Atmos. Chem. Phys. Discuss., 12, C6294–C6295, 2012
www.atmos-chem-phys-discuss.net/12/C6294/2012/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Influence of model resolution on the atmospheric transport of ^{10}Be" *by* U. Heikkilä and A. M. Smith

Anonymous Referee #1

Received and published: 28 August 2012

The paper examines the effect of different model domains/resolutions on the transport of tracers such as 10-Be and 210 Pb, and compares the model behaviour with the available observations. While the results of the study are potentially publishable, the conclusions seem a bit shaky since the model setups used have not been chosen well: for instance the T63L47 model has both a different horizontal and vertical resolution to all the other setups. In addition, this model has a different vertical resolution to the other middle atmosphere-resolving model (T42L39) so attribution of differences between them is difficult.

I would recommend publication if the authors can fill in the gaps between some of these GCM setups with more model runs using different setups (e.g.: a T42L47 for direct comparison with T63L47, or perhaps T21L39 for direct comparison with the T42L39).

I realise that running large GCMs is a non-trivial task, but I think the authors are trying to answer too many questions (horizontal resolution, vertical resolution, effect of model lid height) with just 4 GCM setups. At the moment the authors have produced some interesting results, but attribution to horizontal/vertical resolution/lid height is on shaky ground.

Other comments:

line 64 & elsewhere: "spacial" appears repeatedly- should be spatial

line 70: I think a very short evaluation of the stratosphere is needed here, comparing diagnostics such as frequency of sudden stratospheric warmings vs observations

Table 2: the stratospheric residence times seem very short compared to e.g. age of air which can be years. What is the reason for this?

Figures 2-7: I found it hard to compare the model and observations by eye using this method. Instead of four geographical maps per figure it would be easier if the authors simply plotted 4 sets of model setups vs observations, so one can see the correlations and spread and more easily see where the different model resolutions make a difference.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 18531, 2012.