

Interactive comment on “Contribution of ship emissions to the concentration and deposition of air pollutants in Europe” by S. Aksoyoglu et al.

Anonymous Referee #1

Received and published: 13 November 2015

This manuscript presents valuable results on the influence of shipping on the concentrations and deposition in Europe, for selected pollutants. The results are worth publishing; however, the following comments for improving the manuscript first need to be taken into account.

Major comments

The use of shipping AIS signals in emission modelling has facilitated major improvements regarding the accuracy on how the shipping emissions can be treated. This is a key issue in terms of the aims and contents of this study. The authors should therefore properly discuss these new developments in the introductory section.

The authors should also present in the manuscript a proper evaluation of the accuracy

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of their numerical results. How accurate is the emission inventory for various source categories ? How accurate are the predictions of their chemical transport modelling (CTM) ? What are the most significant uncertainties of the emission inventory and the CTM ? For instance, what is known of the accuracy of modelling biogenic emissions, secondary organics, dry and wet deposition ?

The considerations on modelling uncertainties should be taken into account in the interpretation and discussion of the numerical results. The main factors causing uncertainties should also be discussed in the conclusions section.

The authors describe their methods, regarding the MACC and biogenic emissions. However, they should also clearly state, which emission categories were NOT included - that is good scientific practice. As MACC includes only anthropogenic emissions, they probably neglected at least wild fire, sea salt and dust emissions. If all of these were neglected, they should at least provide some estimate (using proper references) on how large a fraction of emissions for each relevant pollutant was not taken into account. The neglected source categories have a direct influence on the contribution percentages of shipping, compared with total concentrations and depositions.

It should also be reported what was the spatial resolution of the emission inventory (in kilometers), especially regarding the shipping emissions. The authors should also report the resolution of their chemical transport modelling (CTM) not only in terms of degrees; but for readability, also report what these correspond as kilometers in the domain used.

Minor comments

Abstract. "Our results suggest that emissions from international shipping affect the air quality in northern and southern Europe differently and their contributions to the air concentrations vary seasonally." The former part of this sentence is vague ('differently', not stated in which respect), and the latter part is trivial. Remove or clarify the former part, and delete the latter.

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“Increased concentrations of the primary particle mass were found only along the shipping routes whereas concentrations of the secondary pollutants were affected over a larger area.” Trivial statement, to be removed.

Introduction. “The rise in population and mobility is associated with emissions of pollutants from transport sectors such as road, air traffic and international shipping. These emissions affect the air quality and climate.” Trivial statements, to be removed.

International Maritime Organisation: Maritime is written with a capital letter.

‘latest Sulphur limits’, better written as latest fuel Sulphur limits

Line 9. WRF occurs once too many

p. 30967, lines 7-10. How much more important are the effects of secondary compared with primary ? Please state quantitatively.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 30959, 2015.

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