Atmos. Chem. Phys. Discuss., 13, C11014–C11016, 2014
www.atmos-chem-phys-discuss.net/13/C11014/2014/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Diurnal variations of stratospheric ozone measured by ground-based microwave remote sensing at the Mauna Loa NDACC site: measurement validation and GEOSCCM model comparison" *by* A. Parrish et al.

Anonymous Referee #1

Received and published: 13 January 2014

Generally the study is well written and of high value for the future of satellite-based ozone trend estimates.

The authors could think about a few adds in order to make the article more understandable for non-experts, e.g., they could explain why ground-based microwave radiometry seems to be the only measurement technique which can measure the diurnal ozone variation.

In the introduction and later, I am missing a reference to a related new study: "A clima-

tology of the diurnal variations of stratospheric and mesospheric ozone over Bern, Switzerland S. Studer, K. Hocke, A. Schanz, H. Schmidt, and N. Kämpfer Atmos. Chem. Phys. Discuss., 13, 22445-22485, 2013". For example, Parrish et al. wonder that the night-morning differences are larger in the model world than in the observations. I think, Studer et al. experienced the same.

In the introduction, it could be emphasized that observational results of the tiny diurnal variation in stratospheric ozone were quite uncertain until now. I don't believe much in the TIMED/SABER results on the diurnal ozone variation at stratospheric altitudes. They look quite shaky and seem to be not consistent.

Actually the present Parrish et al. study is most convincing since their radiometer measures the complete daily cycle at an high-altitude station. The observational results of Haefele et al. and Studer et al. (2013) are also good and in agreement with Parrish et al. but a rest risk remains in the data retrieval of Haefele and Studer because of the high tropospheric opacity at a low altitude station such as Bern or Payerne.

Thus the main point seems to be that Parrish et al. give for the first time a really clear observational evidence of the daily cycle of stratospheric ozone. I would suggest that the authors communicate this crucial point in a clear manner in the revised version.

p.31858, line 6, the equation for photolysis of O2 is missing

p.31878, last sentence:

"The good agreement between MWR, Aura-MLS, UARS-MLS, and SMILES suggests that the last three, together with the model, can be used to estimate such adjustments over a wider range of latitudes."

I disagree with this statement. The authors did not make a model validation at polar latitudes where model simulations of ozone photochemistry, polar vortex variations and tides are much more difficult than at mid-latitudes.

Acknowledgments: I am missing an acknowledgment to the ISSI ozone team where

ACPD
13, C11014–C11016, 2014

most of the authors participated.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 31855, 2013.

ACPD

13, C11014–C11016, 2014