Geosci. Model Dev. Discuss., 5, C1120–C1121, 2012
www.geosci-model-dev-discuss.net/5/C1120/2012/

Geoscientific Model Development Discussions

Interactive comment on "The SOCOL version 3.0 chemistry-climate model: description, evaluation, and implications from an advanced transport algorithm" *by* A. Stenke et al.

Anonymous Referee #2

Received and published: 21 December 2012

The paper introduces an updated version of the chemistry-climate model SOCOL. It is well written and very suitable for the scope of GMD. I recommend publication after some minor revisions, detailed below.

1) The authors should clarify the hybrid nature of the old transport scheme and mention the operator splitting between horizontal and vertical advection in the introduction.

2) I was always surprised how bad the semi-Lagrangian scheme in SOCOL performed; can implementation errors be excluded?

3) Define/use CCly consistently in all parts of the paper.

4) Please clarify what is done where with the water vapour (CTM/Climate Model).

5) P3424, line10: change campaign to initiative

6) I presume all your tests were done at L39?

7) Could you clarify the horizontal and vertical grid of the CTM please (Gaussian, same as climate model)?

8) Start 2.2 with: The CTM MEZON ...

9) If I understand correctly your transport time-step was 2 hours and has now been reduced to 15 minutes. Wouldn't the performance of the semi-Lagrangian scheme improve as well using a 15 minute time-step?

10) P3432, line 17: Move this paragraph up.

11) P3432, line 27: Mention time-step caveat.

12) Not sure I understand the following statement; I assume your transport is done on the corresponding Gaussian grid as is the radiation? I would guess the other effect is second order? Isn't it more problematic that you have diagnostic vertical velocities? Some models have prognostic velocities in a semi-Lagrangian context (e.g. UMUKCA)?

13) P3435, line 4: Maybe you could expand this point to illustrate the change that occurs due to the interactive ozone.

14) P3441, line 8: I am surprised by this statement, Why is this? Is the resolution still too low?

15) P3443, line 21: Please explain the difference in definitions.

16) P3445, line 14: How are vertical velocities coupled?

Interactive comment on Geosci. Model Dev. Discuss., 5, 3419, 2012.