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Interactive comment on “Mixing of dust and NH₃ observed globally over anthropogenic dust sources” by P. Ginoux et al.

P. Ginoux et al.

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We thank the reviewer for the constructive and helpful comments, and our reply to each comments are provided below. Based on the reviewer’s comments, we made significant changes in the manuscript. In particular, we have added a figure showing dust and NH₃ mass burden on May 16, 2009, and we used an additional land-use dataset from Ramankutty and Foley (1999).

Comment 1: We agree that the existing figure showing the annual mean concentration is not a good indicator of actual mixing between dust and ammonia. Doing case studies to make sure that both species are mixed would help but would be cumbersome. Instead, we found dust events matching NH₃ hot spots over different regions on May 16, 2009. The Figure is used to discuss the limitation of our study, in particular that in

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Sahel the observed dust event from the Bodele is transported over the boundary layer in Sahel. We add the suggested reference in our discussion.

Comment 2: We have clarified this point. The MEE is calculated using dry uncoated dust, which may be introducing a 10% error. This error estimate is based on sulfate content in dust samples collected in West Africa.

Comment 3: We have added in Section 5, describing AERONET data, a paragraph providing the estimated error of the inversion algorithm.

Comment 4: We agree with the reviewer and we have articulated our discussion differently. We have added the two suggested references.

Comment 5: The implications of the difference of optical properties between anthropogenic and natural dust on radiative forcing will be studied in a subsequent paper.

Minor comments: - We have clarified this point and added that the "mass burden is greater than 1 mg/m²". - We have added the triammonium hydrogen disulfate. - We have clarified that the property is the mass extinction efficiency.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 12503, 2012.

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