

Interactive comment on “Precise pointing knowledge for SCIAMACHY solar occultation measurements” by K. Bramstedt et al.

Anonymous Referee #2

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This study by Bramstedt et al. reports on the precise registration strategy of tangent height from SCIAMACHY solar occultation measurements. The information of accurate tangent height for atmospheric occultation measurement is essential for scientific analysis using the satellite data. The authors described a method to determine the Elevation Angle Offset (EAO) by fitting the up- and down-scan above 100 km, and then extrapolating it to lower altitude. It might be a good idea to publish this result in AMT if this method is proven solid. However, I felt that the authors have not shown enough evidence to convince the readers that the extrapolation is valid. Please see each comment shown below, and consider appropriate revision.

<Major Comments>

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1) The authors fit the up- and down-scan signal from PMD 4 to determine the position of solar disk with tangent heights above 100 km for state 49 (Fig. 5). Then, they determine $d(\lambda)$ for 30 scans, and fit to a linear line and extrapolate it to the value down to 17.2 km (Fig. 6). They claimed that tangent heights above 100 km are used because refraction due to Earth's atmosphere is negligible there. However, I think that refraction due to Earth's atmosphere is still enough small even at lower altitude around 50 or 60 km. On the other hand, I worry about the reliability of extrapolation of a linear fit curve from above 100 km to 17.2 km. I want to see the EAO values between 17.2 and 100 km in Fig. 6 to see the validity of the extrapolation.

2) The authors don't show any other proof to show the absolute pointing error of the SCIAMACHY occultation measurements. Is retrieved minor constituent profile improved with this new tangent height registration method? If it can be proved by showing the improvement of SCIAMACHY profile compared with some other validation data (e.g., ozonesonde profile), it would be nice to see such a figure in this paper.

3) The numbers (achieved precision, offset, seasonal cycle amplitude for both EAO and AAO) are shown in several part of this paper, but some of them are inconsistent among in contents, in conclusion, and in abstract. Please check the values. Also, it would be a good idea to add a table to summarize the result in errors both in angle [mdeg] and tangent height [m] units.

<Minor Comments>

1)P.3799, L.21: 0.0045 deg → 0.045 deg

2)P.3799, L.23: 0.0045 deg → 0.045 deg

3)P.3800, L.19: 0.08 deg → 0.008 deg

4)P.3800, L.20: the term “SFD” first appeared here, but not explained (first explained in P.3812, L.24)

5)P.3802, L.4: sun follower device → SFD

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- 6)P.3802, L.8: sketched Fig. 2 → sketched in Fig. 2
- 7)P.3802, L.12: 0.0045 deg → 0.045 deg
- 8)P.3804, L.16: to the the maximum → to the maximum
- 9)P.3804, L.19: the term “CFI” first appeared here, but not explained.
- 10)P.3806, L.10: to noisy to be used → too noisy to be used
- 11)P.3811, L.13: Fig. 10e → Fig. 10f
- 12)P.3811, L.15: Figure 9e → Figure 9d
- 13)P.3815, L.16: 0.025 deg → 0.0025 deg
- 14)P.3815, L.23: as for the EAO → as for the AAO (?)
- 15)P.3816, L.5: mean error is about 1.1 mdeg → mean error is about 0.6 mdeg (?)
- 16)P.3817, L.3: an amplitude of 3.4 mdeg → an amplitude of 2.4 mdeg (? P.3815, L.24)
- 17)P.3817, L.3: offset of 93 mdeg → offset of 89.5 mdeg (? P.3815, L.27)
- 18)Figure 10H: The color between state 47 and state 47 (SFD) is very similar and are hard to distinguish. Please change one of these colors, or change the simbol.

Interactive comment on Atmos. Meas. Tech. Discuss., 5, 3797, 2012.