Atmos. Chem. Phys. Discuss., 8, S9568–S9570, 2008
www.atmos-chem-phys-discuss.net/8/S9568/2008/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Assessment of the MODIS Collections C005 and C004 aerosol optical depth products over the Mediterranean basin" *by* C. D. Papadimas et al.

C. D. Papadimas et al.

Received and published: 1 December 2008

We would like to thank Referee #1 for his helpful comments. Indeed, in our analysis we have used Level-3 MODIS C005 and C004 aerosol datasets to evaluate the performance of the second generation Collection 005 MODIS operational algorithm for the greater Mediterranean basin. In this context, both C004 and C005 AOD datasets were compared against ground based AERONET measurements. We agree that using Level-3 AOD data, averaged for grid boxes of 1degx1deg (100 Km resolution) , for comparison against point measurements from AERONET may not be that adequate since the Level-3 data may lose detailed spatial features of aerosols, and thus could affect the statistics. Instead, Level-2 data, available at a spatial resolution of 10 Km at nadir, should be more adequate for such comparisons. Therefore, as suggested by

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the Referee, we made use of Level-2 MODIS AOD data for comparison against seven (7) important AERONET sites over the study region (Mediterranean basin) to assess the uncertainty introduced by the use of Level-3 data. The sites were appropriately selected in order to be representative for the different aerosol types that are observed over the greater Mediterranean basin (e.g. urban, desert, maritime) also ensuring a homogeneous and complete spatial coverage of the study region. The selected AERONET stations are: Nes Ziona, FORTH, Bucarest, Etna, Ispra, Ville Franche and Blida. In our analysis, we applied the spatio-temporal window technique described by Ichoku et al. (2002). We finally used 50x50 Km window sizes, for the reasons explained by Ichoku et al. (2002). For each day of our study period, and for each station, we performed the comparisons using the derived Level-2 AOD data and compared the results with those obtained from the comparison between MODIS Level-3 and AERONET. The results of this analysis have shown that the findings and conclusions of the paper (using Level-3 data) remain unaffected. Thus, the improved performance of MODIS Collection 005 with respect to Collection 004 in terms of comparison against AERONET, as well as the general decrease of AOD values over the study region (with decreasing values over land and slightly increasing values over ocean) are valid whether using Level-2 (10 Km resolution) or Level-3 (100 Km resolution) data. Specifically, our analysis has shown that the correlation coefficients (R) between MODIS and AERONET did not change drastically using Level-2 instead of Level-3 data. Specifically, the differences in R values did not exceed 0.02 (only for the single case of the Nes Ziona station Level-2 provided a larger increase of R equal to 0.18). It is important that no systematic behaviour was found for the examined stations in terms of performance of Level-2 and Level-3 data against AERONET, i.e. for some (3) stations a better comparison was found using the Level-2 than Level-3 AOD data, against a worse comparison for some (3) other stations. In addition, the computed correlation coefficients between the Level-2 and Level-3 AOD data are quite high, with values ranging from 0.84 to 0.99. Finally, the differences between MODIS and AERONET are similar using either Level-2 or Level-3 data. Thus, the differences range from -0.09 to 0.07 for Level-3 data,

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and from -0.09 to 0.12 for Level-2. The relative percentage differences, with respect to AERONET AOD values, between using Level-2 and Level-3 AODs are smaller than 5%. This interpretation of data has been added in the text (page 10, line 30 through to page 11, line 29) and was also summarized in the Conclusions (page 14, lines 16-17).

References

Ichoku, C., D. A. Chu, S. Mattoo, Y. J. Kaufman, L. A. Remer, D. Tanrι, I. Slutsker, and B. N. Holben, 2002: A spatio-temporal approach for global validation and analysis of MODIS aerosol products. Geophys. Res. Lett., Vol. 29, No. 12, doi:10.1029/2001GL013206.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 16891, 2008.