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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Interannual variability in hindcasts of atmospheric chemistry: the role of meteorology" *by* P. Hess and N. Mahowald

Anonymous Referee #1

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The authors present an analysis of long-term hindcast simulations of global chemistry driven by two sets of meteorological fields but using the same set of emissions. The comparison of these simulations reveals some important differences between calculated trends in climate variables and the relationship between climate variables, most notably between simulated temperature and precipitation, as a result of using the different meteorological fields. Even more importantly, the study also quantifies differences between SNCEP and SCAM in the simulated relationships between climate and air quality variables such as the much weaker correlations between most chemical variables and surface temperature in SNCEP than SCAM, and differences in the sensitivities of different variables to interannual changes in climate parameters. The latter

analysis is particularly useful from a climate change perspective as it allows at least an indirect assessment of the modeling systems' ability to accurately respond to changes in climate forcing by relating results from hindcast studies to results from future-year simulations. The setup of the numerical experiments described in the manuscript is sound. The manuscript is very well written, clearly structured, and presents the results in a concise manner. The figures and tables presented in the manuscript support all arguments and conclusions reached by the authors. The work presented in this manuscript is discussed in the context of previous work, and the authors present a number of sound recommendations for future work as a consequence of their study. While I would have liked to see some comparison of the simulated fields with observations of selected variables at selected sites, especially a comparison of observed and simulated relationships between variables such as temperature, O3 and CO, I realize that this is outside the scope of the current manuscript. Therefore, I recommend publication of this manuscript after the authors address the following editorial comments.

Figures 1-4: Please add labels defining the color scale.

Figure 5: Please check the units of the y-axis for panels q-r (surface ozone results)

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 3485, 2009.

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Interactive Comment