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Atmospheric Chemistry and Physics Discussions



# *Interactive comment on* "Chemistry of the antarctic boundary layer and the interface with snow: an overview of the CHABLIS campaign" *by* A. E. Jones et al.

**Anonymous Referee #2**

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Jones et al CHABLIS review:

This paper summarizes the context of the CHABLIS field campaign and describes some major findings from the study. The paper is well written and useful in that it provides a big-picture summary of the successful field mission. It also makes reference to largely published studies and thus can direct somebody interested in the field campaign to the proper paper.

The authors may want to consider a few points with regard to their broader conclusions drawn from the study:

On page 5157, line 22, it is stated that halogens control HOx cycling. I think that the halogens are quite significant and were unexpected, but they are not the only control on HOx cycling.

On page 5158, line 8, it is stated that nitrate radical is below 2 pptv, which makes it impossible to explore its role. Can the authors take this detection limit and consider an upper limit for NO3 chemistry at this site and consider what this constraint would mean for nitrate radical chemistry? Additionally, NO3 can react with NO2 to form N2O5 in a reaction that is often near equilibrium in the atmosphere and is a strong function of temperature. To what degree do the NO3 measurements constitute a constraint on possible N2O5 chemistry at this site. Is this still a fully open question?

On page 5159, line 1, it is stated that halogen chemistry dominates the sea ice zone. The CHABLIS data are not observed on the sea ice, and thus this point seems overstated. Their data are from a site impacted largely by airflow off the continent and some flow from the sea ice, and they observe halogen oxides in both types of airmasses, albeit at lower levels for less-marine influenced airmasses. Additionally, Saiz-Lopez et al., [2007] shows most summertime airmasses have significant BrO and IO that is photochemical in origin. These data seem to point to snowpack sources of halogen oxides not directly related to the sea ice zone. The authors might consider that snow photochemistry, at least in the coastal zone, could be responsible for some of the halogen chemistry.

Reference:

Saiz-Lopez, A., Mahajan, A. S., Salmon, R. A., Bauguitte, S. J-B., Jones, A. E., Roscoe, H. K., and Plane, J. M. C.: Boundary layer halogens in coastal Antarctica, Science, 317 (5836), 348–351, 2007.

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Interactive Comment