**Atmospheric
Chemistry
and Physics
Discussions**

Interactive comment on "Measurements and modelling of ozone in the Mediterranean MBL: an investigation of the importance of ship emissions to local ozone production" *by* I. M. Hedgecock et al.

Anonymous Referee #2

Received and published: 23 August 2012

General remarks:

The manuscript presents a modelling study on the influence of ship emissions on ozone concentrations in the Mediterranean area. It starts with a detailed introduction into the topic, providing a great number of references, so that the interested reader receives the necessary background information. The manuscript continues with a description of the measurement campaigns, where an overview table with the different periods and lengths of the campaigns would be useful to have. In the model description section it is not very clear, if an in-plume chemistry approach for ship emissions is used or

not. This should be clarified, also to better understand the differences in the simulation results with and without ship emissions. In the model results sections the five tables with statistical analysis for the model evaluation are not convincing enough for the overall evaluation of the model results. For example it is not distinguished between day- and night-time ozone concentrations or minimum and maximum ozone concentration. This would help to clarify if background ozone concentrations or peak ozone concentrations during daytime are modified. As already mentioned by the authors on page 16575, short time fluctuations are not captured this way, nor are day- and night-time variabilities resolved. I strongly recommend to reduce the number of statistical tables for model evaluation and to show instead meaningful figures e.g. scatter plots or time series. This way a better overview over the different campaigns and years might be achieved for the interested reader. The selection of different years and dates shown in figures 4-8 needs to be motivated, as it remains unclear if these are representative or random results. In the current version of the manuscript, the reader is a bit lost as it is not easy to have the different campaigns and length of campaigns in mind with the statistical tables and description in the text only. The results of a more detailed evaluation should be taken into account in the conclusions as well.

The author tends to use pretty long sentences throughout the manuscript. In most cases, those can be easily divided into two sentences. I recommend to do so as this will facilitate the reading of the manuscript greatly. Altogether, I suggest that the manuscript needs major revisions before publication in ACP.

Specific remarks:

- title: please avoid abbreviations like MBL

- page 16560, line 24: delete 'in'

- page 16561, line 18, delete 'of the'

- page 16562, section 2 Measurements: a table with an overview of the campaigns and

observations including the period might be helpful to add

- page 16563, line 1: 'in addition to' instead of 'as well as'

- page 16563, line 4: 'started' instead of 'took'

- page 16566, line 19: delete chem_in_opt = 0, this is technical information unimportant for the reader

- page 16567, line 25: please indicate more clear if the ship plume parameterisation is used or not, if not section 3.2.1 should be considerably shortened. This is also important to understand section 4.3.

- page 16567, line 27: delete 'the applying'

- page 16569, section 4.1 Model validation: please add illustrations of e.g. scatter diagrams or time series to replace a few of the statistical tables and to illustrate the model evaluation results in a more detailed way

- page 16573, lines 26-29: not shown, scatter plots or time series should be presented

- page 16573, line 28: delete 'to'

- page 16574, section 4.2: This paragraph clearly illustrates that with the statistical means of temporal averages most of the instantaneous differences are smoothed out. A focus should be put on peak ozone concentration as these may be expected to contribute most to the increase of daily average ozone levels.

- Fig. 4-7: As the differences in high- and low-level emissions simulations are so small, only one scenario should be shown. This way, Fig. 6 and 7 can be combined in one figure.

- page 16576, section 4.3: The selection of the results for the years 2005 in Fig. 4, 2006 in Fig. 5 and 2003 in Fig. 6 and 7, and one day in 2000 in Fig. 8 should be motivated. It is not clear why these years or exact dates have been selected. Are they

representative or not?

Fig. 8 caption: the caption needs clarifications as it is not clear what is meant with 'the standard is met', does is mean ozone concentrations below or above 120 ppbv?

Fig. 9: missing

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Interactive comment on Atmos. Chem. Phys. Discuss., 12, 16557, 2012.