

Interactive comment on “SCIAMACHY Level1 data: Calibration concept and in-flight calibration” by G. Lichtenberg et al.

G. Lichtenberg et al.

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The authors would like to thank the referee for his/her constructive comments on our manuscript. The specific comments are addressed below in order of their appearance.

1. General comments

The paper did not discuss the on-ground specific goals and requirements, because we felt this would take the focus away from the current issues and problems in the calibration, which are probably more relevant for the Level 2 user. We wanted to give a description of the calibration and Level 1 quality to a degree that the 'uninitiated' reader

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can understand the critical points in the calibration. While it is certainly interesting to know how well the instrument succeeded in realising its performance goals from the instrument development point of view, this is less important for the current quality of Level 1 data.

For the impact of calibration issues on the Level 2 products only a few studies exist to date. We agree with the referee that such studies must be done and our paper is intended to be a starting point for future studies.

2. Specific comments

p. 8932, line 9: The *spatial* resolution can be tuned by changing the integration time of a given cluster. A clarification was added to the text.

p. 8932, eqn 1: The wavelength dependence was added to the equation.

p. 8938, eqn 3: We agree that the polarisation sensitivity can change with different detector temperature. The question remains if such a change is significant in comparison to other effects in these channels. Generally the polarisation effects are not as important in the IR as they are in the UV/VIS channels. The temperature change is at most a few Kelvin, making it very unlikely that the polarisation sensitivity will be changed significantly. Nevertheless this issue will be investigated during the review of the calibration data currently done at SRON.

The ice will probably also change the polarisation sensitivity. However, it is most likely that other changes caused by the ice, especially the slitfunction change is the dominating detrimental effect on the trace gas products. An investigation of polarisation effects of the ice will also be very difficult, since there is no source of known polarisation in orbit and the polarising

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effect certainly depends on the exact composition, phase and structure of the ice which is largely unknown. We added a sentence in the polarisation section on the possible effect of both, the detector temperature and the ice on the polarisation sensitivity.

p. 8940 line 22, spectral shifts: The mentioned shift was derived from a comparison of several measurements done in-flight under different thermal conditions (see the cited reference *Ahlers, 2004a* for more details). Some of the measurements were done at a point in time where it cannot be excluded that thermal gradients in the detector assemblies are still present. The detector temperature is only measured at one point of the assembly making it impossible to determine thermal gradients. However, the cited wavelength shift was derived from a period where the detector temperatures are reasonably stable apart from a small change in time due to seasonal variation. The temperature of the optical bench was stable for all measurements used. The wavelength shift does not strongly correlate with changes in detector temperature in the data used in *Ahlers, 2004a*. Anyway, as already mentioned, the wavelength calibration of the spectrum is done with in-flight measurements. Any shift with respect to the on-ground calibration is corrected.

p. 8943 line 20: The stray light fractions are based on on-ground data. No in-flight analysis is available yet. The error estimate for channel 1 stray light was done using redundant on-ground data.

p. 8947, footnote: Added a comment to that effect.

p8961, degradation: Added a sentence to that effect.

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3. Technical corrections

p 8954, eqn 16: Corrected.

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