

Interactive comment on “A high-resolution reanalysis of global fire weather from 1979 to 2018 – Overwintering the Drought Code” by Megan McElhinny et al.

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We thank the reviewer for their useful comments and provide our response here.

Original reviewer comment: 2. Global revisions to improve the paper - The data repository presents different spatial resolutions according to the years. Authors would need to display information about the spatial resolution used in the repository's raster files and whether this spatial resolution depend on geographic location or not. - Is it possible to complete the data repository with the intermediate calculations or variables performed?

C1

Response: We are not sure what the referee is referring to here and would require further clarification. The spatial resolution of the FWI product is the same for all years since it is based on the input variables from ERA5 output at 0.25 degrees globally. This information is already given in lines 106-108 of the manuscript.

Original reviewer comment: 3. Particular revisions to improve the paper - Fig.1, Fig.2 and Fig.3 use a reference system, probably geographic coordinate system over WGS84 to show the maps. It is necessary to indicate the reference system used in all maps. It would be highly recommended to indicate throughout the paper (for example in the footnote under figures), the reference system used. - Fig. 3 shows a map for North America in 2016, but we do not know the reference system and no grid appears.

Response: We thank the referee for pointing this out and now have added the reference systems used for the maps in the revised paper for captions for Figs 1, 2 and 3.

Original reviewer comment: - In section 3.3, the authors describe that R-cffdrs package is used for calculating FWI Systems outputs. It is very important to show the version of the packages used. The versions of the packages in R are necessary to reproduce the calculations the authors made. - There are several reported examples that using different versions of R packages produces different results in calculations. To improve reproducibility, I recommend the use of R packages such as the Git package. If this is not possible, the authors must show the list of all the packages used as well as the dependency tree, together with the version of R used.

Response: We have identified the packages and version numbers used which we now include as a table in the appendix of the paper. We do not believe a dependency tree is necessary since such trees are not common in the literature and the moreover, the version numbers are sufficient for reproducibility of the results. We have therefore added a table of all packages and version numbers as a new Appendix B in the revised paper. We have also added a note to the manuscript (lines 198-199) to refer to this new table.

C2

Original reviewer comment: - Section 4.2 and Fig.2 represent validation for Canada. Some graphics appear in figures (upper left corner), but It would be very interesting to know if the represented histograms fit some known probability density function and what function might be.

Response: The histograms shown in Fig. 2 represent the corresponding metrics. We are not sure what physical interpretation could be given to a fit of a known probability density function. Instead, it would seem to be more meaningful to fit distributions to the FWI values derived from stations and from the ERA5 reanalysis and to see if they belong to the same distribution or family of distributions. However, this is outside the scope of the present study which was to present an overwintered global calculation of the FWI System indices and present a simple validation. It may be of interest in further studies where, for example, such data is used to calibrate FWI projections under climate change using a parametric bias correction approach.

Original reviewer comment: - In section 4.3, the authors present the specific statistical study for 2016 in North America (FWI index). It would be necessary to extend this study for several years, to see if the observed differences depend on the place or also depend on the time variable, showing a larger geostatistical study using time and position.

Response: We agree that this would be an interesting extension of the present work. However a spatiotemporal study of the effects of the overwintering procedure on drought codes it outside the scope of this paper is left for future work. Here we sought to highlight a single year that demonstrated that significant differences between the default calculation with and without overwintering may occur.

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