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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Simultaneous measurements of OClO, NO_2 and O_3 in the Arctic polar vortex by the GOMOS instrument" *by* C. Tétard et al.

C. Tétard et al.

cedric.tetard@aeronomie.be

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Reply to anonymous referee #1: At First, we would like to thank anonymous referee #1 for his helpful comments and suggestions.

General comments: The paper has some merit, especially the discussion of novel OClO measurements from GOMOS. As at the earlier stage before the paper went to ACPD, I still think that the paper has one shortcoming, namely that the GOMOS OClO product has not been validated. Although the authors indicate that they are aware of this, I think they could do more to remedy this shortcoming. In particular, they could provide in the Introduction (e.g. p. 12710, after l. 21) a summary of why the work on

OClO, although preliminary, is useful and/or important (e.g. capabilities of GOMOS, need to monitor OClO). Furthermore, the authors could provide more information on what is new in this work. Once this is done, and the specific comments below are addressed, I think the paper should be suitable for publication in ACP.

Reply: First of all, it is true that the GOMOS OClO product has not been validated but GOMOS is almost the only instrument performing nighttime measurements of OClO (the balloonborne instrument SALOMON performs also this measurement but the SALOMON data are not available for the moment). The comparisons between daytime OClO and nighttime OClO require to model the diurnal variations. All this work requires time and will be done in the future as it is explained in the conclusions of this paper. We have already compared our results to the results of the BASCOE model (cf the end of section 3) and this comparison is quite good. Thus, we think that the use of our GOMOS OClO product is not premature. As requested by the reviewer, we have highlighted in the text the importance to monitor nighttime measurements of OClO: the sentence p12710, l. 2021 has been removed and replaced by a comment on the importance of these measurements.

P. 12708, l. 24: What heights are you referring to when discussing TPSC?

Reply: The temperature of formation of PSC has been modified. We use 195 K (at 50 hPa). This new temperature is more currently used by the scientists (for instance, Pitts et al., 2007, ACP, 7, 52075228).

P. 12709, l. 9: Can you provide examples of the chemical models you discuss? Are these chemistry transport models, box models?

Reply: Thanks to this comment and the comment of anonymous referee #2, we have removed the end of the sentence l. 9 ("by constraining the chemical models"). OClO is not often used to constrain chemical models.

P. 12709, l. 18: Could the authors discuss briefly what is the effect of denoxification of

the polar vortex?

Reply: As requested by the reviewer, a discussion about the effect of denoxification of thepolar vortex has been added l. 18 : “denoxification causes a delay in chlorine deactivation and a more prolonged period of ozone loss.”

P. 12710, l. 3: Indicate that it is EOS Aura.

Reply: This has been modified in the text.

P. 12710, l. 21: I think this is a good place to introduce a summary of why the work on OClO is important (see general comments).

Reply: According to the reviewer suggestion, a comment about the importance of this measurement has been added in the text: “this article highlights the capabilities of GOMOS to ensure a global monitoring of OClO and NO2 during nighttime.”

P. 12711, l. 3 and l. 19: Sunsynchronous misspelt.

Reply: This has been modified in the text.

P. 12713, l. 23: Could the authors also provide references in the peer reviewed literature that discuss the winter of 2007/2008?

Reply: According to the reviewer suggestion, we have changed the web site reference by a literature reference (Kuttippurath et al., 2009).

P. 12714, l.2627: Should be “MediumRange”.

Reply: This has been modified in the text.

P. 12717, l. 67: Could the authors also provide references in the peer reviewed literature that discuss the winter of 2004/2005?

Reply: A reference has been added (Kleinböhl et al., 2005).

P. 12718, l. 912: It would be helpful if the authors could provide further discussion on

the anticorrelation between NO2 and OClO SCDs.

Reply: we agree that a further discussion would be helpful. Nevertheless, it is difficult to discuss more because of the large error bars. We can just highlight that the observation is in agreement with the known chemistry. This has been added in the text at the end of section 5.5.

P. 12719, l. 2: It would be helpful to summarize here why the work on OClO is important (see general comments).

Reply: We agree. A comment about the importance of the measurements of OClO has been added: “It is important to continue the monitoring of these species to better understand the interactions between halogen and nitrogen species within the framework of the ozone depletion”.

P. 12719, l. 4: It would be helpful to comment here on why it is important to validate the OClO product.

Reply: We agree. We have added a comment on the importance of the validation: “The accuracy and reliability of our OClO products will be established through comparison with other measurements made by other instruments.”

P. 12730, Fig. 8: It would be helpful to mark TPSC in the temperature graphs, e.g., by a horizontal line. Reply: We agree. A horizontal line has been added.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 12707, 2009.