Response to SC1

Manuscript amt-2018-316: "Cloud Products from the Earth Polychromatic Imaging Camera (EPIC): Algorithms and Initial Evaluation"

By:
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SC1 comments:

I have three comments to this interesting paper:

- page 2, section 2.1: the threshold values used for the different cloud mask tests should be specified

- **Response**:

We thank Dr. Loyola for his interest in this paper and for the comments.

We made changes to the threshold description over ocean surface and added the threshold values to the text: "Thresholds are derived empirically. BRF values $T_{680} = 0.11$ and $T_{780} = 0.10$ are used to separate low confidence clear and low confidence cloudy scenes for the 680nm and 680nm channels, respectively. $T_{680} \pm 0.03$ and $T_{780} \pm 0.03$ are used as the high confidence thresholds for the two channels, respectively."

As mentioned in the text, over land and ice and snow covered areas, the thresholds are a dataset that is a functions of surface height and surface reflectivity as described in Tilstra et al. (2017). For these surface types, we described the derivations of the thresholds in the text, which are relatively simple steps.

- page 4, section 2.2: O2 A-Band cloud retrievals are also operational for GOME, GOME-2 and TROPOMI/Sentinel-5 Precursor, see Loyola et al. 2007 and Loyola et al., 2018.

- **Response**:

We added references to the Loyola et al. 2018 and the Schüssler, 2014 papers

- page 5: The statement "the EPIC measurements generally do not provide enough information content to retrieve the actual cloud top, but they are sufficient for retrieving another important cloud location information – namely CEP/CEH" is not correct. The main reason for retrieving a CEH instead of the cloud top height is the usage of a Lambertian cloud model instead of a more realistic Mie scattering cloud model, see Schüssler et al., 2014 and Loyola et al., 2018.

Response:

The EPIC instrument has two points of measurements in the oxygen absorption spectrum (764nm and 688nm). Under special situations, e.g., for optically thick clouds over dark surfaces with vertically uniform extinction coefficient, it is possible to retrieve cloud top and cloud

geometrical thickness simultaneously (Yang et al., 2013). However, we have established that, in general, EPIC's O_2 channels do not provide enough independent information for vertical extinction profile retrieval (Davis et al., 2018a,b). Consequently, unless the vertical extinction profile is known or can be retrieved by some other means, we won't be able to separate the cloud thickness effect from the cloud top effect (e.g. Joiner et al 2012). Hence, on this point, we are not in agreement with Dr. Loyola.

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