

## ***Interactive comment on “Modeling investigation of light absorbing aerosols in the central Amazon during the wet season” by Qiaoqiao Wang et al.***

### **Anonymous Referee #1**

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This paper does a modelling investigation of the light absorbing aerosols in a pristine tropical forest site. The manuscript is extremely well written, figures have good quality and the topic is of interest to the ACP readers. In the attached PDF file I have added comments indicating where further explanation/discussion is needed or could be helpful. Besides these technical remarks, I only have two important comments.

The authors used a modified version of GEOS-Chem which they validated against AERONET, MODIS and CALIOP. However, what happens to aerosol particles in the atmosphere depends on meteorological conditions and you have not shown if your model reproduces the observed climate/weather. Does your model simulates the observed precipitation rates (distribution in time and space)? What about wind direction and speed? Boundary layer height and TKE? Clouds? SW and LW radiation? These are all important for properly accounting for physico-chemical transformations of aerosols

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in the atmosphere. The model could be getting the ground concentration right (or wrong) by biased PBL heights, for instance. If this modified version of GEOS-Chem was not validated yet, the authors should include some discussion about it, at least in the supplement.

The authors use a mixture of different emission inventories, most of which are widespread used and considered to be reliable in our community. However, looking at the AOD plot in Fig.14 one can see similar values over the Amazon as over the northeastern coast of Brazil, from Ceara down to Bahia (highly urbanised and lots of anthropogenic emissions). Therefore, it seems that your inventories don't account correctly for urban emissions in South America. Except for SP (which shows up as a red spot at 47W 23S), none of the other large metropolitan areas seems to be represented. If such information was not available for using in GEOS-Chem, the authors should at least discuss the limitations of their results for not considering those emissions.

Please also note the supplement to this comment:

<http://www.atmos-chem-phys-discuss.net/acp-2016-586/acp-2016-586-RC1-supplement.pdf>

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