

Interactive comment on “Aerosol effects modeling using an online coupling between the meteorological model WRF and the chemistry-transport model CHIMERE” by Régis Briant et al.

Anonymous Referee #1

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This is an interesting paper and it reflects the fact of more recognition that coupling meteorological model with chemistry transport model with online feedback is an important way to make the modeling system having a more realistic representation. Overall the paper was well written and well organized. However, it lacks of one crucial information, in my opinion, and that makes the paper less convincing. That piece of information is the location of the aerosol, in particular, mineral dust. Authors have pointed out the relationship of aerosol direct and semi-direct effect and radiative budget. It will be great if authors can show where the mineral dust is. With this information, it will be much clearer and convincing in determining the performance of the model with respect to sur-

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face temperature and short wave surface radiation. Another thing is AOD calculation is part of CHIMERE model (the offline version) and it was included in the performance evaluation of the online model but did not do a sufficient analysis to explain why the online model did not do anything. The authors just explained it could be due to more resolved meteorology and change of wind speed. I believe this paper requires major revision before any consideration. Here are the detailed comment/question:

- * it might be nice (more informative) to indicate usage of OASIS in the title
- * page 4, line 8 - 11, what compiling flags? Why hard-coded? Should that be considered a bad coding practice?
- * page 4, line 20, why it is impossible for OASIS to perform spatial interpolation? Fortran (I assume that what CHIMERE is written with) is a column major language so when collapsing a 3D array to a 1D array, it is quite easy to figure out where the spatial boundary in the 1D array.
- * page 4, does CHIMERE use the same domain decomposition method as in WRF?
- * paper 5, section 2.3.2, should you mention what LW and SW schemes are being used in WRF? RRTMG was mentioned in the later portion of the paper. Also what are the chemical species are being used for the optics calculation?
- * page 6, based on Figure 1, it seems to me (I don't know CHIMERE well) that the online model will make met data available to CHIMERE at time step 0, 600, 1200 and so forth. So within CHIMERE at time step 300, 900 and so forth, which time step meta data is being used?
- * page 10, what is LUCIA?
- * page 11, Why there is a big gap (close to 200 seconds) between case 2 and 1 when 1 core was used? Why not show the actual model run time rather than average per iteration (were there any big variation in run time among different iteration)?

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- * page 12, Why there is a big and gradual increase when number of cores > 12? In general, why case 2 used more time than case 1? What constitute that difference?
- * page 15, Figure information such as number and title, is missing.
- * page 15, 16, figures missing label on the y-axis on the right hand side.
- * page 17, figure missing label on the y-axis. Is the GMT time or local time being used in the graph?
- * page 17, Why case 2's temp increased during the second half of day time period on every day?
- * page 33, why the number of data points in each site is so small in a 44 days period?

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