

Interactive comment on “Aerosol acidity and liquid water content regulate the dry deposition of inorganic reactive nitrogen” by Athanasios Nenes et al.

Anonymous Referee #2

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This is an interesting and original manuscript based on scientifically sound investigation. The paper is well written and clearly structured. The paper should be published after the authors have considered the following minor issues.

Page 4, line 18: The authors state, without any justification, that the dry deposition both ammonia and nitric acid are about 10 times higher than the corresponding particulate forms of these compounds. The authors should shortly explain what this statement is based on? Dry deposition of aerosol particle is strongly dependent on particle size, so do the authors implicitly assume that both ammonium and nitrate are located in the typical accumulation mode size range? As mentioned briefly in section 6, a notable

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fraction of nitrate can be in the coarse mode at high dust (or sea salt) loading, which would increase the deposition velocity of particulate nitrate.

When investigating and discussing the implication of this study, the authors emphasize air pollution accumulation. This is certainly an important implication. Another theme that the results of this study might have implications are the strength and spatial distribution of nitrogen (also acid) deposition. Could the authors elaborate this issue a bit more than just mentioning "prediction of nitrogen deposition flux" in one place (page 11, line 8)?

The caption of Figure 4a is insufficient to understand its contents, especially differences between the filled circles and lines. Figure 4a is first discussed in section 4, but it is not until section 5 where meaning of the lines in Figure 4a are shortly mentioned.

What are the 2 different columns under "Beijing" and "Xi'an" in Table 1? They are not explained in Table neither in table caption. The same table has footnotes a and c not explained anywhere.

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