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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Sensitivity of modeled atmospheric nitrogen species to variations in sea salt emissions in the North and Baltic Sea regions" *by* D. Neumann et al.

Anonymous Referee #2

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Review of Neumann et al. paper 'Sensitivity of modeled atmospheric nitrogen species to variations in sea salt emissions in the North and Baltic Sea regions'

This is a nice short study describing the effects of salinity and surf zone on predicted sea salt concentrations. Salinity effects are important, especially in zones with considerably lower salinity values if compared to oceans, however, very few studies have addressed this effect to date, therefore, Neumann et al. study brings valuable insights into complicated field of the sea spray parameterization. The study highlights the improvement of parameterization if salinity effects were accounted for and indicates no significant effect of surf zone as well as insignificant sea salt effects on NH4, NO3 and

SO4 concentrations. The manuscript is generally well written. There are, however, few points that need improvement, especially, the title, which doesn't seem to represent the main outcome of the paper. Therefore, I recommend that this manuscript be accepted for publishing in ACP after minor revision.

My major concern is with the capping of surf zone, although, there are some explanations why it is needed, but physical meaning is not presented. At least, I don't see it. OK, concentration increases without capping, but authors had not shown that it is bad or inconsistent with the measurements. There is no explanation for using the specific 0.47% capping either. Why this value was selected, from which measurements/considerations? How it is applicable to other regions? Removing the capping might change the conclusion of surf zone having no effect. Certainly, more arguments based on data are needed here.

Specific comments: Page 29711, line 13: spume drops are torn by wind and splash drops are created by breaking waves, I'm sure author knows that, but it should also be consistent in the paper (switch places in the text).

Page 29714, line 15: I would disagree, NaNO3 would give Na, but won't be a 'pure' sea salt, rather processed or aged sea salt. Also, line 17-18,: SO4 resulted from DMS can dominate total SO4 in some regions (Antarctic or North Atlantic Ocean), be more specific and present references.

Page 29716, Lines 15-16: It is not clear, why surf zone emissions lead to a reduction in the modeled concentrations, I would expect opposite?

Page 29716, line 20 and figure 5: It is not clear what orange line, is it orange stars?

Tables 3, 4, 5 and Figures 6, 7, 8: it is not an addition of xSO4/sNH4/ etc., but for xSO4/sNH4/. . .

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 29705, 2015.