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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Quantifying the Direct Radiative Effect of Absorbing Aerosols for Numerical Weather Prediction: A case study" *by* Mayra I. Oyola et al.

Anonymous Referee #3

Received and published: 7 June 2018

This paper compares the vertical profiles and associated radiative effects of aerosols simulated by a global aerosol transport model (NAAPS) with in situ data collected during SEAC4RS. The heating rates due to aerosols are evaluated and the implications for weather prediction are discussed. The manuscript is scientifically correct and the results are well laid out. My main concern is related to the scientific significance of the paper. The following comments should be addressed prior to recommendation for publication.

Specific comments:

1. The authors highlight the potential influence of the representation of aerosols in

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numerical weather prediction models thoroughout the paper. However, in the study only a comparison between modeled and observed aerosol properties is conducted while the effect on weather forecasts is not evaluated. As mentioned by the authors, the study represents a relatively simple case and the results may not be generalized to other cases. I think it would be desirable to have a more detailed discussion on the implications for weather forecasts and/or some simple experiments of the aerosol effects on numerical weather prediction models.

2. Figures 3b, 4b, 5b, 6b: Are the magenta lines correct? I would expect the lines to be different for different surface albedo. Also the values do not seem to be consistent with those in Tables 2 and 3.

3. Line 298 and Table 2: Why does the net SW radiation at the surface modeled by the three versions of NAAPS differ by more than a factor of 5, while the AOD is similar across the three models (Table 1)?

Techinical corrections:

1. Line 286: The downward SW flux is shown in Figs 3a, 4a, 5a, 6a rather than Figs 3c, 4c, 5c, 6c.

2. Tables 2 and 3: Units in these tables are missing.

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