

## ***Interactive comment on “Saharan dust infrared optical depth and altitude retrieved from AIRS: a focus over North Atlantic – comparison to MODIS and CALIPSO” by S. Peyridieu et al.***

### **Anonymous Referee #2**

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The manuscript by Peyridieu et al. builds upon earlier work by Pierangelo et al. to retrieve the infrared optical depth and altitude of Saharan dust over the North Atlantic. It is a good study that depicts a very consistent picture of the dust spatial and temporal variability over this region. I have the following comments to improve the manuscript further:

It is not clear to me why situations where less than 5 atmospheres satisfy the criterion on the distance  $d_0$  are rejected. If just a few atmospheres (strictly less than 5) provide a very good fit to the observations, then why should they be excluded? How often does this happen? Why is this an improvement to the method of Pierangelo et al.? What are

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the other improvements?

I accept it is difficult to validate the retrieval of the aerosol optical depth at 10  $\mu\text{m}$  as there is no ground measurement for this quantity. However it might be worth speculating what sort of ground-based measurements might be suitable to document the accuracy of the satellite retrieval.

The PARASOL data should be reprojected on the same grid as the MODIS and AIRS data in Figure 4 and the same color scale should be used. It is difficult to see consistency (or lack of) between the AIRS and PARASOL data with the current figure. Also it would be good to know if the non-spherical AOD has been (can be) validated against observations and what the limitations of the product are.

**Minor comment:**

Figure 3 is not particularly clear. The caption should be increased to explain the figure better.

In Figure 6, change “Aerosol optical thickness” to “Aerosol optical depth” for consistency with the rest of the manuscript.

Herman et al: replace POLDER//ADEOS by POLDER/ADEOS

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Interactive comment on Atmos. Chem. Phys. Discuss., 9, 21199, 2009.

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