

Interactive comment on “Intercomparison between aerosol optical properties by a PREDE skyradiometer and CIMEL sunphotometer over Beijing, China” by H. Che et al.

Anonymous Referee #1

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General Comments

The paper addresses the important question in how far the SKYNET and AERONET ground-based measurements of aerosol optical properties agree with each other. New SKYNET data are presented, and are compared with AERONET measurements performed at the same site. Generally, there seems to be a good agreement, although discrepancies exist for the single scattering albedo and imaginary refractive index, especially at wavelengths larger than 670 nm. These differences are acknowledged, but not expanded upon by the authors. The second part of the paper attempts to classify three different aerosol scenarios in Beijing, China in 2004. The scenario type is es-

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Interactive Discussion

Discussion Paper

estimated from MODIS satellite data, and pyranometer and PM10 measurements were taken into account in the analysis, in addition to SKYNET and AERONET measurements. The aerosol scenarios could be convincingly classified as dust, pollution, and background, and this conclusion was supported by backtrajectory analyses of each studied scenario.

Specific Comments

p. 16025 - I.2/3: Comment: Ground-based measurement networks are very useful for studying aerosol (optical) properties, but they cannot obtain global coverage. This can only be achieved by satellite measurements (and eventually by aerosol models). - I.15/16: Why are the quoted studies not sufficient to compare the AERONET and SKYNET? What were their conclusions? p.16029 - I.11/12: Mightn t a comparison of an interpolated SKYNET value of Angstrom exponent at 440 nm with AERONET Angstrom exponent at 440 nm be more informative than a comparison of alpha(400 nm) and alpha (500 nm) of SKYNET with alpha (440nm) of AERONET? - I.15: The third percentage on this line (0.06%) seems extremely small for values that correlate so badly (as seen in figure 2), especially since the percentages calculated for larger wavelengths are larger despite the (much) better correlation p. 16030 - I.2/3 and I.15/16: why are the number of measuring days and the number of measurements not consistent? p. 16031 - I.24 and further, figure 7: There are MODIS instruments on NASA s TERRA and AQUA satellites; please include the satellite (AQUA for 7 September and 28 March 2004, TERRA for 13 December 2004) and the overpass time. There are MODIS pictures at better resolution available from the AERONET website (although not for 13 December 2004); personally I don t think one can make very conclusive remarks from the figures shown in the paper due to the small scale. p. 16032 - I.18: Please mention that the AOD were obtained from SKYNET measurements. Why are they not compared with AERONET data? This is available at the website for all days mentioned. The comparison will show that on the clear and hazy days the AOD for both measurement types agree very well, whereas on the dusty day the AOD retrieved

by AERONET is much higher than by SKYNET, presumably because the assumption of spherical particles (in case of SKYNET) is wrong in this case. p. 16033 - l.10 and further: The single scattering albedo, as well as other optical parameters, cannot be accurately determined at very low ($\ll 0.4$) AOD. This is most probably the reason for the strong fluctuations seen in figure 12. Might this also be the reason that the correlation of the aerosol parameters studied in the first part of the paper decreases with increasing wavelength (and, therefore, generally decreasing optical depth)? What happens to the correlations of the aerosol parameters if they are separated according to AOD (e.g. in a scatter plot with only values for $\text{AOD} > 0.4$ or $\text{AOD} < 0.4$)?

Technical Corrections

p.16024 - l.16: probablyly -> probably - l.19/20: a part of the sentence before CAN on l.20 is missing p.16025 - l.17: nearby -> nearly - l.17: include OF between YEAR and SIMULTANEOUS - l.21: lights -> light p.16028 - l.17 and further: intercompare -> compare p. 16029 - l.9: remove one THE p.16030 - l.7: skyradiometr -> skyradiometer p.16031 - l.4/5: systemically -> systematically - l.19: skyradiometr -> skyradiometer p.16032 - l.1: effect -> was present - l.2: three -> two (pyranometer measurements shown for only two days) - l.28: add ON THE DUSTY DAY between AND and ARE p.16033 - l.23 and further: bi-mode -> bi-modal - l.28: difference -> differences p.16034 - l.2: very lower -> much smaller - l.5/6: insert RELATIVE between THE and FINE MODE, substitute POSSESSES LARGE SCALE with IS LARGER WITH RESPECT TO - l.15: past -> passed - l.15: acrossed -> crossed - l.16: northeastwardly -> southwestwardly - l.22: original -> originally p.16035 - l.21: systemically -> systematically p.16036 - l.4: manufactory -> manufacturer

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