

Interactive comment on “Saharan dust events at the Jungfrauoch: detection by wavelength dependence of the single scattering albedo and analysis of the events during the years 2001 and 2002” by M. Collaud Coen et al.

Anonymous Referee #1

Received and published: 9 January 2004

Review of paper: Saharan Dust Events at the Jungfrauoch: Detection by wavelength dependence of the single scattering albedo and analysis of the events during the years 2001 and 2002. Authors: M.C. Coen et al.

The authors present wavelength dependent measurements of dust aerosol absorption and scattering from a high altitude site in Switzerland. The measurement data of absorption, scattering, extinction and single scattering albedo (SSA) are represented as exponents of a power-law dependence of the wavelength. These exponents are sensitive to changes in the aerosol type and can be used effectively to identify the onset of a Saharan dust event (SDE). Very few measurements of the wavelength dependence

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of absorption and especially single scattering albedo are available, which makes this study important to the atmospheric community. The wavelength dependent SSA is an important parameter for calculating aerosol radiative forcing. Most radiative transfer models either assume a constant wavelength independent value for the SSA or calculate the value from assumed aerosol refractive indices, size and geometry. The finding of an SSA that increases with decreasing wavelength for dust aerosol is significant information for modeling of dust forcing.

My one major concern of this paper is the absence of a scattering correction to the aethelometer data. Aerosol scattering will enhance filter measurements of aerosol absorption, leading to anomalously high absorption and low single scattering albedo values. Typically this correction is about 2% of the aerosol scattering coefficient. This correction may be insignificant at this particular location because of the relatively clean atmosphere and low aerosol scattering coefficients. However this omission by the authors should be stated.

Comparison of aethelometer data to uncorrected PSAP data makes the seemingly good correlation between these two instruments suspect. A comparison of these instruments should use the corrected PSAP data. These corrections are well known, are used in most published PSAP measurements and are published in Bond et al., 1999.

The detailed description of the meteorology which led to Saharan dust reaching the Jungfraujoch site, while interesting, does not enhance the understanding of the dust aerosol characteristics or transport. Using a simple trajectory model to correlate dust events with changes in aerosol properties is enough justification that a dust event occurred at the site. The detailed climatological discussion detracts from paper's subject, which are the optical characteristics of dust aerosol.

Interactive comment on Atmos. Chem. Phys. Discuss., 3, 5547, 2003.

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