Geosci. Model Dev. Discuss., 6, C1509–C1510, 2013
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Geoscientific Model Development Discussions

Interactive comment on "High resolution air quality simulation over Europe with the chemistry transport model CHIMERE" *by* E. Terrenoire et al.

Anonymous Referee #4

Received and published: 23 September 2013

This manuscript presents the application of the CHIMERE chemical transport model to an annual 2009 simulation over Europe. The manuscript includes an operational evaluation of the model results across the year, presenting various statistical metrics on a seasonal basis for a select number of pollutants. While there can be substantial value in such studies, especially for unique model applications and/or model updates, the manuscript in its current form falls short of presenting the results in a coherent and useful way. Having read the comments of the other reviewers, which already cover my primary concerns with the manuscript, I will only provide several other additional comments/suggestions on the manuscript.

Sections 1 and 2 of the manuscript are generally well written from a grammatical standpoint, but sections 3 and 4 are poorly written and are at times difficult to understand

what point the authors are trying to make. The other reviews have already commented on this, but the authors need to put considerable effort into improving the readability of sections 3 and 4.

As noted by another reviewer, the introduction should include more examples of model applications and evaluations for Europe (e.g. Appel et al., 2012). It would be worthwhile to mention these papers in the introduction and perhaps compare/contrast the results of the two model applications where appropriate.

Specific Comments:

Pg 4142, Lines 1-5: What specific modifications were made to the Kz value? It wasn't clear in the manuscript exactly what changes were made.

Pg 4149, Lines 14-29: Is NOx underestimated through the entire day? It would be useful to know how what the diurnal profiles of NOx and O3 look like, especially since the instances of small bias values could be the result of compensating large positive and negative biases. Also, not sure that I would call a bias of 15% for ozone low (it might be relatively low compared to other seasons).

Section 3.3: Does CHIMERE include a mechanism for gravitational settling of PM10 between model layers? This is a mechanism that is lacking in some other CTMs and has been partially blamed for underestimations of PM10 surface concentrations by the model.

Page 4153, Lines 25-30: Are there any measurement artifacts relating to NO3/HNO3 measurements? For example, so U.S. based networks that measure NO3/HNO3 suffer from a nitrate volatilization issue from the filters (however those filers spend a week in field, which magnifies that problem).

Interactive comment on Geosci. Model Dev. Discuss., 6, 4137, 2013.