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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Dry versus wet marine particle optical properties: RH dependence of depolarization ratio, backscatter and extinction from multiwavelength lidar measurements during SALTRACE" *by* Moritz Haarig et al.

Anonymous Referee #3

Received and published: 17 July 2017

The paper "Dry versus wet marine particle optical properties: RH dependence of depolarization ratio, backscatter and extinction from multiwavelength lidar measurements during SALTRACE" presents a very interesting study on the effects of RH on salt particles using state-of-the-art methodologies and instrumentation. The paper is well structured and clearly written. My recommendation is publication after minor revision.

See some more detailed comments below:

P4, l16: "has been previously studied"

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P4, l23: What is the reason to consider organics here?

P6, l24: Why is the overlap not corrected at 532 nm?

P6, l30: Please, provide estimated values for the uncertainties.

P6, l8: MAL has not been defined before.

P9, l13: Consider softening this statement. From the backward trajectories analysis and the data presented here you cannot completely assure there is no mineral dust influence on 23 February 2014. P9, l32: Why are you averaging 30 min on 23 Feb and 2 hours on 24 February?

P10, l32: Rephrase this sentence "There the increase in depolarization is less pronounced as in the case, where the dried marine aerosol was found within the MAL (24 Feb 2014)."

P11, l13: Did you check somehow that the number concentration stays the same in the two cases presented here? How? The authors should include that information on the manuscript.

P12, l32: How did you include the errors of the lidar ratio in the error of fα?

P12, l17-25: You should include more discussion on the uncertainties here. A relative uncertainty of 12% in the relative humidity retrievals can lead to very large uncertainties in the enhancement factor (see e.g. Titos et al., 2016, and references therein). These large uncertainties can partly explain the differences with the different values provided in the literature.

G. Titos, A. Cazorla, P. Zieger, E. Andrews, H. Lyamani, M.J. Granados-Muñoz, F.J. Olmo, L. Alados-Arboledas, Effect of hygroscopic growth on the aerosol light-scattering coefficient: A review of measurements, techniques and error sources, Atmospheric Environment, 141, 494-507, ISSN 1352-2310, http://dx.doi.org/10.1016/j.atmosenv.2016.07.021, 2016.

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