Atmospheric
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Discussions

Interactive comment on "FRESCO-B: A fast cloud retrieval algorithm using oxygen B-band measurements from GOME-2" *by* Marine Desmons et al.

Anonymous Referee #1

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Review comments on manuscript "FRESCO-B: A fast cloud retrieval algorithm using oxygen B-band measurements from GOME-2"

Authors: M. Desmons, P. Wang, P. Stammes, and L. G. Tilstra MS No.: amt-2018-420
MS Type: Research article

Comments:

This paper presents the new FRESCO-B algorithm, which retrieves cloud properties using measurements at the oxygen B-band regions. This new algorithm adopts the same infrastructure of the robust and well-tested FRESCO model. The paper gives the theoretical basis, radiative transfer simulations and performance evaluation. The

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work is helpful in further understand the cloud retrievals with oxygen A- and B-bands. The paper is well written and the topic is suitable for publication in AMT. I recommend publication after some minor revisions. Some comments are as follows:

1) Trying to understand the simulation results shown in Figure 6. Using Fig 6a as an example (it's easier to analyze since the surface albedo is the same for both FRESCO-B and FRESCO), why do you think the pressure difference is negative for the thin-and-low cloud case? There are three factors that contribute to the pressure difference: (a) the photon path differences inside clouds; (b) the photon path differences below clouds; and (c) the differences in the effective cloud fraction. The only one that can cause negative pressure difference is (c). Since FRESCO-B has a slightly larger effective cloud fraction, the total photon path for the clear part of the pixel should be smaller than FRESCO. I'm thinking if you force the effective cloud fraction to be the same, the negative cloud pressure difference will probably disappear for Fig6a.

Specific comments:

P5 Fig 3: Please check the vertical axis of the figures. It doesn't look right.

P18 Fig 9: Missing the (b) panel caption

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2018-420, 2018.

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