

## ***Interactive comment on “Historical and future anthropogenic warming effects on the year 2015 droughts, fires and fire emissions of CO<sub>2</sub> and PM<sub>2.5</sub> in equatorial Asia” by Hideo Shiogama et al.***

**Anonymous Referee #1**

Received and published: 10 September 2019

The title of the study is confusing. Is it about historical and future anthropogenic warming effects on the year 2015? — could future anthropogenic warming have an impact on a past year? Equally confusing is the abstract. For instance, “we suggest that historical anthropogenic warming increased the chances of meteorological droughts exceeding the 2015 observations in the EA area . . . .” (line 15-29). What does it mean exactly? Which period are those claims referring to?

The abstract lacks fundamental clarity, so does the paper. It seems to me that the authors have not sorted out a coherent logic chain to tell a concrete story. Instead, the paper presents a series of model results without a clear rationale to make sense of

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it. Last but not least, several figures of this paper have been documented by previous studies as cited in the paper (in slight variations); I do not see added value from the duplication. Therefore, I recommend rejecting this paper in its current form.

Please see a few technical issues below (not an exhaustive list):

Line 47: "this study has three aims." What is its relevance given the studies mentioned in the previous paragraph?

Line 48: A higher-level introduction of the "probabilistic event attribution approach" is necessary for the readers to understand the concept. While technical details could refer to published papers, the general principle should be properly introduced.

Line 55-56: On what temporal horizon? This point is not clear at all. After reading the entire paper, it appears to me that the warming scenarios (1.5, 2.0, or 3.0 C) is defined regarding the reference year 2100. However, the simulated results in 2015 are discussed. This setting is problematic since the emission changes in each scenario are not linear across the century, what does it mean when comparing the first few years? The starting and ending point of the simulations are not clearly stated. The use of those simulations is not adequately justified.

Line 64: It will be helpful to state clearly how many ensemble members for each scenario, covering which period, based on what emission trajectory.

Line 77: "Although socio-economic factors are important for fire activities, we only examine the effects of climate change in this study." "climate change" here refers to simulated climate given different forcing scenarios, which by definition accounts for socio-economic factors. Maybe, the authors are referring to local land-use change impact? It is important to make those distinctions to make sense of the results.

Section 2. Compared to the papers cited here, I do not see any new contribution from this section. It just shows what has been done, without any new data or insight.

Line 118: "Please note that both the Hist and Nat ensembles have the same spatial

SST patterns as the 2015 El Niño event". How so?

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Line 124: If the simulation periods are 2006-2015, how come are they future simulations???

Line 136: Why is showing sea ice (Fig. 5) relevant to this study? Similarly, it is not clear about the role of results showing in Figure 4 to Figure 7.

Line 169: Are you comparing fire and fossil fuel emissions from Japan? Not clear.

Line 192-194: By now, it is still difficult to understand what do they mean.

Line 197: "somewhat"?

Line 192-212: The conclusion is far reached.

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Interactive comment on Earth Syst. Dynam. Discuss., <https://doi.org/10.5194/esd-2019-46>, 2019.

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