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Interactive comment on “Model study on the dependence of primary marine aerosol emission on the sea surface temperature” by S. Barthel et al.

Anonymous Referee #2

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The paper is a quite detailed comparison of different sea-surface temperature correction parameterizations. The authors used near-surface observed concentrations of sodium and organic carbon in Europe and equatorial Atlantic. I liked the approach but could not help noticing that all the comparisons are made with regard to absolute concentrations. It may cause some issues since the dry deposition parameterization of Zhang (2001), which is recommended by Seinfeld and Pandis, 2006, was heavily criticized in recent publications. In the current case, an estimation of the related uncertainties would be needed. See also specific comments below.

Specific comments

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Line 77-78. What measurements? A reference would be good here.

Eq.4 misses all powers of temperature T_w

Eq.7, $\text{dlog}D_p$ should probably be $\text{dlog}10D_p$

Line 498-502. The resistance analogy does not work for aerosols, which has been demonstrated in series of recent and old publications. Regarding the particular reference to Seinfeld & Pandis, 2006, they refer to Zhang (2001) parameterization, which is known to give huge dry deposition fluxes with no correspondence to observations. The error is particularly large over water and for accumulation-mode aerosols. Since dry deposition is a significant factor when the sea salt emission and near-surface concentrations are considered, a proper discussion of the subject and quantification of the related uncertainty are needed.

Line 661. Temperature varying by a factor of 6 sounds strange. Please rephrase using xx degrees as a measure of variation.

Lines 650-670. Substantial part of Baltic Sea freezes, which efficiently reduces the emission fluxes and observed concentrations. I guess, this is accounted for in COSMO but discussion here would be good.

Section 4.1. Reading so many numbers from the text is painful. Arranging the mean modelled and observed values into a single table (or into separate tables for each size range) would dramatically simplify the presentation.

Fig.13. The different color scales make the factors of Zb_{13} non-comparable with the other two.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 377, 2014.

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