Atmos. Chem. Phys. Discuss., 14, C4346–C4348, 2014
www.atmos-chem-phys-discuss.net/14/C4346/2014/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Airborne verification of CALIPSO products over the Amazon: a case study of daytime observations in a complex atmospheric scene" *by* F. Marenco et al.

F. Marenco et al.

franco.marenco@metoffice.gov.uk

Received and published: 1 July 2014

We wish to thank Reviewer 1 for his or her review of our article. The reviewer feels that some revision is required, and we shall do our best to submit a revised version in line with the reviewer's recommendations.

a) The dataset that we present is indeed limited to a single case, but these are the limitations of field work for atmospheric research. It is often not possible to replicate an experiment; in particular, atmospheric research flights are sporadic in nature and are subject to budgetary and operational limitations. We are therefore uneasy with

the reviewer's suggestion to increase the number of cases of CALIPSO underpasses with the research aircraft. As far as we are aware, the FAAM aircraft only did two underpasses of CALIPSO: the one discussed in the present article and a flight over Thessaloniki in 2011 (ACEMED experiment). The 2011 flight has been presented at the 26th ILRC, and is being currently thoroughly analysed with the aim of a future publication; that case is sufficiently dissimilar to this one, both in terms of scenario and methodology (the accent in that case being mainly on the in situ characterisation of the aerosols, whereas here we rely on the on-board lidar) to justify separate treatment.

b) We agree that wavelength conversion has its limitations, and we will add a caveat. However, it is the best comparison that we can have given the different wavelength of the two lidars.

Figure 4a) We understand the point raised by the reviewer, because some profiles display very large extinction values. However, each of the profiles has a different horizontal extent and hence a different weight in the averaging. We shall add a sentence to the revised paper, explaining how the mean is calculated.

Colloquialisms) Ok.

Conclusions) We do not believe that one has to be ashamed of presenting a limited dataset. Satellite datasets are global in their nature, but then their verification relies on point comparisons which can be much less general. Different approaches exist: from general comparisons with a large number of ground-based observations within a network, to point verifications at one location; from multi-instrumental approaches to single instrument ones. The scene presented in this paper is quite a complex one, due to the presence of broken clouds within an aerosol layer (top of the boundary layer), and due to the oscillatory behaviour of the aerosol subtype. We have done a considerable effort in trying to disentangle the picture, and the findings are original in showing some of the strengths and weaknesses of spaceborne lidar. Moreover, such a scene is likely to be repeatable in the Amazon during the biomass burning season;

and there have not been many validation campaigns in the Amazon, and in general in the Southern hemisphere. We believe that these arguments make a good case for this publication.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 9203, 2014.