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Interactive comment on "Mineralogical properties and internal structures of individual fine particles of Saharan dust" *by* Gi Young Jeong et al.

L. Shao (Referee)

shaoL@cumtb.edu.cn

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This manuscript has investigated the Sahara dust storm particles for their mineralogy and internal textures. The new method, the focused ion beam (FIB) slices, combined with the TEM-EDXS, was used to characterize the internal structures of particles. The iron compounds associated with the dust storm particles were also discussed in terms of their potential relations to the phytoplankton growth in the ocean. Some interesting results have been achieved. The manuscript was well prepared and organized. I recommend this manuscript to be published, with minor revision.

My suggestions are as follows:

1. This manuscript presented a number of mineral species according to the elemental compositions obtained by the TEM-EDXS. However, minerals have general character-

istics of 'isomorphism' or 'polymorphism', so we cannot classify the particle mineralogy merely according to the elemental compositions of particles. In this manuscript, the authors have referred to the XRD results and have also used the selected area electronic diffraction as well as lattice fringe imaging. Although these methods of mineral identification was introduced in Jeong and Nousiainen (2014), it is necessary to have a simple description of how to interpret mineral species according to EDXP patterns in this current manuscript. 2. Page 9 section'3.6 Comparison with single-particle properties of Asian dust'ïijŽIt is interesting to see that cay minerals are predominant minerals in the Sahara dust storm particles. This is different from the Asian Dust Storm (ADS) samples and I guess this is mainly due to differences in the particle sizes. Please refer to the paper on the mineralogy of the ADS dust fall and PM10 samples, in which quartz occupied a predominant position (Shao et al., 2007, ADVANCES IN ATMOSPHERIC SCIENCES, VOL. 25, NO. 3, 2008, 395-403). Please check if there are any variations of mineral types in association with the particle sizes between Sahara dust and Asian dust storm particles. Plus, the size- segregated mineral compositions may be more important in characterizing mineralogical properties. 3. Page 6, '3.2 Internal structures of individual dust particles': When discussing the internal structures of individual dust particles, 'Clay-rich particles', 'Large minerals with clay-rich coatings', 'Intergrade particles'. . ..., were classified. I am wondering if the term 'aggregate' may be more suitable for these particle categories since the particles presented in this current manuscript are actually the aggregates of minerals, i.e., rock fragments. Not necessary secondary coating. 4. Section "Samples and methods": The methodology needs to be introduced in more detail. A total of 1626 individual particles were analyzed, but how many samples were analyzed? How do you select particles on the filter? Are these samples representative of typical peak dust storm episodes or a non-storm episodes? A table of sample information may be useful. 5. The total clay content determined by XRD for the Cape Verde dust sample was 81%, matching the proportion obtained using single-particle SEM-EDXS data in this study. The value '81%' is a sme value for two cases, too precise!. The XRD measured the volume or weight percentages while

the EDXS give a number percentages, and two methods will not give the same results. Please check this carefully. 6. Page 21, Fig.2c, the ‘kaolin’ might be ‘kaolinite’?

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