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Interactive Comment

Interactive comment on "Impacts of air–sea interactions on regional air quality predictions using WRF/Chem v3.6.1 coupled with ROMS v3.7: southeastern US example" *by* J. He et al.

J. He et al.

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Reply to Comments by Reviewer #3

General comment: The subject is appropriate to GMD. The authors provide insights about effects of two cumulus parameterizations and atmosphere–ocean coupling in WRF/Chem v3.6.1 on model meteorological, cloud/radiative, chemical predictions. The results show that different cumulus parameterization schemes can result in an 85m difference in the domain averaged PBLH, and 4.8 mm difference in the domain averaged daily precipitation. They also find that comparing to WRF/Chem without air–sea interactions, WRF/Chem with a 1-D ocean mixed layer model and WRF/Chem coupled

with a 3-D Regional Ocean Modeling System predict the domain averaged changes in the sea surface temperature of 0.1 and 1.0 0C, respectively. The results confirm the benefits and needs of using coupled atmospheric–ocean model with advanced model representations of air–sea interactions for regional air quality modeling. Therefore I recommend clearly the acceptance for publication of this manuscript after minor revisions. Several editorial comments for improving the information content and presentation of the paper are listed as follows:

Reply:

We thank the reviewer for the positive comments. Please see below our point by point replies to specific comments. The line/page numbers refer to those in the track mode version of the revised paper.

Specific comments: (1) P9966, Line 20: “Extensive validations against observations, show that: : :.” Should be “Extensive validations against observations show that: : :”

Reply:

We have corrected this in the revised paper.

(2) P9977, Lines 8-19: It will be better if you can compare your results to the performance of other models such as WRF-CMAQ under the general conditions to see if your new model has better performance for each species.

Reply:

To address the reviewer’s comment, we have included the comparison of the model performance with WRF-CMAQ in the Section in the revised paper, lines 364-366, page 16, also the statement below: Compared to WRF-CMAQ simulations (Yu et al., 2014), SEN1 gives better agreement for SO42-, EC, and PM2.5 against IMPROVE, and for SO42- and NH4+ against CASTNET.

(3) P9984, Line 9: “: : :.study the sensitivity of cumulus schemes on model predictions”

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should be ": : :..study the effects of cumulus schemes on model predictions".

Reply:

We have revised this in the revised paper.

(4) P10002, Figure 4: I don't think that you need Figure 4 because all these results are already summarized in the related tables. Please delete it to reduce length.

Reply:

We have deleted this figure in the revised paper.

Interactive comment on Geosci. Model Dev. Discuss., 8, 9965, 2015.

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