

Interactive comment on “Studying the impact of biomass burning aerosol radiative and climate effects on the Amazon rainforest productivity with an Earth System Model” by Florent F. Malavelle et al.

Anonymous Referee #2

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This study explores the impacts of biomass burning aerosols on forest production in Amazon, taking into account both diffuse fertilization effects and the climatic feedback of fire aerosols. Results show that the benefit of increased diffuse radiation is nearly offset by the reduced total radiation, while climatic effects of fire aerosols make the dominant and positive contributions to the regional carbon uptake. This is an interesting and comprehensive study, providing new perspectives for biosphere-pollution interactions. The authors performed considerable amount of sensitivity experiments to isolate individual factors and to quantify associated uncertainties. Here I have only

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some minor comments.

Page 2, Line 23: Not sure Spracklen et al. (2012) provides results of fires. A better reference is Randerson, J. T., et al., The impact of boreal forest fire on climate warming, *Science*, 314(5802), 1130-1132, 2016.

Page 2, Line 32: “to cite a few” what does this mean?

Page 3, Line 21: “did not accounted” should be “account”

Page 4, Line 1: “only two studies”. Not correct. For example, Yue et al. (2017b) also used a fully coupled ESM to quantify aerosol climatic and radiative effects on ecosystem. It's better to say “limited studies”.

Page 6, Line 11: “The photosynthesis model is based upon the observed processes”, what kind of processes? More details.

Page 6, Line 28: “the tropical French Guyana site”. It might be inadequate to calibrate model parameters using data from a single site.

Page 8, Line 3: “30-years” should be “30-year”

Page 17, Line 5: “Fig 5d” should be “Fig 4d”, the next line should be “Figs 4a, b, c”.

Page 21, Line 28: “fertilisation”, it's better to use “fertilization” to be consistent with previous instances.

Figure 2: JAS should be July-August-September

Figure 7: Is that possible to calculate the sensitivity of dNPP to BBA, and to compare the values among different months? These results can tell us the impacts of variant environmental/climatic conditions on fire aerosol-induced NPP perturbations.

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