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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Forest fire risk assessment in Sweden using climate model data: bias correction and future changes" *by* W. Yang et al.

Anonymous Referee #2

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The authors examine the effects of statistical bias corrections to climate model outputs on present and future fire weather over Sweden. They find that considerable improvements are made relative to raw model output on present day RCM simulation with implication for FWI projections under future warming scenarios.

This is a good paper. It is very clearly written and provides excellent methodological detail in considering the effect of bias corrections on different weather inputs to the FWI System.

Prior to publication, the paper requires more interpretation of the results in the context

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of other fire projections. As the authors state in the last paragraph of the Conclusions, further work must be done with, among other things, more models to start drawing robust conclusions for Sweden's future fire environment. In that vein, please relate your results to:

1. Flannigan et al. (2013). They projected an increase in the Cumulative Severity Rating (derived from the FWI) over the entire boreal region, including Sweden for 3 CMIP GCMs. All metrics considered indicate an increase in Northern Sweden, inconsistent with the results presented here. Please discuss possible reasons for this discrepancy.
2. Similarly, Dai et al. (2012) estimated increasing PDSI and decreasing soil moisture across all of western Europe including Sweden. This is relevant given the importance of the DMC, DC and BUI to fire risk.

There are obviously methodological differences between your study and these, but the difference in sign from southern to northern Sweden (absent in the other studies) requires discussion.

Specific comments P841 L16: To shorten the paper, consider omitting the FWI System technical details, instead just summarizing the key features of each FWI component. In addition to Van Wagner [1987], Dowdy et al. [2010] provide a readable technical description of the FWI System.

P845 L25: the meaning of 'significant statistical properties' is unclear.

P861 L26: by 'it reflects directly' do you mean, 'it is affected directly'?

P862 L13: change 'sensitive test' to 'sensitivity test'?

P864 L9: change 'well reproduce' to 'reproduce' and end the sentence with 'reasonably well'

P867 L6: Please include appropriate caveats about possible future changes in vegetation/fuels and human activity when projecting future fire risk

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P867 L10: suggest discussing the Flannigan and Dai studies here.

Fig 8: change “1)” and “2) in x-axis label to a & b

References

Dai, A. (2013), Increasing drought under global warming in observations and models, Nature Climate Change, 3(1), 52-58, doi:10.1038/nclimate1633.

Dowdy, A. J., G. A. Mills, K. Finkele, and W. J. de Groot (2009), Australian fire weather as represented by the McArthur Forest Fire Danger Index and the Canadian Forest Fire Weather IndexRep., 84 pp, Centre for Australian Weather and Climate Research.

Flannigan, M., A. S. Cantin, W. J. de Groot, M. Wotton, A. Newbery, and L. M. Gowman (2013), Global wildland fire season severity in the 21st century, Forest Ecology and Management, 294, 54-61, doi:10.1016/j.foreco.2012.10.022.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 3, 837, 2015.