Geosci. Model Dev. Discuss., 5, C636–C638, 2012
www.geosci-model-dev-discuss.net/5/C636/2012/

**Geoscientific
Model Development
Discussions**

Interactive comment on "Implementation of the chemistry module MECCA (v2.5) in the modal aerosol version of the Community Atmosphere Model component (v3.6.33) of the Community Earth System Model" *by* M. S. Long et al.

Anonymous Referee #1

Received and published: 4 September 2012

The manuscript describes the integration of the chemistry module MECCA into the atmosphere model CAM/CCSM. I very much congratulate the authors on this unusual combination of "European" (MECCA) and "United-States" (CCSM) codes. Such exercises especially make it possible to compare different chemistry models in the same atmospheric environment, an important task in assuring the highest quality of earth system models.

Unfortunately there are from my point of view several major shortcomings requiring overhaul of the manuscript.

1. The manuscript is I think too short in many aspects for the described task. For example, the programming languages are not mentioned. The technical implementation should be made much clearer (graphical depictions might help). At the current stage, the manuscript reads often like a paper to non-specialists - especially part 4 could be made much more detailed for CAM or MECCA specialists.

2. For a non-CAM / CCSM / CESM -user it does not get clear initially what model or model version of CAM you used. From my understanding, this is a CAM3.6.33 with a special additional module for modal aerosols? Similarly, the MECCA description could be more detailed, (flexibility, interface, language, the MESSy concept in which the code is written, ...).

3. Model versions: Unfortunately, it appears to me that rather old model versions have been used, MECCA v2.5 was made available in 2008 (now mainly called CAABA as referenced), CSSM3 was available from 2004 (now CAM5.1.1 in CESM). It should be described why the employed model versions were used, how the technical implementation can be used in modern CESM versions and if this is planned. The usage of old model versions and modern references to the current model versions is also confusing for the reader.

4. Please at least cite other 3-D modeling studies using ECHAM5/MESSy with MECCA.

5. Why was such a large chemical mechanism used? This is almost never used in 3-D modeling studies sing ECHAM5/MESSy with MECCA.

6. I strongly suggest to couple this paper to the announced manuscript of an evaluation. If this is not done, a very basic evaluation of a few chemical species, in comparison with the original CAM chemistry scheme, should be shown.

7. How is the surface / 900mb comparison so helpful for the evaluation of the new CAM version? This needs to be much clearer described, at this stage I cannot see what the

main reason for such a graphic is – apart from the fact that it works in some form.

8. The short title is confusing "Implementation of the chemistry module MECCA (v2.5)", in CAM3.6 should in some form be added.

Interactive comment on Geosci. Model Dev. Discuss., 5, 1483, 2012.