

Interactive comment on “Large contrast in the vertical distribution of aerosol optical properties and radiative effects across the Indo-Gangetic Plain during SWAAMI-RAWEX campaign” by Aditya Vaishya et al.

V. R. Kotamarthi (Referee)

vrkotamarthi@anl.gov

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The manuscript describes aerosol optical property measurements using a small aircraft platform during pre-monsoon period over Northern India during 2016. This is likely that first such reported measurements from this part of India and hence quite interesting. In large part these measurements establish previous reports on aerosol property variations going from West to east over this part of India and provides some insights into the variability in altitude. A key missing component in the discussion is an evaluation of mixing and its affect of the vertical profiles reported here. Unfortunately,

C1

the aircraft is limited in its ability to reach higher latitudes (non-pressurized) and hence limited to 3000m above ASL. I suspect this may be within the PBL for all the measurements reported here and the profile is primarily established by strong emissions during the sampling time and possibly an artifact of the time the measurements were made. A slightly later time would probably erase this vertical variability. The PBL height at all three locations is probably above 3km during the pre-monsoon time. I would like to see some more discussion of the meteorological/dynamic state of the atmosphere to put the measurements in context. a) what time of the day where these measurements made? Where all the measurements at all these sites made at the same time of the day? b) what is the PBL height at the time of measurements? Are there any measurements of temperature profiles that are available close to the regions where the aircraft flew? c) Manoharan et al., 2013 established that the aerosol absorption in this region has a correlation to the size of the particle. Is there any data on aerosol size that can be shared? d) measurements over eastern India indicate less absorbing particles (may be more sulfate?). It will be helpful to have a more extended discussion the scattering at the eastern site and how it may relate to radiative forcing. I agree with the ‘cauldron of complex aerosol type’s’. (page 3, line 24) and it may be time to start focusing on the ‘other’ aerosols in the region besides just absorbing aerosols (sulfates and nitrates). These and SOA may have significant health impacts for the region and deserve more attention.

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C2