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Interactive comment on “Tropospheric carbon monoxide over the Pacific during HIPPO: two-way coupled simulation of GEOS-Chem and its multiple nested models” by Y.-Y. Yan et al.

Anonymous Referee #2

Received and published: 26 August 2014

Review of Yan et al. acp 2014 "Tropospheric CO over the Pacific during HIPPO: two-way coupled simulation of GEOS-Chem and its multiple nested models" It's an interesting and important study that pushes to extreme GEOS-Chem's high resolution capabilities and a large aircraft data set. The focus is a rather well studied area - Pacific - and it's ever important and ever changing pollution transport. It's good to see that the authors did not stop at simply evaluating CO concentrations, an important work in itself, but also looked at OH and methyl chloroform, also comparing those values to observations. It's perhaps a bit of a stretch to reason that CO concentration enhancement in the nested model is due to incorrect emissions - it seems too simplistic of an

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explanation. Specific comments: -The work on two-way coupler is commendable and its thorough testing much appreciated. As resolution increases, surely this will be of use in the future as well. I don't see any comment on addressing vertical resolution. Can that remain unchanged? -Global anthropogenic emissions from EDGAR are quite a bit outdated, at least its reference. It would be useful to read a comment on what is expected of these emission inventories given that the observations are much more recent. -I couldn't understand the title of section 3.1 - please simplify. In that section, I am concerned about the last sentence. It seems the issue of differences between different nesting should be explored, but the authors are not reassuring the reader that this is not an issue in their work -p1897, line 25: "flied" should be "flew" -Section 4.4 I wish the authors elaborated on the implication of higher resolution on decreased emissions estimates. Do we see a trend that the lower resolution we use the higher our CO emission constraints tend to be? It would be nice to see that supported by comparison with previous emission studies that used coarser resolution. p.18976, line 16 "show" should be "shows", "CO" should be "CO concentrations" -I look forward to further applications of the two-way nested grid that the authors mention in the last sentence of Conclusion section

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 18961, 2014.

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