

## ***Interactive comment on “Statistically optimized inversion algorithm for enhanced retrieval of aerosol properties from spectral multi-angle polarimetric satellite observations” by O. Dubovik et al.***

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Received and published: 3 April 2011

Dr. Kokhanovsky

We thank you for your comment and for efforts you have been spending for editing our manuscript.

We have carefully analyzed all reviews and comments that were received during open AMT discussion. We addressed most of the questions in the revised manuscript

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and provided detailed answers to every posted interactive comment. The text of the manuscript was read and corrected by a native speaker.

Please, find, below the reply to the specific remark you have made.

1. Remark: “If possible, please, add more discussions on the complex refractive index of atmospheric aerosol and its treatment in the retrieval procedure. The atmospheric aerosol (at a given location) is composed of various substances with different refractive indices. In some cases, the particles of different size ranges (and habits) also have very different refractive indices.”

Answer: In our algorithm we retrieve the values of spectrally dependent complex refractive index similarly to the approach used in AERONET retrieval. We use an assumption that particles of all sizes have the same refractive index. We use this assumption following the results of the sensitivity studies by Dubovik et al. 2000 that demonstrated the indicated major limitations of remote sensing observation in discriminating between refractive indices of fine and coarse modes of aerosol. At the same time, the possibility of retrieving several aerosol components with different refractive indices is also assumed and sensitivity of polarimetric observations to multi-component aerosols is planned to be verified in follow on studies. We have added the clarification in the text of the revised manuscript.

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Interactive comment on Atmos. Meas. Tech. Discuss., 3, 4967, 2010.