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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Retrieval of stratospheric and tropospheric BrO columns from multi-axis DOAS measurements at Reunion Island (21° S, 56° E)" *by* N. Theys et al.

Anonymous Referee #2

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Theys et al. provide evidence for BrO in the free troposphere above Reunion Island. As far as I can judge, their analysis of their measurements is sound, and I recommend publication in ACP after a few minor changes:

- Photolysis of short-lived halocarbons provides a plausible explanation for the occurence of BrO in the free troposphere. However, an alternative would be direct upward transport of inorganic bromine (see e.g. Yin et al., Atmos. Chem. Phys. 1, 19-36, 2001). Although this is briefly mentioned in the introduction, it is not further discussed in the paper. Based on your measurements, are there any clues that support either one of these possibilities?

- You show that you cannot see evidence for BrO in the boundary layer. It would be very interesting to see what upper limit you can assign to the BrO mixing ratio here, based on the uncertainties of your measurements. Can you rule out any importance of boundary-layer BrO, or are mixing ratios around a ppt still possible?
- Introduction: A reference that could be used when refering to polar ozone depletion events is the recent review paper by Simpson et al. (Atmos. Chem. Phys. Discuss. 7, 4285-4403, 2007).
- page 8280, line 12: Did you mean "sparse" instead of "spare"?
- References:
  - Hendrick et al. has been published in ACPD and can be moved from the footnote into the list of references.
  - Check spelling of Ny-Ålesund in the title of Wittrock et al. (2004).

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 8261, 2007.