

Interactive comment on “Columnar aerosol size distribution function obtained by inversion of spectral optical depth measurements for the Zanzan, Iran” by A. Masoumi et al.

Anonymous Referee #3

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Review Manuscript # amtd-3-2367-2010 Columnar aerosol size distribution function obtained by inversion of spectral optical depth measurements for the Zanzan, Iran By A. Masoumi, A. Bayat, and H. R. Khalesifard

Paper reports the results of aerosol property retrievals over Zanzan, a city in Northwest Iran (36.70 N, 48.51 E) from October 2006 to September 2008, i.e for period of nearly 2 years. Authors used observations from a Cimel CE318-2 sunphotometer at 4 wavelength: 440 nm, 670 nm, 870 nm, and 1020nm. They designed a retrieval scheme to obtain particle size distribution for the four broad intervals: 0.005-0.5 mcm, 0.5-1 mcm,

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1-1.5 mcm, 1.5-2 mcm. Results were reported as monthly statistics of aerosol optical depth (AOD), Angstrom parameter, as well as concentration of fine mode (<1mcm) and coarse mode (>1mcm). Authors concluded that the fine mode aerosol dominates during winter months, and coarse mode aerosol is typical for summer months due to increased level of dust in the atmosphere. Reported results is an interesting and important contribution toward better understanding of aerosol properties in Northwest Iran.

Overall, authors carried out the large amount of work with observations, processing and analysis. I could recommend publishing this paper after the critical comments listed below are addressed.

Critical comments:

- 1) Some explanations are required about the choice of constant refractive index of 1.45. Conduct the sensitivity study and evaluate uncertainties of derived results using other reported values of refractive index with non-zero imaginary part. It is commonly recognized that aerosol and dust particle in the region under investigation may have a non-zero imaginary part of the refractive index.
- 2) Provide better review of standard methods for aerosol retrievals from the ground sun-photometer observations and available results for the regions with similar atmospheric conditions and climatology.
- 3) It would be beneficial to compare results of this work with available satellite retrievals from MODIS, MISR and SEVIRI (Meteosat).

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