

Interactive comment on “Retrieval of atmospheric optical parameters from ground-based sun-photometer measurements for Zanjan, Iran” by A. Bayat et al.

Anonymous Referee #1

Received and published: 17 August 2010

The manuscript reports results of Cimel sun photometer measurements of aerosol optical depth and column water vapor in Zanjan, Northwestern Iran. The subject of the manuscript is appropriate to AMT but I am not sure that the paper is suitable for the Special Issue on Tropospheric Profiling. The paper contains some significant original material that is not available in the AERONET database. The results presented in the paper are interesting. The methodology of calculating the aerosol and water vapor parameters is based on well established procedures. However, critical information about the data quality assurance is missing.

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(1) Calibration of a Cimel instrument is crucial for the quality of data. Basically, the calibration components of the instruments should be calibrated once a year. The authors do not provide information about when and how they arranged the calibration procedures.

(2) The authors mention that the city of Zanjan has good weather conditions for sun photometer measurements. However, even for those good weather conditions the deployment of an automatic instrument poses a problem of cloud screening. The automatic Cimel sun photometer acquires data regardless of sky conditions. Unfortunately, the authors say nothing about the procedure of cloud screening the acquired data.

(3) According to Eq. 2 of the paper, ozone (and possible nitrogen dioxide) absorption is not accounted for while calculating the aerosol optical depth. This introduces a bias in the retrieved optical depth that is particularly important for low aerosol loadings.

Interactive comment on Atmos. Meas. Tech. Discuss., 3, 2633, 2010.

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