

## ***Interactive comment on “The Level 2 research product algorithms for the Superconducting Submillimeter-Wave Limb-Emission Sounder (SMILES)” by P. Baron et al.***

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General/scientific comments

It is interesting that channels A and B overlap and that no discontinuity shows up in Figure 1. Is there a brightness T bias correction between channels A and B for this figure?

The instrument appears to spectrally undersample (1.4 MHz spectral resolution with 0.8 MHz channel separation).

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The retrieval of tangent altitudes using a strong O<sub>3</sub> line seems like it would not be sensitive to the assumed O<sub>3</sub> distribution so long as the O<sub>3</sub> is well guessed, however a simulation for an unexpected O<sub>3</sub>-hole (with the hole above 20 km) might be worthwhile or for an error of a factor of 2 in assumed O<sub>3</sub> VMR. In my opinion, the width of the line is sensitive to both changes in tangent altitude and O<sub>3</sub> VMR. The less sensitive quantity is the width/amplitude ratio.

Regarding section 3, my understanding of the method is that the O<sub>3</sub> profile is retrieved down to ~18 km in step2 and the retrieval from step5 would be trusted in the altitude range below (12-18 km, lower strat).

F is stated as the forward model. However in Eq. 10, F seems to represent the simulated "measurements" since this variable is involved in arithmetic operations (subtraction). I suggest F needs to be redefined, otherwise dF/dp also is meaningless (to me).

Technical errors

p3595L7: "An theoretical..." -> "A theoretical"

p3595L13: "It is large..." -> "The error is large..."

p3597L24: "...lines triplets..." -> "...triplets..."

p3600L29: "...linearly interpolated...trend." -> "...linearly interpolating the vertical trend of retrieved angles."

p3604L11: "...out-of-band lines absorption..." -> "...absorption by out-of-band lines..."

p3608L8: "Errors characterisation" -> "Characterisation of errors"

p3608L16: "...as a vertical resolution definition..." -> "...as a measure of the vertical resolution..."

p3609L10: "...errors propagation and correlation..." -> "...propagation and correlation"

C1002

of errors..."

p3609L24 In the final term on the right-hand side of equation 11, the circumflex is missing on the 'p' in the denominator.

p3610L19 "...eigenvectors and eigenvalues matrices..." -> "...matrices of the eigenvectors and eigenvalues..."

p3612L3 "...interest..."->"...value..."

p3612L14 "pressure line width" -> "pressure-induced line half-width"

p3612L16 "...100 hPa...~16 km." -> "90 hPa...~17 km."

p3612L18 "O3v2, O3v1,3". Does "v" refer to the vibrational quantum number or the vibrational band? If it's the latter, the Greek letter 'nu' should be used. And it should be made clear that we are referring to the first excited state for each band (i.e. v=1).

p3613L21 "...widows..." -> "...windows..."

p3614L10 "...of..." -> "...for..."

p3616L9 "...found lower..." -> "...found to be lower..."

p3618L14 "Works are..." -> "Work is..."

p3618L14 "...informations..." -> "...information..."

p3642 Figure 12: The second cyan line at 0 K is not mentioned in the caption. Perhaps this line should not be present, since cyan is used for random error due to O3.

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