

The following are responses to the comments from Referee #2. All responses have been highlighted in light blue for clarity. Please note that all referenced pages and line numbers pertain to those found in the submitted manuscript dated 14 May 2010.

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Indeed this paper represents an interesting sensitivity study of the dependence of mass extinction efficiency of mineral dust. I recommend the paper for publication.

1. Prior publication I would suggest the authors expand the discussion and summary sections. What are the implications for satellite retrievals other than AVHRR? Is it possible to use measured values (field observations and laboratory data) in order to give a best range of likely values?

Per the recommendation of referee #2, the discussion and summary sections will be expanded to include other implications for satellite retrievals besides AVHRR. We are also adding per the recommendation of referee #1, the MEE values corresponding to hematite mixtures of 2%, (please refer to Lafon et al. 2006 and Formenti et al. 2008, for example) as well as mixtures of minerals identified during the SAMUM 2006 field study (Kandler et al. 2008) and an aerosol mixture of dust-soot using the OPAC database (please see our response to referee #1's first comment). This will help compare the full envelope of possible MEE values determined previously (refer to point 3 on page 6 of manuscript) with those that are more representative of typical scenarios. As a note, a more thorough and detailed investigation of dust coatings and mixtures will be formally addressed in an upcoming research study.

2. Is it any possible to make recommendations regarding microphysical parameters that should be better constrained by future measurements?

This is a great question. Constraining these critical microphysical parameters in future measurements is an overlying goal in experimental work and is desperately needed by the modeling community. Take for example particle size. Unfortunately differences in the measurement techniques and in the instruments themselves make constraining these key parameters quite difficult. See for example Reid et al 2003 regarding particle size measurements. Ultimately these differences can result in size distributions having different equivalent diameters which can lead to large uncertainties in the aerosol optical properties used in radiative transfer models. Nevertheless, this is something that needs to be addressed for future work. A short note will be added to the manuscript to address these concerns.

3. Some of the tested model (shape mixture by Kalashnikova et al. (2002); hematite content) do not see realistic compared to more recent field observations.

As mentioned in our first response above (comment 1), we are evaluating the MEE of more realistic hematite mixtures (i.e. 2%) of dust aerosol.

4. Minor comments: Check the reference list, many of them are inconsistent or missing (ex. Farmer).

Thank you for pointing this out. This was also brought to our attention by referee #1. These are all being re-checked for consistency and will be updated accordingly.