Geosci. Model Dev. Discuss., 2, C428–C429, 2009
www.geosci-model-dev-discuss.net/2/C428/2009/

Geoscientific
Model Development
Discussions

Interactive comment on "Coupling global chemistry transport models to ECMWF's integrated forecast system" *by* J. Flemming et al.

J. Flemming et al.

johannes.flemming@ecmwf.int

Received and published: 16 November 2009

We thank the reviewer #2 for the suggested corrections and insightful comments, in particular on the specifics of the coupled approach.

We agree with reviewer #2 that more detail is needed on the selection of coupled species (comment 2) and the motivation for the brief evaluation with observations (comment 5). We would like to refer to our response to reviewer #1, in which we tried to answer these questions. Likewise, figure order and captions (comment 6 and 8) have been addressed in our response to reviewer #1. We will respond to comments 1, 3 and 7 by improving the wording of the manuscript accordingly.

Reviewer #2 raises the interesting question on the chemical response in the CTMs

to concentration fields which were changed because of data assimilation by the IFS (comment 4). This issue had been anticipated as a potential problem with the coupled system but all assimilation runs with ozone and CO did not show pronounced imbalances or swift changes in chemically related species. At the start of an assimilation experiment, the adaptation towards the assimilated observation happens gradually over a couple of days so that the model is not confronted with completely different ozone and CO fields at a time. We have just started to look more into the details of the chemical response. An alteration of the NO2 - NO split in the CTM because of different ozone is noticeable in the PBL but the changes due to emissions are still the dominating factor. Likewise, there were surprisingly small changes in ozone, when NOx was assimilated. There might also be a potential response via the stratospheric ozone field which changes photolysis rates. The more long-term impact of the tropospheric oxidation capacity because of changed CO and ozone fields has not been explored yet. For stratospheric ozone we identified overall a long lasting impact of the improved initial conditions. However, the general problem of the chemical schemes to simulate the fast ozone depletion during the ozone hole could not be overcome by the ozone assimilation because it does not change the concentration of species leading to the catalytic ozone destruction.

Interactive comment on Geosci. Model Dev. Discuss., 2, 763, 2009.

GMDD

2, C428–C429, 2009