

Interactive comment on “Impact of climate change on the production and transport of sea salt aerosol on European seas” by J. Soares et al.

Anonymous Referee #1

Received and published: 24 March 2016

This is an interesting study on the role of an often neglected aerosol such as sea-salt in future climate scenarios. The authors use four different chemistry transport models driven by the same meteorology (climate scenario SRES A1B) and assess the changes in sea-salt emissions, concentrations, depositions and radiative forcing between the periods 1990-2009 and 2040-2059. The manuscript is within the scope of ACP, it is well written and the scientific analysis is thorough and clear. Therefore I recommend publication in ACP after the authors address the following comments:

1. In section 2.3 the authors should make more clear that in DEHM and EMEP the sea salt flux parameterisation assumes a constant 80% RH while MATCH and SILAM use the RH from the climate model. This is stated in Table 1 but should also be emphasized in the text since RH is an important component of the sea salt flux formulation.

C1

2. Including also the basic equations described in sections 2.3.1-2.3.3 (may be in supplement) would help in clarifying the main differences between the models.

3. Lines 169-170: “The fine and coarse fractions in the DEHM model are in the current paper assigned the dry diameters of 1 μm and 6 μm ”. Do you assume a lognormal or some other type of size distribution? Please clarify. The same in lines 192-193, 204-205, 238-239.

4. Please clarify the use of different values for dry/wet sea-salt density (1150 kg/m³, 2200 kg/m³) in the different models.

5. Correct person to pearson Figures 2,3.

6. Line 320 : regional

7. What are the 5 first lines in Table 3?

8. Figure 2 is not needed since the information is already included in Table 3.

9. Line 476: differences

10. Line 555: for all

11. Lines 565-566: “Conversely, warming is predicted where the albedo is high and the AOD is low, e.g. over the mountain tops in Norway and Italy”. I don’t see any warming in Fig12a over the mountains. To me it looks like a net cooling of up to -0.28 W/m² over these areas. In general I am a little confused about the radiative forcing results. Less cooling is not warming and to my understanding the effect of sea salt is found to be an overall cooling for both periods. Including also the corresponding radiative forcing plot for the future runs in Figure 12 could clarify this.

12. Line 567: Could you provide an estimation on the uncertainty range for this result?

13. Line 612: Replace “,” with “;”

14. Line 615: change on SSA deposition

C2

15. Line 617: questions

16. Lines : 619-621 – not clear please rephrase

17. Line 626: mainly

18. Sea salt particles may serve as CCN for the formation of warm clouds especially in the Mediterranean. Such indirect effects should be also discussed in the analysis.

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2015-1056, 2016.