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Comment on essd-2022-413

Anonymous Referee #1

Referee comment on "Fire weather index data under historical and shared socioeconomic pathway projections in the 6th phase of the Coupled Model Intercomparison Project from 1850 to 2100" by Yann Quilcaille et al., Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2022-413-RC1, 2023

Summary

Fire weather index (FWI) is an important indicator for depicting potential fire risks. When ignitions and fuel couple with higher FWI, serious wildfires could be triggered. In this study, Quilcaille et al., generated the FWI data from history and under various SSP scenarios based on the Earth System Models (ESMs) of CMIP6. They used all available ESMs with all ensemble runs under all scenarios, therefore the generated dataset is potentially useful for understanding future changes of fire weather risks and their uncertainty. The paper is generally well written, and I only have some minor concerns listed below. I would recommend this work for publication after the concerns being addressed.

Minor comments

(1) Validation of the adjustments: Three types of adjustments including effective day length, drying factor, and overwintering were involved in the products, and it seems that such adjustments were empirical. For example, the settings of carry-over fraction and effectiveness of winter precipitation for overwintering seem subjective. Since the results (e.g., Fig., 3-5) showed considerable differences for the adjustments relative to the original ones, how to guarantee that the adjustments were more effective for deducing fire risks? If the adjusted ones were not more effective on reflecting fire risks, why people should use them instead of the original ones?

(2) Average versus minimum relative humidity: I understand that there are larger ensembles for FWI using average relative humidity, but it seems not clear whether such FWI based on average relative humidity achieve reasonable performance on reflecting fire risks relative to that based on minimum relative humidity. Since Fig.6 showed noticeable

differences between these two FWIs and the annual indicators such as “fwixd” were based on the exact FWI values, it is reasonable for the potential users to know whether they used FWIs were reliable or not.

(3) Usage notes: the possible paths for data users deserve more explanation or discussion. It is important for the users to clearly know the usage of the data and what kinds of highly urgent scientific questions can be answered with the produced data. For example, why the listed opportunities in line 410-420 are important? what kinds of scientific questions remained in the fire weather studies but could be answered with the produced data?

(4) The title: this study focused on the Canadian fire weather index data, therefore many other fire weather indexes in Table A (line 420) were not involved. So I suggest to revise the title to highlight “Canadian fire weather index”.