Responses to reviewers' comments on gmd-2021-47

The authors appreciate the many constructive comments and suggestions made by the reviewer. The paragraphs below address each comment in turn.

Anonymous Referee #2

The revised manuscript is much more convincing in demonstrating that the moving point source model has significant benefits compared to the line source model when dealing with the dispersion of ship emissions. I have only a few remaining remarks that should be handled before publication in Geoscientific Model Development:

1. In the Introduction, the difference between the two main types of atmospheric models (Lagrangian and Eulerian models) and the Gaussian plume models should be described more clearly. I suggest to rearrange the text on page 2, by first introducing the Gaussian models, their application to ship emissions, and their limitations. After that, introduce the Eulerian and Lagrangian model types, their differences, as well as their application to ship emission dispersion.

Response:
The authors thank the reviewer for the suggestions. In the revised paper, the introduction has been modified to better describe the different types of dispersion models (pg 2).

2. In section 2.2, explain in more detail how the additional parameters are derived from AIS ship position data.

Response:
The authors thank the reviewer for the question. Three additional parameters (namely turning angle, start time and stop time) are defined to provide the options to customize the ship movement, if the exact values of the additional parameters for one ship can be obtained from either the ship traffic website or other databases, so that they can make the MPS model more flexible and realistic.

However, in our study, we didn't get the values of the additional parameters for each ship, due to the lack of such data. For this reason, in each simulation hour, the start time (t_{S1}) and stop time (t_{S2}) of all moving ships are assumed to be 0s and 3600s respectively, meaning that the ships keep moving for the entire hour. In addition, the turning angle (θ) is set as 0° in this study, meaning that the ship is assumed to move straightly. In the revised paper, new materials have been added in pg. 5 (line 137-138) and pg. 7 (line162-164).

3. Figure 18, in the 2-D maps of differences in figure parts a) and b) the color bar title should be "delta NO2" and "delta PM2.5".

Response:
In the revised paper, the color bar title has been modified as "ΔNO_2" and "$\Delta PM_{2.5}$" for Fig. 18(a) and 18(b).