

Interactive comment on “The benefit of limb cloud imaging for tropospheric infrared limb sounding” by S. Adams et al.

Anonymous Referee #1

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General comments:

The paper describes how a limb cloud imager can help to improve tropospheric trace gas and temperature measurements using an IR limb sounder. The study uses cloud data from geostationary weather satellites in combination with ECMWF temperature profiles and ice and liquid water content data of the "Lokal-Modell-Europa". It is shown that the tropospheric coverage of IR limb sounding can be improved if one has information about the cloud fraction within the line-of-sight of the sensor.

The paper is well organized. The results are well presented with appropriate figures.

The title of the paper is misleading. "limb cloud imaging" sounds as if cloud properties are measured. It should be clear from the title that the aim is to measure trace gas

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concentrations and temperature profiles. A better title would be "The benefit of limb cloud imaging for tropospheric infrared limb sounding of tropospheric trace gases"

Specific comments:

- p1: "A proposed limb cloud imager (LCI) mode will measure clouds with unprecedented spatial resolution."
"Measure" should be replaced by "detect", because the measurements are not used to derive cloud microphysical properties. "Unprecedented spatial resolution" is only true for limb sounding (4 km across track times 8 km along track). The High Resolution Visible channel of MSG (Meteosat Second Generation) has for instance a spatial resolution of 1km x 1km.
- p5: "LME provides the full 3-D structure of the cloud"
In order to resolve 3D-structures of clouds a much higher resolution is required. To estimate the cloud fraction along a LOS the resolution of LME is sufficient, but definitely not to calculate 3D cloud scattering effects.
- p6: "This threshold is based on radiative transfer calculations."
How exactly are the radiative transfer calculations performed?
- p11: "Nevertheless, the cloud occurrence calculated with the LME data is significantly higher and more realistic than that calculated with the BT data, which can be seen by a comparison with SAGE measurements (not shown)."
Why is the comparison to SAGE measurements not shown? It would be interesting to see whether the cloud amount is really overestimated when the LME data is used.

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