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Geoscientific Model Development
Discussions

Interactive comment on "Tropical troposphere to stratosphere transport of carbon monoxide and long-lived trace species in the Chemical Lagrangian Model of the Stratosphere (CLaMS)" *by* R. Pommrich et al.

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This paper presents a simple way of modeling the CO transport in the UT/LS region. Besides the simplicity, the authors also seem to emphasize the reduced numerical cost of simulation. The paper is well written, and easy to understand.

There seems to have several models simulating tracers in the UTLS. For example, one of the recent papers in ACP talks about using trajectory to simulate both ozone and CO (http://www.atmos-chem-phys.net/14/7135/2014/acp-14-7135-2014.html) in the UTLS.

Their model is also fast (could be finished in 4 days for a 30-year run), and simple (by "borrowing" the circulation from reanalysis and the chemical production and loss from WACCM). Their results are quite convincing and matching with that from the MLS and ACE measurements. So I am wondering, compared to that model, what is the major advantage(s) of the model in this paper – besides the deliberate mixing scheme? Also, a suggestion is that the authors might need to mention previous work properly, because it will lead the readers with more information to discuss about.

The other question is that this paper also mentioned limitations of capturing elevated CO due to convection. But at the beginning of the paper, the authors mentioned about using MOPPIT and MLS observations as boundary/initial conditions. So I am guessing the convection's influence is already included in the boundary conditions, it is correct?

Most of the figures in this paper only compare the anomaly, which is only a qualitative measure of patterns. I am guessing, if the climatology of circulation and chemistry is correct, the anomalies could be pretty resembling no matter what. Therefore, I am wondering if the authors could show some comparisons of modeled CO comparing to measurements quantitatively in real values? This helps in evaluating the model's performance.

Interactive comment on Geosci. Model Dev. Discuss., 7, 5087, 2014.