I have reviewed the manuscript "Spatiotemporal 1 Heterogeneity of b Values Revealed by a Data-Driven Approach for June 17, 2019 Ms 6.0, Changning Sichuan, China earthquake Sequence" by Jiang et al. The paper focuses on investigating the spatiotemporal heterogeneity of b values for Changning Sichuan, China earthquake sequence, using a data-driven approach. Based on their analysis, the authors have shown strong spatiotemporal heterogeneity of b values on the horizontal surface distribution, depth profile distribution and distance-rank index map.

The study of Jiang et al. provides detailed calculations of the spatiotemporal distribution of Changning earthquake sequence that are potentially important to improve the seismic hazard assessment. Moreover, this work may support the application of the data-driven methods to estimate better b values, which may be of interest to a broad audience. I suggest that the paper can be published with minor revisions. However, I have several concerns from the current version of this study, which are listed below.

1.   The calculations of b values strongly rely on choice of cut-off magnitude (Harte, 2016). However, the authors did not show efficient information on this issue. I suggest the authors provide more information on choice of cut-off magnitude and completeness magnitude of the seismic catalog.

2.   The choice of region selection is also an important issue in calculation of b values (Gulia and Wiemer, 2019; Dascher-Cousineau et al., 2019). For the data-driven method, how does the selection of region effect the calculation of b values? I suggest the authors at least discuss the potential impacts their selection of regions ABCD and A'B'C'D'.

3.   The authors provide a spatiotemporal distribution of b values on depth profile. Their findings are interesting and provide additional understanding of seismic hazard at depth. However, the uncertainties of depth location are usually large (several kilometers). The authors claimed the vertical uncertainty of relocation is 0.654 km, which may need more information to support this. At least, the authors should consider the potential influence of uncertainty of depth in the calculation of b values.

4.   Figure 4 clearly provide spatiotemporal heterogeneity of b values before the Changning earthquake and for the entire study period. I suggest the authors add results of b values for Changning mainshock and aftershock sequence to present comparisons between b values before and after Changning mainshock.

5.   Line 270-275. The authors show that the occurrence of the Changning mainshock has a great impact on the continuity of temporal b values. In addition, there were four M>=5.0 aftershocks, which might also contribute to the continuity of temporal b values. Their effects should be considered or discussed.

Minor/general comments:

Line 3. "Earthquake".

L70. Consider replace "found out" with "investigated".

L159-160. Remove "There were".

L166. Remove "As can be seen", and use capital form of "from".

L184. Remove "is shown".

L185. "shows".

L189. "Distributions".

L210. Remove "where".

L254-255. The sentence "study the entire period as a whole ….. were studied separately" should be rewritten.

L259. Remove "occurred".

L266. Remove "occurred".

L300. I suggest replace "Although the b values to drop" with "Although the decrease of b values"

L301. Remove the last ",".

L303. Replace "b values time variation" with "temporal variations of b values".

L304. Replace "(Parsons, 2007), or some studies" with "(Parsons, 2007). Some studies".

L312. Replace "calculated the pattern migration" with "investigated the migration pattern". Replace "space" with "dimension".

L316. "migration pattern"

L315-318. The logic of this sentence is not clear. I can't figure out how the migration pattern could lead to "increase the pore fluid pressure". The author should rephrase this.

L331. "we believe" to "we deduce".

L333. "mainshock triggering" to "mainshock which triggered"

L334. "earthquakes" to "aftershocks"

L337. "the b values" are not specific, because there are a lot "b values" calculated in this manuscript.

L346. "people" to "studies".

L347. The author should refer Gulia and Wiemer (2019) at the end of this sentence.

L351. Remove "a parameter calculation method for ".

L364-365. The "fluid intrusion" and "increased pore pressure" is not opposite, therefore it could be confusing. Please, rephrase it. The same problem is in L367-368.

L367. "It may be that the mainshock triggered" to "The mainshock may triggered".

L380. Lack of the second bracket.

L583. "fromall" to "from all".

Fig. 4. Is that possible to plot small earthquakes in the spatial distribution of the ensemble median b values? This could help compare spatial distributions of seismicity and b values.

Fig. 6-7. I suggest plot the time at the upper x-axis to better show temporal evolution of b values.

References:
Harte, D. S. (2016). Model parameter estimation bias induced by earthquake magnitude cut-off. *Geophysical Journal International*, *204*(2), 1266-1287.

Rivière, J., Lv, Z., Johnson, P. A., & Marone, C. (2018). Evolution of b-value during the seismic cycle: Insights from laboratory experiments on simulated faults. *Earth and Planetary Science Letters*, *482*, 407-413.

Marzocchi, W., Spassiani, I., Stallone, A., & Taroni, M. (2020). How to be fooled searching for significant variations of the b-value. *Geophysical Journal International*, *220*(3), 1845-1856.

Dascher-Cousineau, K., Lay, T., & Brodsky, E. E. (2020). Two foreshock sequences post Gulia and Wiemer (2019). *Seismological Society of America*, *91*(5), 2843-2850.