

Interactive comment on “A review of sea spray aerosol source functions using a large global set of sea salt aerosol concentration measurements” by H. Grythe et al.

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Answers are in bold

The paper gives a very nice overview of many of the used parametrisations of the source functions for SSA in the litterature, and based on results by the flexpart model the paper comes with the best estimate of a new source function.

We would like to thank reviewer for the positive overall assessment of our paper and the constructive responses.

C9500

1. First a minor comment about misspelling: the last line on page 20744 there are two misspelled Words.

Corrected.

2. But I have some large comments to the paper. There are some references in the paper to maartensson et al 2003. But it is only concerning the temperature dependence of the source functions. But the paper also give an expression of the source function of SSA. for SSA for the fine fraction of SSA. The EMEP model are using this source function for the fine fraction of SSA combined with the source function of Monahan for the coarse fraction. I think it could improve the paper if it also include this combined Mårtensson/Monahan source function was used as described in Tsyro, S., Aas, W., Soares, J., Sofiev, M., Berge, H., and Spindler, G.: Modelling of sea salt concentrations over Europe: key uncertainties and comparison with observations, Atmos. Chem. Phys., 11, 10367–10388, doi:10.5194/acp-11-10367-2011, 2011.

This is a good point and we did consider including the Mårtensson/Monahan (MM) parameterization, although at the end we did not do it. The main reason for this is that the Mårtensson part of this combined source function is not numerically stable. It is also not clear from Tsyro et al. (2011) whether a fixed temperature is used in EMEP or a temperature dependence is applied to the first six size bins (that are covered by Mårtensson et al. 2013) or if this also extends into sizes covered with the Monahan parameterization.

In the EMEP documentation the temperature dependence in production seems to be applied where sea surface temperature information is available. As far as we understand, the EMEP model further uses MA03 for $D_p = 0.02\text{--}1.25 \mu\text{m}$, above that it uses M86. It will be technically challenging to incorporate such temperature dependence for only a part of a source function since the size bins used in FLEXPART and EMEP are different.

C9501

Rather than to include MM we chose to highlight that the Sofiev et al 2011 (S11) is a parameterization based on the MA03 /M86 data, fitted to these functions in much the same way as it is done in the EMEP model and the combined MM source function from EMEP will yield very similar results to the S11 function for a non-temperature dependent MM function.

3. Furthermore it could be nice if the different source functions in the appendix was more clearly separated f.ex by headlines (M86, S11, S11F etc). It will make it easier to find the different source functions in the appendix.

Headlines have been added for all the source functions in the appendix. This certainly improves the reading of this section and makes it easier to navigate.

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