

## ***Interactive comment on “Variability of the infrared complex refractive index of African mineral dust: experimental estimation and implications for radiative transfer and satellite remote sensing” by C. Di Biagio et al.***

### **Anonymous Referee #1**

Received and published: 12 May 2014

Di Biaggio et al. present a very interesting study on the infrared refractive index of desert dust. The manuscript is well structured and the work is precisely described. As the presented work might be of very high value for many researchers I strongly recommend publication of the manuscript after some minor revisions.

I have only one major comment which the authors might wish to think about. I would strongly encourage the authors to provide the refractive index data of their study, either as table or in the form of harmonic oscillator parameters. Potentially the data

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can be provided online as supplementary material along with the online version of the manuscript, if the authors wish to not add an additional table. As they correctly describe, many applications rely on at best inappropriate descriptions of the optical constants of mineral dust. So providing the new set of dust refractive indices would potentially be extremely beneficial for a whole range of applications.

Minor comments:

I. 94: Chlorite is not really a clay mineral.

I. 95: I know that iron oxides locally strongly contribute to mineral dust. What would be typical fractions of titanium oxides? Are they important on large scales?

I. 223: Ryder et al. (2013) found particles up to  $100\mu\text{m}$  during the Fennec campaign. Given the OPC measurements, how likely is it that the large / giant particle fraction is underestimated in the size distributions?

I. 291: I understood that the particles have diameters smaller than  $20\mu\text{m}$ , which would be about the Mie-scattering particle size. How realistic then is the assumption, that scattering effects can be neglected? It would be worth to comment a bit more on this assumption.

Section 5.3: OPAC (and other older databases) have a quite coarse spectral resolution in the thermal infrared window. It would potentially be worth to discuss this point, especially in the light that a couple of spectral features are not represented in the OPAC optical properties.

I. 660: Which algorithm for calculating the Mie-scattering functions has been used? Especially for the small ( $x < 1$ ) particles described here, how stable is this algorithm when approaching the Rayleigh limit? For the Rayleigh limit itself, has there any other approximation been used, which is not original Mie theory? If so, which one?

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Interactive comment on Atmos. Chem. Phys. Discuss., 14, 10597, 2014.

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