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## ***Interactive comment on “Simulating emission and chemical evolution of coarse sea-salt particles in the Community Multiscale Air Quality (CMAQ) model” by J. T. Kelly et al.***

**Anonymous Referee #4**

Received and published: 28 January 2010

This study examines incremental changes to parameterizations of sea-salt emissions from the coastal surf zone and the dynamic transfer of  $\text{HNO}_3$ ,  $\text{H}_2\text{SO}_4$ ,  $\text{HCl}$ , and  $\text{NH}_3$  between coarse particles and the gas phase in CMAQ. It fits well within the scope of GMD and provides useful information on the treatment of sea-salt particles in CMAQ.

The manuscript is overall well written, clear, straightforward, and convincing. It would probably be an exaggeration to say that new general insight into sea-salt treatment in advanced modelling systems (such as CMAQ) has been gained here. This study provides a critical perspective on current knowledge on the subject and on the methods used to investigate it. The modelling approach has been thought through and is sound,

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though it somehow assumes that discrepancies in the modelling of inorganic aerosol species stem from the treatment of sea-salt particles. I am pleased to recommend the manuscript for publication in GMD after the authors clarify a few minor points (some editorial), which are detailed in the following. Counting all the lines and referring to the page number:

P1339, L10: Please correct 'disposition' to 'deposition'.

P1345, L17-19: The sentence 'Those cation concentrations are downscaled during post-processing of the model output for comparison with observed sodium concentrations.' needs to be clarified. By the way, should 'Those cation concentrations are' read 'The concentration of those cations is'? Please explain how the downscaling of the concentration of cations is done with respect to their emissions.

P1346, L23: I would suggest replacing 'is reasonable' by 'sounds reasonable'.

P1348, L15: Please change 'on 15 days' to 'for 15 days' and qualify 'collected' on L14 to specify the frequency of the sampling (e.g. 'collected daily'?, 'collected continuously'?).

P1349, L25: Should 'CMAQv4.6' read 'CMAQv4.6b'?

P1350, L13: Please add '(Fig. 3)' after 'improvement'.

P1352, L3: I would replace 'biggest' by 'largest'.

P1357, L12-13: Please change 'though, because measurements are not available' by 'as measurements were not available'.

P1357, L25: I would delete ';' mean|...|<sub>N</sub>'. C and N are not defined and the notation is different from that used in the footnotes of Table 2 on P1367.

P1367, footnotes of Table 2: C and n are not defined and the notation is different from that used on P1357, L25.

P1369, Fig. 2: Please modify the figure so that the land/sea contrast is visible.

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P1370, caption of Fig. 3: Please change ‘dashed line represents 1:1 ratio’ to ‘the dashed line represents the 1:1 ratio’.

P1371, caption of Fig. 4: Please change ‘dashed line represents 1:1 ratio’ to ‘the dashed line represents the 1:1 ratio’.

P1373, caption of Fig. 6: Please change ‘Tick marks represent’ to ‘The tick marks’.

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Interactive comment on Geosci. Model Dev. Discuss., 2, 1335, 2009.

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