning earthquake sequence, Sichuan, China" by Changsheng Jiang et al., Nat. Hazards Earth Syst. Sci. Discuss.,
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Dear Authors,

I found manuscript entitled "Spatiotemporal Heterogeneity of b Values Revealed by a Data-Driven Approach for June 17, 2019 MS 6.0, Changning Sichuan, China earthquake Sequence" very interesting and worth to be published. The composition, reasoning and presentation of results are clear and understandable. However, I have some issues, which should be cleared before accepting the manuscript for further editorial steps. I list them below:

- My main concern is the b -value analysis done by authors. Missing point in this analysis is how the b -value was fluctuating in the same area long before the main event. If the b -value is stable it should be more or less the same in shorter period long before the main shock, than taken into account in this analysis. Authors calculated b -values before and after the main event, but did not check if during the time of almost 10 years before the main event, there were any changes in b -value in the analyzed area. Assuming that b -value distribution in time and space is stable according to other studies is in my opinion not enough. The b -value spatiotemporal distribution should be checked for annual changes or cumulatively 1 year before the main event, 2 years before the main event etc. It should clearly show if the main finding of the study of the low b -value location in the area of main shock is a long term feature of the process.
- It is well known, that the b -value estimation methods may be sensitive to both magnitude range and completeness level. Did You check Your methods towards this issue?
- I can't find the completeness level value in the manuscript. What was the completeness level of the data set? I think, it should be calculated and taken into account in the analysis. Otherwise, the b -value computations may be spoiled.
- The last issue is related with the activity rate in the studied area. It was not included in the analysis. Activity rate of the events respectively to b -value may be very informative. It may be interesting to see, what was the activity on the considered area (eg. within Voronoi cells) and cross-sections

- I would suggest to change the color of the fault lines to black in Fig. 1, because they are hardly visible when plotted together with the aftershocks.

Please also note the supplement to this comment:

<https://nhess.copernicus.org/preprints/nhess-2021-3/nhess-2021-3-RC1-supplement.pdf>