

Interactive comment on “Surface features on Sahara soil dust particles made visible by atomic force microscope (AFM) phase images” by G. Helas and M. O. Andreae

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We thank the referee for his review. Before addressing the minor comments, we would like to point out one important feature. Referee #2 states that we made use of intermittent-contact images. This is not the case. We deliberately avoided intermittent contact methods. The reason for this choice is that the phase signal would become distorted, and thus the phase shift, each time the sensing tip touches ground. Another reason is that we do not want to touch and possibly modify the surface of the particles under investigation, a possible problem as pointed out in other publications (Behrend et al., 1998).

Minor comments:

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"In the first two paragraphs of the Introduction a general reference on AFM should be cited."

We will add as a general introduction the monograph edited by D. Bonnell "Scanning Probe Microscopy and Spectroscopy".

"an image can be formed in a similar way as is done for terrain mapping using remote sensing techniques from satellites.." This comparison may be confusing, since satellites do not change their altitude with surface topography.

We agree that our comparison for terrain mapping may be confusing. Our main aim was to say that the images are produced line after line from above the surface. We propose to say ... an image is formed line by line (page 2, line 23).

"Unfortunately, the transmission electron microscopic procedures also result in the destruction of the particles. TEM a destructive method" This is a gross exaggeration. Many types of atmospheric aerosol particles can be studied with TEM without any damage to them, only the most volatile species are destroyed.

Certainly, we had the more volatile aerosol particles in mind, when saying that TEM is a destructive method. Unfortunately, however, in our experiments we had to learn that many of the most interesting aerosol particles disappeared during investigation with TEM.

Samples were collected in 1992 "how were they stored? Is there any possibility that the surface deposits formed during storage?"

As said in response to Referee #1, we have no possibility to exclude an artifact formation during storage. We intend to include a sentence on page 10, line 4 (see response to Referee #1).

"The EFM signal varies accordingly, but obviously is much less sensitive." Why is it obvious that it is less sensitive?

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In our experiments the EFM signal obviously was less sensitive than the phase signal, as can be derived from the relative noise in the EFM and phase traces in Figure 3g. We did not want to say that the EFM technique necessarily is less sensitive. We had optimized the EFM response in our microscope system.

Literature Behrend, O. P., Oulevey, F., Gourdon, D., Dupas, E., Kulik, A. J., Gremaud, G., and Burnham, N. A., 1998. Intermittent contact: Tapping or hammering ? Appl. Phys. A 66, S219-211.

Bonnell, D., 2001. Scanning Probe Microscopy: Theory, Techniques, and Applications; Wiley-VCH, New York, U. S. A.

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