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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Evaluation of the atmospheric transport in a GCM using radon measurements: sensitivity to cumulus convection parameterization" *by* K. Zhang et al.

K. Zhang et al.

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We would like to thank the reviewer for the comments and suggestions.

1. About the East Asia summer rainfall.

   "Although the paper is on the chemical transport aspect of the GCM, limited information on meteorology in East Asia (e.g. Fig. 1) does indicate improved simulation over the NCAR model in precipitation over Asia. It might be noted though that the CMAP precipitation may have underestimated precipitation in central China east of the Tibetan Plateau."

   In the revised manuscript we have added two panels in Fig. 1 showing the TRMM

data and the in situ measurements at 160 observatories in China. It is true that compared to these two data sets the CMAP precipitation is weaker in the southern China, but the underestimate is not large. On the other hand, all three observations indicate that *on* the Tibetan Plateau (east of 100°E, north of 25°N) only very weak precipitation appears. This is the area where the most dramatic differences are seen in the simulations performed with CAM2 and two version of GAMIL.

2. About the credibility of the GAMIL model:

   "It would be useful to provide a figure demonstrating the realistic simulation of the global climate/circulation by the model before going into the presentation of tracer transport. It helps to establish the credibility of the model."

   Thanks for the reviewer's advice. We have added a Taylor diagram to show the overall performance of the ZMH and TN versions of the model in AMIP simulations. A paragraph is added in Section 2 which describes the diagram and discusses its indications.

3. About the convective mass flux:

   "When discussing the global geographic distribution of radon, the paper states that the mass flux from convection using the Tiedtke scheme is much weaker than that using the Zhang-McFarlane scheme, but did not show the figure. I suggest the authors include such a figure in the paper, which should strengthen their points."

   Thanks for this advice. We have added a figure to the manuscript as well as some further discussions in the 4th paragraph in Section 4.2. (Please see also our response to reviewer 2's comments.)

4. About the citation in Table 1:

ACPD

8, S1593–S1595, 2008

"Literature sources listed in Table 1 for observational data of radon need to be included in the reference list."

Publications cited in Table 1 have all been added to the reference list.

5. About the English usage and the specific city name.

   "The paper in general is well written. However, there are a number of places where the English usage can be improved, for example, the sentence "...due to regarding the frozen soil as non-frozen..." on page 2101 (bottom two lines) reads awkward. Maybe it can be changed to "...due to treating frozen soil as non-frozen..." Some editorial work is in order. p. 2103, line 4, "ineligible" is a misuse. It should be "non-negligible". p. 2103, third line from bottom. Should "Gaoxiong" be Kaohsiung as it is known?"

   The wording errors pointed out by the reviewer have been corrected. Note that we've changed the phrase "the city Gaoxiong" on page 2103 to "the city Gaoxiong (also known as Kaohsiung)". However, in Table 1 and in the figure showing the location of the East Asia stations, we still label the city as "Gaoxiong" because this is the name used in the original data set of Jin (1998).

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 2085, 2008.

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