Dear Reviewer,

Thank you very much for your attention to our paper acp-2009-277 "Influence of scintillation on quality of ozone monitoring by GOMOS". We greatly acknowledge comments and suggestions. Below we present the detailed replies to each comment.

General comments

Reviewer #1

My largest concern is the Introduction. There are a number of grammar problems in this section (and a few in the Abstract as well). A few items are discussed in the Introduction without description or explanation, only to be described in more depth later. For example, stellar occultation is discussed, but reference to a figure depicting the geometry isn't provided until the beginning of section 2. GOMOS fast photometers are discussed and a figure is presented, but information on the photometers isn't really presented until section 2. I just felt information presented in the Introduction wasn't quite logically organized in relation to the rest of the paper.

There is no mission description in the Introduction, or at the very least a reference to a mission overview. I realize this paper is part of a special issue, but it should still be somewhat self-contained.

Authors

We have reorganized Introduction and Section 2. The Introduction contains now a short description of the GOMOS mission, the instruments, the measurement principle etc. In the revised version, the estimates of the magnitude of fluctuations caused by scintillation (Fig.1) are moved to Section 2.

Reviewer #1

Mention is made a few times that the residual errors from uncorrected effects of isotropic scintillations are significant for bright stars, but that wording is vague. I assume that means the contribution to the error is similar regardless of star brightness, but other errors vary with star brightness and are a minimum for the brightest stars, meaning the error from this source is a smaller percentage of the total error for dimmer stars. However, I think there are different ways to interpret that statement.

Authors

Your assumption is absolutely correct: we meant that the scintillation correction error constitutes a significant percentage of the total error for bright stars. We corrected the corresponding statements in the revised version.

Reviewer #1

The statement is made that using regularization reduces retrieval errors. I assume you are saying regularization reduces unphysical oscillations in the retrieved profiles that arise from uncorrected scintillation effects in the observed spectra, and stronger regularization in oblique occultations is a benefit because the unphysical oscillations are larger in these occultations. To imply that increased regularization equates to reduced errors in general would be somewhat misleading. It is true for this special case. In other situations, increasing regularization could increase errors through excessive smoothing of the retrieved profiles.

Authors

You are absolutely right in your comment that our statement is true for the GOMOS case. An excessive smoothing is prevented by the applied "target resolution" regularization method. We have noted this and refined our statements in the revised version.

Specific comments

Reviewer #1

Page 12620, line 15: you say you generate a smoothing for l(t) using a Hanning filter with a FWHM of about 3 km, but the variable being averaged over appears to be time, not distance. I thought perhaps you meant the time it took for the tangent height to change by 3 km, but with refraction effects at low altitudes, that time is not constant, so it wasn't clear what this meant.

Authors

The width of the smoothing window (in time) is not constant because of refraction. The cut-off scale for profile smoothing is the altitude scale, because of it is related to the atmospheric processes: the smooth signal should not contain fluctuations that are caused by scintillations. Technically (related to measurements), it is the smoothing with the window of variable width in time (the window of constant width in altitude). In the revised version, we have clarified the statement.

Reviewer#1

Page 12622, line 20: You say the residual scintillation modulation is below 1% above ~20 km. From Figure 2, it would be more accurate to say it is less than 1% above 23 km (for the example shown). Considering the location of the ozone concentration peak, some people might consider this a significant distinction.

Authors

In our statement, we characterized fluctuations by their rms, which is below 1% above ~20 km. To avoid ambiguity, we indicated this explicitly in the revised version. According to the suggestion of Reviewer#2, we removed the words "in the main ozone layer".

Reviewer#1

Page 12626, line 19: what is the variable xi_o? It is never defined. Should it just be xi?

Authors

Thank you, the clarification is added.

Reviewer#1

Page 12627, line 5: what is rho_o, the average density at altitude z from the reference set?

Authors

Yes, we added the clarification.

Reviewer#1

Page 12619, line 21: your comma (after T_ref) comes out as a subscript of a subscript.

Authors: text is corrected.

Please find the file with indicated changes in the manuscript.

As a corresponding author, I confirm that all co-authors concur with the submission in its revised form.

Yours sincerely,

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