

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC2  
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## **Comment on nhess-2021-403**

Anonymous Referee #2

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Referee comment on "Pseudo-prospective testing of 5-year earthquake forecasts for California using inlabru" by Kirsty Bayliss et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-403-RC2>, 2022

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In this paper, the authors applied the open-source inlabru method to time-independent earthquake forecasts. They used the California region, defined for the RELM experiment, as a case study. The authors described the methodology details in another scientific paper just published. In the first part of the paper, the authors described: i) the spatial models applied in broad terms, ii) the gridded forecast and the synthetic catalog obtained from the method application, and iii) the test applied for the validation of results. For the model construction, the authors examined the relative contributions of the full and declustered catalogs. In the second part, the authors analyze the results obtained with the proposed methodology applying both grid-based and synthetic catalog tests included in the PyCSEP system. Furthermore, they compared the performance obtained with their models with that produced by Helmstetter in 2006 and submitted in the RELM experiment. They concluded that: (i) the full-catalog models performed well in retrospective testing (number, magnitude, and spatial distribution) for the first period 2006-2011 and the results are comparable with those produced by the Helmstetter model; (ii) for the period 2011-2016 the declustered catalog models performed better than the full catalog models, (iii) in the period 2016-2021 the models performed better the N-Test respect to S-Test and the CL-Test and (iv) the simulated catalogs forecasts pass the consistency test more often than their grid-based forecasts.

The paper is satisfactory, and the methodological approach is partially described in the text and referred to another published paper. The data and the code are available for free. The article is well written, and it represents a development in the integration of data from different sources. The use of tests that incorporate grids and synthetic seismic catalogs is also appreciable.

I suggest that the paper must be published after minor revision.

I recommend only a few comments about the paper:

- Why don't you use the 2005 data as input or in the testing phase?
- The imposition of  $b = 1$  for the declusterized catalog probably affected the results obtained. When the catalog is declustered,  $b$  tends to be lower than one due to the lack of smaller events. What were the real values of the  $b$ -value in the complete and declustered real catalog?
- In the tests, you have combined various input data that you had in your possession. Why didn't you test the model with only past seismicity? In this way, it was possible to see how other data contributed to the result. It might also be interesting to see the seismic catalog alone in the synthetic catalog test.
- Figures 3, 5, 6, and 7: insert in the caption the various acronyms (MS, SR, FD, NK, and DC) to facilitate the reader to understand the results;
- Page 10, line 211: change "Figure 4" to "Figure 5".