

## ***Interactive comment on “Level 1b error budget for MIPAS on ENVISAT” by Anne Kleinert et al.***

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Answers to the interactive comment on "Level 1b error budget for MIPAS on ENVISAT" by Anne Kleinert et al. by Anonymous Referee 1.

We thank Anonymous Referee #1 for reviewing the paper and the valuable comments. Our answers to the comments are given below. Relevant referee comments are inserted *in italics*.

*The presentation is very clear, but I find that in some figures the choice of colors (some of which are really similar), line styles and symbols do not help readability, specially in the most "crowded" plots in which several lines are plotted together.*

The idea behind the color selection was to use similar colors for the detector "pairs" (although they should still be discriminable). In order to enhance readability, we will

C1

use cyan and blue for channels B1 and B2, respectively, and grey instead of dark grey for channel D1. In the plots where the five spectral bands are shown, we will change the colors for AB and B accordingly and use grey instead of black for band D.

*A technical remark: in section 2 MIPAS is described as a Michelson interferometer, but I'd define it more of a Mach-Zehnder design.*

Although the design of MIPAS is not identical to the original Michelson interferometer, we think that it is appropriate to describe MIPAS as a Michelson interferometer, rather than a Mach-Zehnder interferometer.

*At the end of section 2 I'd use "trade-off" instead of "trade".*

Ok

*In section 3 the authors refer to a "simple correction algorithm" for the spike correction: it would be desirable, if possible, to have more detail, or a literature reference.*

If a spike is detected, the values of the affected data points are divided by 2 until they are below a threshold defined by the adjacent points not affected by the spike. We will add this information in the text and add a reference to the Algorithm Technical Baseline Document (ATBD) for MIPAS Level 1B Processing for more detailed information.

*Page 13, line 30: the phrasing is not clear, possibly the comma after "assumption" needs to be removed.*

We will re-phrase the sentence by:

"There are three main sources of uncertainty for the determination of the non-linearity: (1) the assumption, that the detector curve is characterized by a 3rd order polynomial for channels A1 and A2 and by a 2nd order polynomial for channels B1 and B2, (2) the estimate of the modulation efficiency, and (3) the regression error."

*Figure 13: it seems that the colors in the caption are not in agreement with the ones used in the figure.*

C2

Yes, sorry. We will correct the caption.

*Last, a more general remark about section 6.2 (and the paper in general): there is a lot of detail in the characterization and description of the measured contributions to the error, but in several places I find that some kind of physical interpretation of the measured phenomena (e.g. seasonal cycles) could be provided together with the characterization. In section 6.2 there is a couple of sentences providing an interpretation for some of the measured effects, but I think the work could gain a lot of significance if this could be expanded and applied in each case where a significant and characteristic effect is detected.*

We agree that the value of the work is increased by giving a physical background of the error sources and explaining the measured phenomena. There are, however, some effects which we cannot explain. Especially for the offset variation described in section 6.2 we have not found any instrument effect that could explain this behavior. Also a correlation with cloud cover, which could give a hint to straylight effects, has been investigated but did not give a clear picture. Therefore we are limited to reporting the observed offset variation. The variation with day/night, season, and altitude shall demonstrate the variability of the offset. We will add an additional sentence at the end of section 6.2 in order to make the limits of this analysis more clear:

"Also the day/night variation as well as the seasonal, latitude dependent variation of the offset cannot be explained with known instrument effects, but the observed offset variation gives an impression of the expected offset error and its variation."

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