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Interactive comment on "Intercomparison of satellite retrieved aerosol optical depth over ocean during the period September 1997 to December 2000" *by* G. Myhre et al.

Anonymous Referee #1

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In this paper, the authors compare monthly mean aerosol products to each others as well as to monthly means from Aeronet (point) measurements. They clearly show large differences between the products, which suggests caution when using such products for further analysis (as in evaluating aerosol transport modelling). This paper is obviously the result of a lot of hard work. It is a nice compilation of currently available aerosol products and is certainly of interest for the scientific community that is not specialist of remote sensing products t but still want to use them. I would therefore recommend publication

On the other hand, the paper never goes deeply enough to understand the differences in the products; It may not be possible when the comparison makes use of monthly mean data: The data have been acquired on different days, and the monthly average may be based on a rather small number of valid days. As a consequence, large differences shall be expected, even if each individual measurement is of perfect quality. The same can be said on spatial means that are shown in Figures 2, 3 and 4. The spatial coverage of the various satellites is quite different (see Fig 1), so that the ocean means are based on different regions. As the tropical areas have a rather large aerosol load compared to other regions, and some aerosol products are limites to these regions, difference including biases are expected. Because of these limitations, it is difficult to analyse the causes for differences and biases based on monthly means.

The paper could be better presented. Despite a number of English speakers in the author list, the language is not better than mineĚ There is a very large number of figures, and some of them are not realy needed (Fig 1c, Fig 2b, 2c). Fig 8 is hard to read.

P8204 l25: POLDER, MODIS and MISR are well suited to monitor aerosols, but they have other objectives. They are not dedicated to this task. P8206 l25: to convert TOMS AOD from the UV to the visible, which monthly mean at 550 is used ? P8207 l22-24: Not clear. This paragraph discusses the accuracy of sunphotometer AOD measurements. Sunphotometer measure directly the AOD and are not affected by particle shape or size distribution as these sentences indicate.

P8208 l19. The limited coverage is not due to orbital drift, but rather to low sun at the local time of observation which limits aerosol retrievals. The fact that measurements are available for given years and not for others at mid latitudes is due to a different time of observation, which is a result of orbital drift.

P 8208 l27: It should be easy to tell whether aerosol in Northern Pacific are predominantly pollution or sea salt from the Angstrom coefficient.

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P 8213 l24 to P!214 l 11: There is a discussion on the effect of water vapor and clouds on the AOD and how it may affect its spatial variation. This discussion is not clear, and I did not understand the conclusions. If there is no conclusion, one may simply say that aerosol-cloud interactions may affect the AOT, leading to biases in the point measurement of the photometer and the area-averaged of the satellite product.

P8214 l24: A low value of SeaWifs monthly averaged compared to the satellite product is expected as large optical depths are removed before computing the monthly mean.

P8215: One discusses the number of Sunphotometer measurements used to compute a monthly mean. One should make a similar discussion for the satellite products that may also be based on a limited number of measurements.

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 8201, 2004.