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Interactive comment on “First climatology of polar mesospheric clouds from GOMOS/ENVISAT stellar occultation instrument” by K. Pérot et al.

Anonymous Referee #2

Received and published: 25 January 2010

General comments:

This paper presents the retrieval technique and first analysis of Polar Mesospheric Cloud (PMC) properties measured with the GOMOS photometers via the stellar occultation technique. The results described in this work are new and add to the community knowledge on the mesospheric ice layers. High sampling frequency of the instrument in combination with the good vertical resolution provides important results on clouds altitudes and their interhemispheric differences.

It is this reviewer's opinion that the paper is suitable for publishing in ACP after a minor revision.

Specific comments:

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Page 25602, lines 22-23: recent results of [Murray et al., 2009; Zasetsky et al., 2009a, and Zasetsky et al, 2009b] specifically address the mesospheric ice nucleation mechanism and formation rates can be mentioned in this section.

Page 25605, lines 1-3: please rewrite this sentence, possibly as: 'This, however, does not affect our results on PMC climatology as these clouds do not form in the winter mesosphere.'

Page 25605, line 23: [Stevens et al., 2009] have published the detailed analysis of the diurnal variations in PMC properties at mid-latitudes. Perhaps this work should also be mentioned.

Page 25606, line 13: "other sources" that contribute to the signal should be either described, or at least mentioned here.

Page 25608, line 4: does the solar zenith angle of 94° correspond to the daylight conditions? The sun is well below the horizon in this case. Please clarify.

Page 25613, lines 8-12: comparison of GOMOS PMC properties for these seasons with other instruments' results may help to identify and maybe even quantify the instrument effects.

Technical corrections:

Page 25600, line 25: add "typically" before "greater than 55".

Page 25602, line 13: replace "satellites" with "instruments" as SBUV and SBUV-2 were flown on various satellites.

Page 25603, line 9: spell GOMOS, as well all other abbreviations (as MIPAS and SCIAMACHY in the next paragraph), when they are mentioned for the first time.

Page 25605, line 14: replace "plan" with "plane".

Page 25606, lines 23-24: please rewrite this sentence. In its present form it reads as

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the scattering process is governed by the Mie theory.

Figure 5: all labels near and inside the panels are too small to read. Maybe the landscape format will allow for more space for larger fonts.

References:

Murray, B.J. and E.J. Jensen (2009), Homogeneous nucleation of amorphous solid water particles in the upper mesosphere, *J. Atm. Solar-Terr. Physics*, doi:10.1016/j.jastp.2009.10.007.

Stevens, M., et al. (2009), The diurnal variation of noctilucent clouds frequency near 55N observed by SHIMMER, *J. Atmos. Solar-Terr. Phys.*, 71, 401–408.

Zasetsky, A.Y., S.V. Petelina, and I.M. Svishchev (2009 a), Thermodynamics of homogeneous nucleation of ice particles in the polar summer mesosphere, *Atmos. Chem. Phys.*, 9, 965–971.

Zasetsky, A.Y., et al. (2009 b), Ice particle growth in the polar summer mesosphere: formation time and equilibrium size, *Geophys. Res. Lett.*, 36, L15803, doi:10.1029/2009GL038727.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, 9, 25599, 2009.

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