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## ***Interactive comment on “On retrieving refractive index of dust-like particles using shape distributions of ellipsoids” by O. Kemppinen et al.***

**Anonymous Referee #1**

Received and published: 30 August 2015

The paper by Kemppinen et al. aims at analysing the capability of ellipsoids optical models in reproducing the optical properties of irregularly shaped dust particles. In particular the analysis focuses on the retrieval of the particle complex refractive index. The main results of the paper show the high limits of the ellipsoids-based retrievals in accurately reproducing the properties of dust, and also the impact of the obtained results on the calculations of particles optical properties (single scattering albedo, asymmetry parameter) and radiative effects. The analysis carried out in this paper is quite useful for the community working on the retrieval and modelling of the dust optical properties and estimates of their radiative effects.

The paper is well organized, well written, and the discussion is performed in a balanced way. The limits of the used approach and of the results are discussed in a clear manner.

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The number of figures and tables is correct, and the cited references are appropriate.

I find the paper a very good read, as well as a useful contribution for people working on this topic. I recommend the publication of the paper on ACP. I have only few minor comments listed below.

#### Minor comments

Title: I wonder if the title is not misleading. Actually the retrieval of the refractive index is just used as a test to verify the performances of the ellipsoids-based retrieval technique. However a similar analysis could be performed focusing on another optical parameter. By reading the paper then I can understand the sense of the used title, however I would encourage the authors to eventually reconsider it.

Section 2.2, line 7: please give some more details on the stereogrammetry technique.

Figures 3 and 4: it is not clear by looking at the figures how to separate the contributions of Cal, Agg and Sil, as discussed in the text. Moreover, Sil is not mentioned in the captions of the two figures. So, please clarify to the reader how to read the figures.

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Interactive comment on Atmos. Chem. Phys. Discuss., 15, 16861, 2015.

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