

Response to referee #2

Thank you very much for your helpful comments and for the time and effort put in to help with this study.

Title: Recommend saying “Assessment of the quality of...” instead of “Validation of” because only the PCL measurement is really “a truth measurement”. But as you note, the OSIRIS data do not coincide well in time with the PCL data.

Title is now, “Assessment of the quality” instead of “Validation.”

(Section 1, Introduction): The work of Clancy and Rusch (JGR, 1989) offers a useful perspective of early satellite efforts to provide the distribution of temperature in the mesosphere.

Clancy and Rusch [1989] is now referenced.

lines 44-45: A measurement vertical field of view of 1 km narrows the vertical resolution of the retrieved T, but does equate to it. And your vertical sampling rate is only every 1.5 km.

Changed “resolution” to “field of view” and we now state that the vertical sampling is ~1.5 km.

line 99-101: Stevens et al. is in press at JGR and describes SOFIE v1.2 and 1.03, not v1.1. Above 88 km SOFIE T is significantly warmer than OSIRIS values. Refer to Marshall et al. (AMT, 2011) for SOFIE error estimates throughout the mesosphere.

Stevens et al. [2012] is now referenced properly, and corrected to v1.2. It is now mentioned here that OSIRIS temperatures are warmer than those of SOFIE above 88 km, and the error estimates from Marshall et al. are also now mentioned.

(Section 2, OSIRIS temperatures), line 113: Part of the uncertainty about the O₂ density profile must come from knowledge of the vertical alignment of the VER profile, which has a registration uncertainty of 0.5 km. In the extreme how would your T(z) be affected, if the measured altitudes were incorrect by 1 km? Your estimate for 0.5 km should part of your error budget for Table 1.

Systematic uncertainties due to pointing error are now accounted for and discussed.

(Section 3, Results), line 205: You need to understand the nature and causes of the outliers, too.

Less than 3% of the OSIRIS data is rejected due to detected outliers, they are due to random errors within the retrieval. Now mentioned in the text.

line 244: A high bias of 2K for OS versus SABER agrees nicely with the stated finding on line 96 that the SABER (version ?) temperatures are cold by 2 K in mesosphere.

Discussion of the SABER bias is now included here.

Figure 5: Bias at the stratopause is large and significant at high latitudes of the SH. Any thought about why? Scatter from high surface albedo or another reason?

As mentioned in the text, this is believed to be due to not taking into account multiple-scattering.

line 262: Please summarize here the probable reasons for this disagreement.

The reasons are now summarized.

line 287: I suggest saying “a much colder bias” rather than “lower bias”.

“lower” has been replaced with “colder”.