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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.

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Review comments on manuscript entitled "Evaluation of the atmospheric transport in a GCM using radon measurements: sensitivity to cumulus convection parameterization" by K. Zhang et al.

General comments

The paper uses radon as tracer to investigate the large-scale atmospheric transport in a GCM and to examine its sensitivity to convection parameterization. The GCM uses the physics packages from NCAR CAM2 and the dynamic core developed in house at the authors' institution. Two convection schemes are used, one by Tiedtke and the other by Zhang and McFarlane. The authors report that the simulated climatology and

seasonal variation of radon are in good agreement with observations. While there are no real surprises in the results probably as expected, the paper does have a few unique aspects. One of them is the detailed analysis over East Asia. Another uniqueness of the paper is the systematic compilation of available observational data from literature. Overall the paper is well written, the analysis is thorough, and the results are interesting and important. This is an important contribution to the literature.

Specific comments

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.

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.

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.

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

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.

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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?

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

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