Atmos. Chem. Phys. Discuss., 5, S1930–S1932, 2005
www.atmos-chem-phys.org/acpd/5/S1930/
European Geosciences Union

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Sensitivity of Global Modeling Initiative chemistry and transport model simulations of radon-222 and lead-210 to input meteorological data" *by* D. B. Considine et al.

Anonymous Referee #1

Received and published: 4 August 2005

GENERAL COMMENTS/ASSESSMENT:

The manuscript presents three different simulations of radon-222 and lead-210 with a chemistry transport model based on different meteorological input data. The simulations are intercompared in order to investigate the variability due to the different meteorological input, and their agreement to observations is assessed. The manuscript is written in a detailed, concise and well understandable way and left me with only minor comments and suggestions given below. It was a pleasure to review a manuscript of such high quality.

SPECIFIC COMMENTS AND SUGGESTIONS:

- As far as I understand, convective transport in the chemistry transport model GMI is parameterized using the same parameterization as in NCAR MACCM3 (CONVTRAN routine). However, what convective parameterizations are used in GISS and GEOS-STRAT? As the convective mass fluxes produced by MACCM3, GISS and GEOS-STRAT are used to calculate the convective transport in the chemistry transport model GMI, the differences in the simulations might also be a result of the different convective parameterizations in MACCM3, GISS and GEOS-STRAT. A discussion on this (in section 4.3) and an improved description on which parameterization is used where (in section 2, page 5330, paragraph 15) would be illuminating.

- In section 4.3 it would be nice to have a discussion on how the vertical resolution of the data sets (MACCM3, GISS and GEOS-STRAT) have an influence on convective transport. E.g. the transport from the surface into the lower stratosphere is very different in the three simulations. Might this also be a result of the vertical resolution in the troposphere?

- When describing the meteorology from the two GCMs (MACCM3 and GISS), it is stated that "the data sets do not correspond to any particular year". It is not clear to me, what this means and how this is possible. Are the data a climatological mean over several years? An explanation on how the meteorological data of the GCMs are generated would be nice.

TECHNICAL CORRECTIONS:

- A lot of abreviations are used in the paper. It would therefore be nice to have a clear and unique naming of the three meteorological data sets and the different simulations. It is confusing and takes some time to get an overview, as the naming for e.g the GEOS-STRAT data switches between "GEOS-STRAT", "GMAO", "DAO" and "assimilated".

- page 5330 paragraph 25, second last line: replace "updraft velocity" by "updraft ve-

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locity parameter"

- page 5334, paragraph 25: replace "the heavy black line" by "the heavy white line"

- page 5343, paragraph 15: replace "GMI/DAO" by "GMI/GMAO"

- figure 8: replace "GMI/DAO" by "GMI/GMAO" in the label

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 5325, 2005.