

Interactive comment on “Climate changes and wildfire emissions of atmospheric pollutants in Europe” by W. Knorr et al.

Anonymous Referee #2

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This outstanding and comprehensive manuscript greatly advances the next generation of fire-pollution-climate science. It would be wise to conduct similar analyses for US region. I have only relatively minor comments to be addressed. I highly recommend the paper for publication.

1. Page 7, Line 160. “but also no change in fuel load”. Incorrect statement. The Pechony and Shindell (2010) fire model does have a dependence on fuel load. I believe it is through sensitivity to changing LAI, but you may need to check the exact formulation with the developers.
2. The Methods section needs to be re-written/re-organized/untangled with subsections that describe which modeling exercise refers to which specific project goal. Many different datasets are introduced and it is hard to keep a track. At present, the

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reader is essentially left to work out which experiments and datasets are used for which task. For example, the anthropogenic and fire emissions comparison aspect involves the GFED inventory for present day, which is confusing because the study is initially presented as a dynamic fire prediction project.

3. On extension of this point (2), how does the present day dynamic fire prediction scheme compare with GFED inventory? I suspect these results are in one of the Knorr et al. papers but it is not clearly explained where and what is the status of the validation.
4. How was the CMIP5 data downscaled to 1x1 deg for the fire-vegetation model?
5. To the conclusion “The evidence for changes in fire regimes in Europe for the past several decades is not clear enough to attribute any changes to climatic drivers”, what statistically robust physical climate changes have occurred in Europe over the period? What has happened to temperature and precipitation, and extreme meteorological events? For example, if not much actual climate change has occurred (yet), then it's obvious that there wouldn't be any climate-driven changes in fire regimes (yet).
6. Page 22, Line 525. “Likewise, the uncertainty in the published range of even the present anthropogenic emissions is of similar relative magnitude”. Is this true? Based on this and other studies, seems that uncertainty in wildfire emission estimates must be larger than for anthropogenic sources?
7. What about surface ozone impacts, which depend on the wildfire-anthropogenic emissions interactions?

Text issues

Page 15, Line 355. Missing reference year. Page 18, Line 439 delete “more”. Page 20, Line 473. delete “with”. Page 21, Line 493. “implemented”. Page 21, Line 514. delete “wildfires”.

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