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Atmospheric Chemistry and Physics Discussions

Interactive comment on "On the wintertime low bias of Northern Hemisphere carbon monoxide in global model studies" *by* O. Stein et al.

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The authors address a very important problem in global chemistry modeling that was first highlighted by Shindell et al. (2006) - winter/spring bias in simulated CO concentrations compared with observations in the extratropical Northern Hemisphere. A similar bias in NH CO concentrations was found for models that participated in the recently conducted Atmospheric Chemistry Climate Model Intercomparison Project (ACCMIP) (Naik et al. 2013).

My comment is related to the use of methane lifetime to evaluate model global mean OH. The authors need to make the distinction between CH4 lifetime against loss by tropospheric OH versus the total CH4 lifetime that also includes stratospheric and soil

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sinks. Prather et al. (2012) estimate the total CH4 lifetime to be 9.1±0.9 years where as their tropospheric CH4 lifetime due to OH loss is 11.2±1.3 years. Based on the latter number, both the MI and MI-OPT simulations underestimate the tropospheric CH4 lifetime and therefore have too much OH. However, their MI and MI-OPT CH4 lifetimes are consistent with those simulated by the ACCMIP models (Naik et al., 2013; Voulgarakis et al. 2013).

References:

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Interactive comment on Atmos. Chem. Phys. Discuss., 14, 245, 2014.