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Geoscientific Model Development Discussions

Interactive comment on "APIFLAME v1.0: high resolution fire emission model and application to the Euro-Mediterranean region" *by* S. Turquety et al.

Anonymous Referee #1

Received and published: 12 December 2013

Summary

The manuscript contains a detailed description of the various data sets to be used in a high-resolution fire emission model. The fire emission model applies the classical methodology to determine fire emissions (one equation). The new aspects of the manuscript need to be clarified by the authors: Is this the high temporal and spatial resolution of the calculated fire emissions or the use of new data sets? Besides this issue, the manuscript would benefit from a re-organisation of its sections and subsections, and a reduction from 9 sections to 5 sections as described in the general comments below. In addition, the manuscript needs to include a discussion about peat fire emissions as outlined in the general and specific comments below. These topics need to

be considered in the manuscript in addition to the specific comments outlined below, before it can be published in GMD.

General remarks

The manuscript would benefit from a rearrangement, so that the necessary input data sets are first described followed by application studies, e.g. section 4 should become a subsection of section 3, which makes the connection and logical order of the manuscript more clear. As the model development is in the centre of interest, section 5 should become section 2, than Fig. 6 would be the first figure, which clarifies the further sequence of the manuscript in describing the necessary input data sets. The original sections 2 and 3 would then be subsections of the new section 2, to be arranged in the appropriate order. This way the repetitions can be avoided, e.g. section 4.3 'Diurnal variability' and section 5.3 'Diurnal cycle' should be combined. Also sections 5.4 and 7.1 should be combined into one subsection. Section 8 should be a subsection of the new section 2.

- page 5491, line 5-7: It remains unclear what are the new aspects of the model besides its flexibility, maybe high temporal and spatial resolution, as the classical approach to determine fire emissions is applied. Which look-up tables are provided for the flexible use besides those of the Euro-Mediterranean region? Maybe it is also the use or creation of new data sets? Please specify at the beginning of the manuscript.

The spatial resolution of the results should always be indicated in the figures to allow a better understanding of differences etc.

The manuscript lacks a discussion of how or if or if not peat fire emissions are included, e.g. peat bogs appear as a 'vegetation type', however, probably with much to low biomass load. Results of peat emissions are not presented and discussed and uncertainties of fire emission estimates due to potentially missing peat fire emissions are also not addressed.

Specific remarks

- page 5496, lines 1-10: It would be helpful to include the section numbers, where the mentioned topics are presented. In addition, it is rather helpful to mention here as well in which section a comparison with other inventories is provided

- page 5496, lines 6-12: How can peat fire emissions be derived from MODIS land cover classes?

- page 5496, line 27: Please explain L3 observations.

- page 5497, lines 14-25: How do these resolutions of 70 km and 30 km correspond to the 1 km resolution mentioned on the first page?

- page 5498, line 3: How does ORCHIDEE determine the biomass density of peat?

- page 5498, line 3: Please explain PFT.

- page 5498, lines 4/5: The sentence is unclear in this context – please rephrase and explain better what is meant.

- page 5498, line 8 and Table 1: It seems that peat land biomass density is set equal to forest and grassland. Please comment and discuss the associated uncertainties by referring e.g. to Levine, GRL (1999).

- page 5499, lines 22-26: Please mention the revisit time, to specify the temporal resolution.

- page 5501: line 8: What about false detection induced by volcanic thermal anomalies?

- page 5501, line 4: Please add, if this is a new analysis or if the data have been analysed in a similar way before.

- page 5501, line 21: The first sentence is unnecessary, because its statement is without much meaning.

- page 5502, line 9: Large area burned values are also visible in Russia, please comment.

- page 5502, lines 11-24 and Table 2: What about Russian fires? Are they not included in the European fire database?

- page 5503, line 25 and Fig. 4: Category 13 (peat) is missing, please add.

- page 5503, line 27: A discussion of uncertainties associated with peat fires needs to be included, in particular for the 2010 fires in Russia.

- page 5506, line 8: Which resolution is meant with fire resolution?

- page 5506, line 20: Please explain DM.

- page 5507, line 1-5: If ORCHIDEE does not determine peat biomass load (a question raised above), then peat biomass load should be included based on available data sets – please discuss in the manuscript.

- page 5508, lines 1-19 and Tab. 4 and Tab. 5: Both tables are unnecessary, as some of the presented numbers could be inserted into the text. In line 4-6 and Tab. 4 it is only indirectly clear that these values are for European conditions, this should be stated clearly.

- page 5510, line 10: Correct (Mu et al., 2011) into Mu et al. (2011).

- page 5512, lines 23-28: Please include a discussion of the year 2010, where GFAS produces much higher emissions. Does GFAS take peat burning into account?

- page 5513, line 6 and Table 8: CLC category 13 (peat) is missing. Why? Please add the results to Tab. 8

- page 5513, line14 and Tab. 9: It remains unclear which area is used for the GFED and GFAS inventory for comparison with the estimates determined in this manuscript. Please indicate in Tab. 9, that the first four columns represent estimates determined in

this manuscript – this is at least my indirect understanding. Please also delete in the caption of Tab. 9 the sentence about parenthesis – there no parenthesis in the table. Again, are peat fires and their inadequate representation in the inventories a possible reason? Please discuss.

- page 5514, line 25 and Fig. 7 and Fig. 8: For Greece and Ukraine-Russia Fig. 7 and Fig. 8 values seem to be different for the estimate determined in this study, but also for others, even if the presentation of monthly versus daily values is taken into account. Please correct or explain. In addition, please add the starting day into the caption of Fig. 8.

- page 5516, line 2: Please include a discussion of the limitations of the estimates conducted in the manuscript, in particular concerning peat areas.

- page 5516, line 5: 'used' instead of 'use'

- page 5516, line 7: 'uncertainty of' the instead of 'uncertainty on'

- page 5517, line 25: please delete 'on'

- page 5519, line 3: Please add a discussion of uncertainties associated with peat areas.

Interactive comment on Geosci. Model Dev. Discuss., 6, 5489, 2013.