

Interactive comment on “How Alpine seismicity relates to lithospheric strength” by Cameron Spooner et al.

Anonymous Referee #2

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The manuscript compares the distribution of earthquakes in a ca. square-shaped region centered on the Alps, and discusses the spatial correlation with a rheological model based on observations. The manuscript is relatively short, ca. 350 lines, with 1 table and 10 figures, no supplement.

While assessing the manuscript, three major concerns crystallized which raise the question on the suitability of this work for publication. These are the following.

1) Area of study. As Figure 1 shows, the area of study does not include the entire Alps. The majority of the Western Alps are left out, and the eastern termination are also left out. I find this is an issue as there are earthquakes in both of these areas and they would add to the rheological discussion as well. A broader, or different shape chosen for the study would justify the title and improve the discussion by a lot. The current map

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makes it awkward to really label this work “Alpine”.

2) Seismicity. The seismicity data shown in this paper is from the ISC catalogue. This catalogue is known to have drawbacks compared to more detailed local/regional/national catalogues in the Alpine area. This should be discussed in detail, uncertainties are a crucial element of such an analysis. I’m afraid the selection criteria chosen by the authors (lines 131 onwards) removed the majority of events from the map. Moreover, several events are close to the border of the study area – are there edge effects that affect the mechanical analysis? By the way, the majority of the 4405 chosen events are in the Apennines. To illustrate the problem of data selection, a question: can figure 9 (seismic density and maximum depth of events) be interpreted without discussing magnitude of completeness?

3) Only incremental advance. By comparing the proposed figures to those in recent publications of the lead authors, there is a large overlap. Spooner et al. 2019 Solid Earth, as well as Spooner et al. 2020 Global and Planetary Change already include numerous figures of this study. Namely: figure 1, figure 2, figure 3, the data for figure 4, a precursor of figure 5, precursor of figure 6. Figure 9a is a representation of ISC data. Figure 10a is a new way of comparison but similar to the 2020 paper, figure 10b is from another paper. This leaves only Figures 7 and 8 as new. Is this sufficient to publish a paper?

Interactive comment on Solid Earth Discuss., <https://doi.org/10.5194/se-2020-202>, 2020.

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