

Interactive comment on “Simulation of fine organic aerosols in the western Mediterranean area during the ChArMEx 2013 summer campaign” by Arineh Cholakian et al.

Anonymous Referee #1

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This manuscript presents a study concerning Secondary Organic Aerosols (SOA) over the western Mediterranean basin using the Chemistry Transport Model (CTM) CHIMERE. This study is done in the framework of the ChArMEx project. The aim of the study is to compare four different ways of modelling SOA in the CHIMERE model using SOA measurements made during ChArMEx, especially the SAFMED campaign. After an introduction, the manuscript presents the CHIMERE model and the four SOA schemes used in this study. Section 3 presents the observation used in this study for the validation of the model simulations done in section 4 and 5. The selected SOA scheme, being the modified VBS is then used to simulate the organic aerosol over the western part of the Mediterranean basin in order to examine the composition of the

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organic aerosols.

This manuscript is well presented and gives an extended validation of the organic aerosols over the two main ground stations used during the SAFMED campaign. The authors deal with the issue of the orography that appears here over the Erba station. The solution provided is original and very interesting. The sentences are sometimes too long. They may be hard to understand sometimes.

I would then recommend minor revisions before publication.

General comments:

1. Page 6, line 2: I don't understand the aim of the sentence "Four volatility bins are added for anthropogenic and biogenic SOA ranging from 1 to $1000\mu\text{g}\cdot\text{m}^{-3}$ ". You say on page 5, that you have 9 volatility bins between 0.01 and 10^6 , corresponding to the figure SI2. On the Figure 2, you represent the 4 volatility bins between 1 and 1000. Which bins do you use in the model? Please make the manuscript clearer.
2. Page 10, line 34: I don't understand what you mean by "for regimes".
3. Page 12, line 18-20: Could you explain a little more the cloud effect affecting aerosols concentrations.
4. Page 18, line 10-12: The concentrations of allPOA around Corsica does not reach $1.5\mu\text{g}\cdot\text{m}^{-3}$ in figure 12.g. Same for figure 13.e and the 30% of allPOA to the OA. Could you correct the text.

Figure related comments:

1. Figure 4: You mention a, b and c, but they are not reported on the figure.

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2. Figure 5.b1: The blue ribbon around the date 20130726 seems weird. As I understood your method, it should be placed around the simulation results (blue line), but on these part of the graph it seems to be around the black line corresponding to the observation. Could you explain why?

Technical comments (when a letter or a word is missing, it is in bold in the comment):

1. Page 5, line 26: Please add "SI1" after "in the supplementary information".
2. Page 6, line 33: as in Shrivastava et al. 2013 -> as in Shrivastava et al. (2013)
3. Page 6, line 36: life time -> lifetime
4. Page 10, line 14: Please add "Orographic Representativeness Error" for the clarity of the text.
5. Page 12, line 30: You say the correlation is 0.26, but in the table it is 0.36 for Ersa and 0.47 for Es Pinar. Could you correct, or explain?
6. Page 14, line 22: Could you precise what US stands for?