

Geosci. Model Dev. Discuss., referee comment RC2  
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## Comment on gmd-2021-439

Minzheng Duan (Referee)

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Referee comment on "Introduction of the DISAMAR radiative transfer model: determining instrument specifications and analysing methods for atmospheric retrieval (version 4.1.5)" by Johan F. de Haan et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2021-439-RC2>, 2022

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A forward modelling is essential for understanding the physics behind radiation measurements, it is also the base of building accurate algorithm for remote sensing, DISAMAR is of a such important tool for retrieving atmospheric gases and particles, and it has been used for TROPOMI and SP4/SP5 observations. This model introduces several numerical techniques such as layer-based SOS method, semi-analytical derivatives etc. to improve its computation efficiency as well as its computational accuracy. I agree its publication in GMD after minor revision, and I'm looking forward its application for more space-born instruments in future.

- Around line 280, it is not clearly to see how can we get EQ. 25 from EQ 24, please add more description.
- For the convolution of the ISRF around Line 109. "If there is a strong absorption line in the interval, the interval is reduced until the position of the strong line is reached, so this interval is smaller than the FWHM", this is easy to do for O2-A band which is regular spaced, for irregular spaced absorption band, say, water vapor band, is this method easy to apply this algorithm?
- Line 114, "Typically the number of Gaussian division points is between 3 and 30 per wavelength interval in the O2 A-band for a FWHM of 0.5 nm." Is there a rule for the reader to know how to choose the number between 3 and 30.
- "only the adding of different layers and the subsequent calculation of the internal field is replaced by the successive orders of scattering method." Please add several sentences to make clear how to calculate the internal field?