

Interactive comment on “A detailed characterization of the Saharan dust collected during the Fennec Campaign in 2011: *in situ* ground-based and laboratory measurements” by Adriana Rocha-Lima et al.

Anonymous Referee #1

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Review of “A detailed characterization of the Saharan dust collected during the Fennec Campaign in 2011: *in situ* ground-based and laboratory measurements” by Rocha-Lima et al.

The publication describes spectral optical scattering/absorption and mass concentration measurements performed at two locations in Mauritania and Algeria during an intensive operation period of the Fennec campaign in 2011. Moreover, it includes supplementary measurements of size distribution, particle density and bulk chemical composition. For the optical measurements the authors use a new combined approach of

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nephelometry and filter-based reflectance measurements, which they describe shortly. They present time series of dust concentrations and optical properties like single scattering albedo and imaginary part of refractive index, which are set into context with third party and literature data. They conclude that fine mode dust can be at times dominate the dust optical properties and that Saharan dust is not uniform and should not be considered as homogeneous, e.g. for later modeling purposes.

The paper is well-written and clearly structured, references are made where appropriate. The new technique is not described in detail, some more information or a reference would be helpful here.

Apart from that, only some minor remarks are to be regarded from my point of view:

P6L4 and P15L8-10: Aerodynamic diameter is defined for spheres, and non-spherical particle shapes like for dust will lead to larger aerodynamic diameters, so the 6.1 μm cut-off is most probably a minimum estimate. Reversely, it might not only the density of the particles leading to a different aerodynamic diameter.

Figs. 3 and 4: I suggest combining into one figure with single time axis to facilitate comparison.

P11: I suggest moving the method description to a single chapter before results (as in the pages before) are presented. Also, more information on the new technique should be provided (e.g., a calibration plot of a material with known optical properties).

P15L3-17: Damage by the electron beam and low aerodynamic diameter indicates biological debris. Is there no EDX spectrum available?

P15L28: Numbers of stages / pore size exchanged.

Caption figure 9 and other places: SEM sizes refer usually to projected area equivalent diameter. Although geometric diameter is not totally wrong, I suggest using the more precise term.

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P18L15-16: In which cases dust particles are commonly spherical?

Fig. 12: Comparison with total aerosol mass would make more sense, if oxide weights would be used, where applicable.

P21L5-7: How significant is the vanadium (and chromium signal), as it might be tracer for certain industrial activities?

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