Atmos. Chem. Phys. Discuss., 9, C2891–C2893, 2009
www.atmos-chem-phys-discuss.net/9/C2891/2009/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Constraints on inorganic gaseous iodine in the tropical upper troposphere and stratosphere inferred from balloon-borne solar occultation observations" *by* A. Butz et al.

Anonymous Referee #1

Received and published: 16 July 2009

General Comments

The study by Butz et al. addresses an important issue in research on stratospheric ozone, namely the question what the impact is of iodine catalyzed chemistry on stratospheric ozone depletion. The measurements presented provide new information on the upper limit of the stratospheric iodine burden deduced from recent balloon-borne measurements.

I suggest that the paper should discuss in more detail the importance of the new upper limits of stratospheric iodine on ozone loss estimates. I have also a number of minor

comments listed below. After these comments have been taken into account, I suggest that the paper should be accepted for publication in ACP.

Comments in Detail

p. 14647, l. 24: "much more": How much more? This statement should be better quantified.

p. 14651, l. 11-12: What is the justification for this assumption? And what is the impact on the deduced IO and OIO values should this assumption be violated? I suggest a more thorough discussion here (see also below).

p. 14652, l. 15: "lower upper limits": quantify how much lower upper limits.

p. 14656, l. 8-12: First the word "aerosol" should not be used synonymously with "ice particles". The papers cited here are referring to ice particles, not to aerosol particles. Second, the issue should be discussed in more detail. Is it only extinction that is relevant here? Could multiple scattering play a role? Further, for the tropics, it was recently reported that events of enhanced ice water content are observed which are related to recent impact of convection. (Schiller, C., et al. (2008), Ice water content of Arctic, mid-latitude, and tropical cirrus, J. Geophys. Res., 113, D24208, doi:10.1029/2008JD010342). Is it possible that in this way injections of iodine into the lower tropical stratosphere are masked and are not detected in the measurements reported here?

p. 14657, l. 27: is it correct to say that "all" reactions relevant are incorporated? Isn't it possible that the chemistry of non-methane hydrocarbons becomes important at these altitudes?

p. 14660, l. 3: It is unclear what the numbers 0.007 and 0.15 mean. If there are dimensionless numbers, which quantity are they describing? If they are reaction rates,

what is the unit?

Section 5: The assumption inherent in the retrieval of IO and OIO is that the mixing ratio is constant along the line of sight. This assumption could be tested here against the model results. In how far do the model results support the assumption of a constant mixing ratio along the line of sight?

Conclusions: The impact of the new upper limits for I_y on estimates of the contribution of iodine to observed ozone loss is only mentioned in Section 6. It is an important issue and should also be (briefly) discussed in the Conclusions (and likewise in the abstract).

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 14645, 2009.