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Interactive comment on "Technical note: Low meteorological influence found in 2019 Amazonia fires" *by* Douglas I. Kelley et al.

Anonymous Referee #1

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This manuscript investigates the probability that the burned area anomaly in Amazonia in 2019 was caused by anomalous meteorological conditions. The presented approach is interesting and allows a quick evaluation of recent fire events. They estimate the probability that the event is caused by meteorological conditions using a model setup that includes the meteorological forcing, but not the changes in ignitions caused by humans. This is theoretically a valid approach, however, it remains unclear to me how well the model is able to capture extremes caused by meteorological conditions. I recommend to improve the discussion of the model performance by investigating the model performance for the investigated regions specifically for years that are known to have anomalies in observed fire occurrence caused by meteorological conditions. Source code and data are made available as recommended in best practice guidelines. The

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manuscript is well written. The presentation requires some clarifications as indicated in the specific comments.

Specific comments:

p.1 l. 27: Last sentence of abstract should be a conclusion rather than another result.

P2. l. 65: what exactly is a loose attribution? I guess it comes down to interpreting correlations, which can easily be confounded due to the many drivers, as causations?

P3 l.71: actually FDIs often make assumptions on the available fuel, for instance the difference in fuel drying between 1hr, 10hr, 100hr and 1000hr fuels in the fire danger index used in SPITFIRE. Isn't this the basis for Kelley and Harrison 2014 as well?

p.3 l. 81, you could add Forkel et al. 2017 (GMD)

p.3 l. 77: I believe the main disadvantage of fire models embedded in vegetation models is the complexity of the whole model that makes it difficult to fuse the model quickly with most recent observations. Also the inputs from the vegetation model are limiting the model performance. Having a simple fire parameterization which is largely driven by observations clearly has an advantage here. But can not represent the feedbacks between vegetation and fire on the other hand or estimate impacts on the carbon cycle, hydrology etc.

p. 3 l.85: again I think the main advantage is that it is largely driven by observations and it is optimized using observations.

p. 3 l. 85: track uncertainty in the model? Uncertainty in the model suggests that you may refer to the uncertainty related to the model structure, e.g. the shape of functions you implement and the choice of drivers. Usually such bayesian frameworks capture uncertainties of the optimized parameters and can propagate these uncertainties to the output variables. (which is also possible with other optimization techniques.) Please be more precise.

L .109: something wrong with the sentence. Which variable has such coarse resolution? You might reconsider interpolating that variable to higher resolution and therefore being able to maintain the information of the subgrid heterogeneity of other variables could be advantegeous.

l. 155 based on what information did you choose these areas?

l. 165: maybe possible to describe the technique briefly to not make the reader go back to Kelley again?

l. 168: unclear, please rephrase

l. 174: so 1 and 3 are basically the same? 3 for annual 1 for monthly burned area?

l. 179: how do you define areas of recent deforestation? Please indicate these areas.

l. 217: the authors write that in no region the observed anomaly has been that far outside the model range as in 2019. If I look at figure 1 I get a different impression: Region C: 2019 within full posterior of the model, 2007,2010, 2012, 2017 not. Region d: 2010 and 2004 seem much more outside the model range than 2019.

l. 246: what is the novelty in your bayesian approach?

l. 249: explain the setup of your model: it underpredicts burned area when taking into account meteorological conditions but keeping land use and population density constant.

l. 445: Figure 1 caption, please explain the color of the columns on the left.

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