

Interactive comment on “TEM analysis of the internal structures and mineralogy of Asian dust particles and the implications for optical modeling” by G. Y. Jeong and T. Nousiainen

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Reply to the comments by anonymous referee #4

We appreciate the referee's valuable comments.

Comment 1: Figure 1 would be more complete if not just clays but all important groups of sheet silicates, such as mica were included among the schematic drawings, especially that muscovite and biotite with submicrometer grain sizes are shown in Figs. 4 and 15.

Reply 1: Fig. 1 will be modified to include biotite. However, muscovite is not well dis-

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tinguished from illite due to their almost identical structure and chemistry in submicron scale. In sheet silicate mineralogy, muscovite and illite are often confused because of their similar structure and chemistry. Illite is distinguished from muscovite by its higher Al, lower K, and often fine grain size. Illite is formed in low-temperature geological environments such as by diagenesis and hydrothermal alteration, while muscovite crystallizes from magma or during high-grade metamorphism. Fine soil fractions of dust are formed by the physical breakdown of bedrock. In such source soils, fine muscovite and coarse illite are often difficult to distinguish. Thus, it is safer to group submicron dioctahedral mica into illite. Thus, we will change muscovite in Figs. 4 to illite.

Comment 2: In the caption of Figure 5: "(e) TEM lattice 767 fringe image of ISCMs. – I assume the number 767 appears by mistake. "(f) TEM lattice fringe image of ISCM and chlorite." – please mark chlorite in the image.

Reply 2: In the caption of Fig. 5, 767 should be removed. "and chlorite" is our mistake, and should be deleted. In text, chlorite is not mentioned when explaining Fig. 5f.

Comment 3: Fig. 13. I cannot see any reflections at the positions marked 0.43 and 0.46 nm in the f panel.

Reply 3: We will replace current image with a brightness-enhanced image (Suppl. Fig. 1)

Comment 4: I wish the authors had cited this paper, which I think is highly relevant to the topic since it was the first to describe crystallographically oriented aggregates of clays on other minerals in atmospheric dust: Díaz-Hernández, J. L. and J. Párraga (2008). "The nature and tropospheric formation of iberulites: Pinkish mineral microspherulites." *Geochimica et Cosmochimica Acta* 72(15): 3883-3906.

Reply 4: We will cite Díaz-Hernández, J. L. and J. Párraga (2008) in the revised version.

With the closing of discussion forum, final version will be prepared considering com-

ment and reply above.

Sincerely

On behalf of co-authors

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Interactive comment on Atmos. Chem. Phys. Discuss., 14, 6619, 2014.

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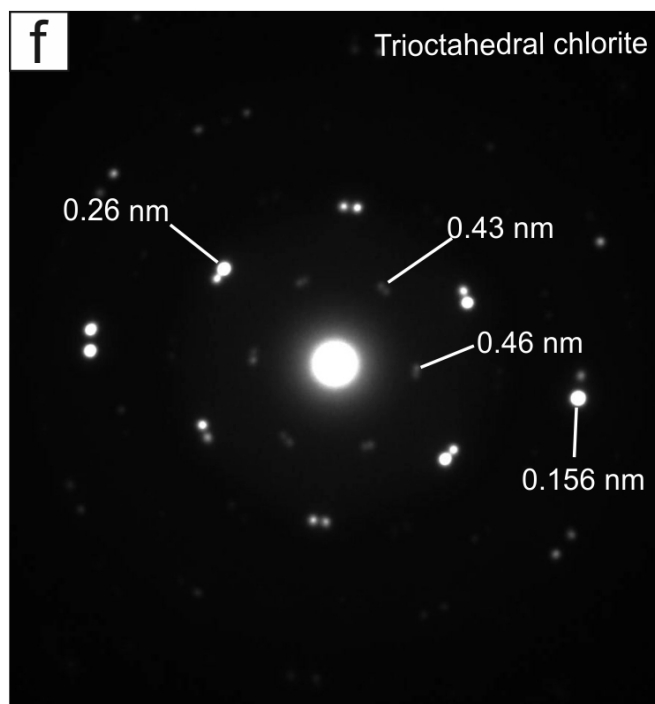


Fig. 5f. A brightness-enhanced image.

Fig. 1. Suppl. Fig. 1

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