

Interactive comment on “Impact of biomass burning aerosols on radiation, clouds, and precipitation over the Amazon during the dry season: dependence of aerosol-cloud and aerosol-radiation interactions on aerosol loading” by Lixia Liu et al.

Anonymous Referee #1

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This research aims to quantify the impact of biomass burning on radiative forcing in Amazon forest. The authors present a very comprehensive analysis and I believe that this research would help us better understand the climate impact of biomass burning in this region. Improvements are needed to make the manuscript scientifically sounding and suitable for publishing, as follows:

Major concerns:

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1. In Section 3, was the WRF simulation nudged towards FNL analysis data? If so, is it fair to compare nudged model results with observations? Please clarify on this.
2. Is the conclusion sensitive to different plume rise parameterizations? Can the authors provide some validations on the simulated plume rise heights?
3. Is the conclusion sensitive to the choice of the period? One month seems to be quite short. Why not consider multi-month or multi-year analysis?
4. The main conclusion is that lower precipitation is expected with biomass burning aerosols. Do historical observations support this conclusion?
5. Why did an underestimation of precipitation during Sept 17 & 18 lead to much lower temperature and higher RH, compared to the observations? Why did the temperature vary little these days? Maybe it would be worthy to check the synoptic pattern and assure that this is not a model bug.
6. The validations of AOD simulation are not so impressive, it would be helpful to show: 1. the mean absolute bias & correlation between simulation and observation, making the validation more quantitative; 2. reference other papers for the bias between simulated and observed AOD in South America and other regions, quantitatively.
7. The authors may consider to move Section 3 to supplement to make the manuscript less length and more focused.

Technical comments:

Line 27: 'which enables them' -> 'which enable them'

Line 151: Need a reference

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