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Interactive comment on "Radiative budget in the presence of multi-layered aerosol structures in the framework of AMMA SOP-0" *by* J.-C. Raut and P. Chazette

J.-C. Raut and P. Chazette

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The authors thank Sebastian Otto for his interest in the article. The question concerning the limited measurements of large particles and their influence on the radiative effects is indeed relevant. Yes, the authors performed sensitivity studies with respect to the influence of these coarse mineral dust particles. We used a Monte Carlo approach based on 200 Gaussian random realizations and showed in Sect. 5.1.2 that uncertainties as large as 30% in the PCASP measurements were leading to uncertainties of 0.003 on the imaginary part and 0.08 on the real part of the dust ACRI. This should clearly influence the calculations of aerosol radiative impacts through the single-scattering albedo and the asymmetry parameter. The spectral extinction coefficient is not affected by this uncertainty because, as we mentioned in Sect. 4.2, it

is determined from the measured extinction coefficient and Angström exponent. The global retrieved uncertainty on the radiative impacts is only of order 3 W/m2, which is comparable to the day-to-day variability in TOA and BOA radiative impacts (Sect. 6.2.3). Such a small uncertainty is due to a compensation of uncertainties in both the size distribution and the complex refractive index. As a matter a fact, when size distribution is underestimated (resp. overestimated), the retrieved ACRI, and particularly the real part, is overestimated (resp. underestimated) so as to converge towards the measured constraints of scattering/extinction coefficients, single-scattering albedo and BER. The resulting change in the spectral single scattering albedo and asymmetry parameter is small. Therefore, the errors on PCASP measurements do not clearly affect the spectral retrieved optical properties and as a consequence the radiative effects. Finally, the uncertainty in radiative effects due to uncertainties in the measurements is of the same order of magnitude in the dust layer than in the biomass burning layers. This point will be discussed in the revised manuscript.

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