

Interactive comment on “Historic global biomass burning emissions based on merging satellite observations with proxies and fire models (1750–2015)” by Margreet J. E. van Marle et al.

Anonymous Referee #2

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This paper presents the methods and results from the development of a global fire emissions inventory representing 1750–2015. The results are to be used as consistent inputs to climate model simulations. The authors integrate the results of fire models, satellite-based fire inventories, fire proxies (i.e., charcoal records), and visibility observations to provide emission estimates. The description of the methods is very complete. Further, this type of effort is incredibly challenging, and the authors provide an good discussion about the uncertainties in the assumptions they made in their approach. Despite shortcomings in the data and models, this is a very good effort and will provide improvements to future model simulations. I only have minor suggestions and some editorial comments for the authors.

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General Comments: I may have missed this, but I would assume that the Fire models that are described need to be forced with atmospheric inputs. It is unclear to me what forcing were applied in the simulations that produced the emission results. This should be made more clear somewhere in the paper. I am assuming that they were all driven by the same climatic drivers?

El Nino is obviously an important driver of fire activity and emissions, particularly in EQAS. This is not captured in the emission estimates before the 1970's. Is this a problem? Can the authors comment on this further?

Editorial Comments:

Page 3, line 16: Should it be “directly” and “indirectly”

Page 3, line 24: What other land surfaces? The previous sentence talks about deforestation fires. So, is this land surfaces other than forests?

Page 5, line 7: Change to “All of these”

Page 5, line 14: Change “which” to “that”

Page 6, lines 7-11: This is a very long sentence and could be broken up to read more clearly.

Page 6, line 18: The differences “over the past decade”? What is meant by this?

Page 7, lines 9 and 10: “data” are plural. Change to “provide”

Figure 1: Shouldn't the satellite observations circle expand downward to local scales?

Page 9, line 6: The reference for GFED4s should be provided.

Page 10, line 11: A comma should be used before the word “which” (here and throughout the paper).

Page 11: The emission factors used in this are from Akagi et al. 2011. Did you include the emission factors from the updates to this dataset (from 2015)

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Page 14, line 17: Change “which” to “that”

Page 14, line 25: change the tense to be consistent (“are” should be “were”)

Page 16, line 3: How can you compare the visibility outputs to 1750 – 2000 when those data don't go back that far? This is unclear.

Page 17, line 2: all “of” our

Page 18, line 22: Define IAV when first used.

Page 18, line 24: Change “which” to “that”

Page 28, line 2: Change to “there are very little data”

Page 34, line 18-19: Current emissions? Does this mean the current emissions (2000? 2010?) in the CMIP5 estimates?

Page 34, line 21: Should “in” be “is”?

Page 36, line 14: This sentence is worded poorly and should be rewritten.

Page 39, line 8: Should there be an ; or : after “emissions”

Interactive comment on Geosci. Model Dev. Discuss., doi:10.5194/gmd-2017-32, 2017.

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