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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.

**Anonymous Referee #2**

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This is a clearly written and straightforward paper that compares GCM simulations of radon concentrations with available observations. Notably it repeats the comparisons for versions of the GAMIL GCM that use the Tiedke convection scheme and the Zhang-McFarlane scheme. Comparisons are made with (i) long-term means for each calendar month of surface concentrations at a large number of stations, and (ii) vertical profiles as summarized in the old paper of Shaw Liu et al, but supplemented with results from some more recent campaigns. As a side benefit, the present paper collects many radon observations together in a convenient form (including extensive surface observations from China), and so is a kind of update of the Liu et al work of 25 years ago.



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Discussion Paper

The authors might want to consider discussing a little more about how the actual meteorological performance of the GCM depends on the convection scheme employed. Earlier studies (Ricciardulli and Garcia, 2000 JAS) suggest some very strange aspects of models run with ZM, at least in the tropics. Notably the simulated tropical precipitation in the NCAR model run with ZM is dominated by a very strong and regular diurnal cycle and is not realistically modulated from day-to-day. Could the high radon values in the upper troposphere in the GCM with the ZM scheme be due to very strong (perhaps unrealistcally strong?) diurnal pumping over tropical land areas?

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



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Interactive Comment