

Referee Comments – Martin Setvák, CHMI

03 July 2020

General Comments

The paper focuses on automatic detection of anvils of deep convective clouds (DCC), based on BDRF model developed by the authors. Various anvil detection techniques or products are being used in (satellite-based) nowcasting systems, thus any new similar method can enhance credit of the satellite data. This gains on importance with recent onset of new generations of GEO satellites, such as Himawari-8/9, GOES-R series, FY-4A series, or GEO-COMPSAT-2A, or the upcoming third generation of Meteosat satellites (MTG). For these reasons I welcome the submitted paper, and recommend it for publication.

Specific Comments

Page 2, Lines 25 – 29

I would be somewhat more conservative about usefulness of the WV-IR BTD method, namely for the overshooting tops (OT) detection. It depends not only on availability of appropriate WV channel and scanning geometry, but for specific cases namely on presence and total amount of water vapor in the lower stratosphere, above the storms, and its vertical thermal profile. Reading this part as it is written now may impose an impression that this technique is broadly used for OT detections, being reliable – which is far from the reality. However, I do not dispute its use for detection of DCC in general.

Page 4, Lines 1 – 2

As written, *its application in enhancing anvil cloud detection (and thereby OT detection) capability*, it may seem that the method can be directly used for OT detection. Though the authors elaborate this statement later in the paper, perhaps a more accurate wording might help here.

Page 4, Lines 16 – 17

Can there be any impact of the location of the satellites – Himawari-8 providing data namely for DCC above the ocean, while GOES satellites depicting namely storms above the continent? I'm not speaking here about different underlying surface, but rather about different types and concentrations of the condensation nuclei above continent and oceans, which may affect the cloud top microphysics and thus also its reflectance (BRDF) ...

Page 14, Line 13 and 24

... should exhibit spatially uniform cold temperature values ... You discuss here the impact of colder overshooting tops, but how about the enclosed warm areas of storms exhibiting cold-Vs or cold rings? How does the algorithm deal with these?

Other comments

I can hardly discuss the technical details of this work (as I have no personal experience in this area), however from an observational perspective and long-term personal experience with satellite observations of storm tops, the individual steps, their settings and parametrization seem to be reasonable and justified. I hope that the authors plan extension (or verification) of this work also to the GOES-16 and GOES-17 data, and possibly also to Meteosat's SEVIRI and future FCI data.