

Interactive comment on “Cloud top pressure retrieval with DSCOV-EPIC oxygen A and B bands observation” by Bangsheng Yin et al.

Anonymous Referee #3

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This paper introduces a method to retrieve cloud top heights from measurements in the wavelength range $\sim 680\text{nm}$ to $\sim 780\text{nm}$ in and next to the oxygen A and B absorption bands. Measurements are performed by the EPIC sensor which is operated on a satellite near the first Sun-Earth Lagrange point so that scattering angles are always 165° or larger.

I agree with each point raised by the first reviewer. While the science is probably sound as far as can be judged from the current manuscript, the manuscript requires major revisions and a further round of review before it might be published as a final paper.

Besides some language issues, the description should be improved, e.g. not all steps in section 3.2 can be followed. Section 4 could be split in two parts, since the first part is more about method description while the second part shows the results. Maybe

C1

Sect. 2 + 3 + the first half of Sect. 4 could be merged into one section (called 'Theory and methods' or just 'Methods') with several subsections. A discussion of the results is missing. The conclusion section currently is more like a summary. A few minor remarks:

- Line 14: "analytic transfer model": Do you mean your retrieval? In my view, even if it is a relatively simple retrieval and the term 'model' may not be completely wrong it should be called retrieval (or inversion or maybe 'inverse model' or 'retrieval using a analytic transfer model' or similar) because at least some readers will connect the term 'model' more with a forward model than with a retrieval.
- Line 22: "a one-hundred-fold time reduction": Which time is reduced? (Computation time I guess) Compared to what? (line-by-line calculations?)
- Line 36: The spatial resolution of the sensor could be mention here. Also the scattering angle range ($\geq 165^\circ$) could be mentioned somewhere.
- Figure 1 caption: The model should be mentioned here. Currently it is mentioned only later in the text. Is the figure for 1013hPa? Is it only for O₂ or for all atmospheric constituents?
- Line 122: 'we are trying to develop' could be replaced by 'we develop'.
- Line 134: 'outer space' could be replaced by 'TOA'.
- Line 144: 'airmass and aerosol that located above or below cloud': also inside a cloud Rayleigh scattering and extinction by aerosols can happen.
- Line 152: 'between solar and satellite sensors': You mean 'between Sun and satellite sensor'?
- Line 154: 'layerd' should be 'layered'.
- Line 284: 'and hard to tell directly' should be removed.

C2

- Line 371: 'decrease' should be 'increase' if I understand correctly.

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