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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Impact of an improved radiation scheme in the MAECHAM5 General Circulation Model" *by* C. Cagnazzo et al.

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GENERAL COMMENTS

The revised manuscript looks much better than that published in ACPD. I am now happy with the validation procedure presented. However, I still have some serious reservations about the validation results. The point is that after this paper had been published in ACPD, another paper on a similar subject was also published in ACPD. This is a paper by Nissen K. M., Matthers K., Langematz U., and Mayer B., "Toward a better representation of the solar cycle in general circulation models". Atmos. Chem. Phys. Discuss., 7, 45-64, 2007. Nissen et al. compared solar heating rates produced by FUBRad, ECHAM5 and libRadtran schemes and concluded that "within the ECHAM5 vertical domain, both the 4-band ECHAM5 and the high-resolution FUBRad

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shortwave schemes give heating rates close to those of a detailed radiative transfer code, libRadtran, and should produce realistic results in climate intergation." This obviously contradicts with the results presented by Cagnazzo et al. Thus, I suggest to resolve this controversy between the authors of the papers prior to either of the papers is published in ACP. Otherwise it will confuse all the readers.

Also, on p. S7006 of their response, the authors claimed that the purpose of the MAECHAM5 is to simulate the troposphere-stratosphere system, namely the part of the atmosphere from the surface to 1 hPa. Nevertheless, the authors have discussed many features appeared in the mesosphere. So, if the MAECHAM5 is primarily designed to model the atmosphere only below 1 hPa, I would recommend the authors to clearly indicate it in Introduction and, maybe, reduce discussion of the mesospheric response in section 4. Otherwise, the readers can have a wrong impression about the MAECHAM5 region of interest.

SPECIFIC COMMENTS

p. 3, right, 4th paragraph: "... oxygen absorption is not included in the first band of the SW6 (negative bias close to 0.1 K/day)".

The SW6 underestimates heating rates by up to 1.5 K/day near 0.1 hPa as seen from Fig. 1. Mentioning a negative bias of about 0.1 K/day, do you mean that neglection of O2 gives only 0.1 K/day of up to 1.5 K/day difference? Please clarify.

It is also not clear if the LBL code you used includes O2 absorption. Please indicate it clearly.

p. 8, Table 1: I would recommend to include in Table 1 an information on how you divided the flux at the model top between the different bands. This information is given in your response on p. S7006.

TECHNICAL AND TYPOGRAPHICAL CORRECTIONS REQUIRED

p. 3: please spell out acronym LBL when it first appears in the text.

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6, S7312–S7314, 2007

Interactive Comment

EGU

p. 4, left, L-17: Fig. 5 does not have a top-right panel.

p. 5, left, L-2: tropsphere - should read troposphere. On p. S7009 of your response you mentioned that a spell-checker was run. Please run it again.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 11067, 2006.

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6, S7312–S7314, 2007