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Interactive comment on "Multi-modal analysis of aerosol robotic network size distributions for remote sensing applications: dominant aerosol type cases" *by* M. Taylor et al.

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We would like to thank Dr Andrew Sayer for quickly pointing out that the introductory paragraph needs re-writing. We apologise for this. It was not picked up during the initial submission stage which reported a very low similarity score via the authenticity checking software. As Dr Sayer kindly says, the entire paragraph is based on a paragraph in (Sayer, A. M., A. Smirnov, N. C. Hsu, and B. N. Holben, 2012, A pure marine aerosol model, for use in remote sensing applications, J. Geophys. Res., 117, D05213, doi:10.1029/2011JD016689) – which provided what we considered the most clear and concise description of how satellite retrievals depend on models of particle

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size and composition (and also surface reflectance information). We suggest changing the wording of the introductory paragraph from:

"Satellite retrievals of aerosol optical depth (AOD) and related parameters typically require the use of prescribed models of aerosol size and composition. In particular, the aerosol volume size distribution (AVSD) and the spectral complex refractive index are needed to compute properties such as the scattering phase function, the single scattering albedo and the extinction coefficient, which are in turn used to calculate quantities such as the total AOD from the columnar abundance. In general, the information content of measurements from current satellite radiometers is insufficient to unambiguously retrieve all these parameters particularly when the (spectral and directional) behavior of the surface reflectance is unknown (Hasekamp and Landgraf, 2007). For this reason, aerosol retrieval algorithms employed by most of these sensors are required to make assumptions about microphysical properties. The consequence is that these assumptions then contribute to differences in retrieved AOD – even in the idealized case of a black (non-reflecting) surface (Kokhanovsky et al., 2010)".

to the following:

"The retrieval of parameters such as the aerosol optical depth (AOD) from satellite measurements is accomplished by algorithms that model the optical characteristics of columnar aerosol (the spectral scattering phase function, single scattering albedo and extinction coefficient) via parameters of microphysical structure including the aerosol volume size distribution (AVSD) and the spectral complex refractive index. Retrievals are therefore rather sensitive to the choice of model of particle size and composition. The complete set of parameters Furthermore, difficulties are compounded by the fact that the complete set of required parameters cannot presently be obtained unambiguously (Hasekamp and Landgraf, 2007) especially when the spectral and directional behavior of the surface reflectance is unknown (Kokhanovsky et al., 2010)".

We will reply post a further reply in answer to Dr Sayer's scientific comments and

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suggestions as soon as we have performed a couple of test runs to investigate whether or not the coarse mode double-hump remains when ensemble averages of marine AVSDs are modeled with this method.

Kind regards,

Michael Taylor (Corresponding author)

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