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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Contribution of ship traffic to aerosol particle concentrations downwind of a major shipping lane" *by* N. Kivekäs et al.

Anonymous Referee #1

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Comment on "Contribution of ship traffic to aerosol particle concentrations downwind of a major shipping lane", by Kivekäs et al. The authors present a methodology for the quantification of the contribution of ship traffic to particle number and mass concentration. The method is intended for use at other on-shore field sites. The method presented is rather simple and allows for a reasonable estimation of the ship contribution. The main sources of error have been included and presented.

Comments: Pag. 8421, Line 11: "Emissions of SO2 lead to the formation of sulfate aerosol particles, which generally. . ."; Remove "generally"; Pag. 8421, Line 17: ". . .to 0.5% sulfur. . ."; Remove "sulfur"; Pag. 8425, Lines 22-24: How were the losses taken

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into account? Pag. 8426, Lines 13-14: Can the authors say whether there have been rainy days weighting down the calculated mean contributions from ships? Pag. 8427, Lines 3-10: This part of the manuscript is not very clear. The days were classified into 4 categories based on the trajectories. For example a ship day is a day when all trajectories arrive from the sea. Does it mean that all the calculated air masses cross the shipping lane during 24h? Please, clarify this point. A sea day is defined as "a day when all trajectories arrive from the sea (either from south or north)". However, in Figure 4 there are no trajectories arriving from the north during sea day. Moreover, the authors defined a mixed day "if there were more than one type of trajectories". However, the mixed day presented in Figure 4 only shows air masses from the north. Please, clarify this point.

Pag. 8427, Line 20-23: How did the authors define the shipping lane? Was it placed in such a way the particles were 1 hour aged at the sampling site? What is the criterion used for placing the shipping line?

Pag. 8430, Line 23: Where 1.5 gcm-3 comes from? Is there any reference for this value? Pag. 8430, Lines 25-26: "The total daily number and volume concentrations of particles were extrapolated to cover also the unanalyzable periods". Please, clarify how this was done.

Pag. 8431, Par. 3.5: These simple formulas allow for a reasonable estimation of "low" and "high" ship plume contributions. I would remove the zero term in formula (4).

Pag. 8433. Par. 4.1 It is not clear how the authors use the information about the number of ships in their manuscript. Please, clarify. Pag. 8436, Lines 1-3. Remove the sentence. Is a repetition.

Figure 1: This map does not show the coordinates (latitude and longitude).

Figure 4. Does this figure show all the hourly backtrajectories calculated for the 4.5 months study period?

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Figure 6 (Bottom). A) Y-axis should report the % values (+/- 10%). B) It seems that the smoothed absolute Nb change rate never exceeds the defined threshold of 56 cm-3 (cf. Pag. 8429, Lines 27-29). Please, clarify this point. C) Is there any reason why the points around 72.3 were considered as analyzable? The relative change exceeded the selected threshold.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 8419, 2014.