

Comment on amt-2022-31

Anonymous Referee #1

Referee comment on "A semi-Lagrangian method for detecting and tracking deep convective clouds in geostationary satellite observations" by William K. Jones et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2022-31-RC1>, 2022

This paper proposes a new algorithm for the detection and tracking of DCC from geostationary observations. The data and method are very well presented, and the manuscript is well written and easy to read. This new method addresses some issues related to DDCs detection at any moment of their lifetime and their movement tracking, showing good performances. The method claims to improve the accuracy of the current detection algorithms; however, I believe it would benefit the paper to place this work in a broader context. It could be beneficial to the paper to mention the accuracy of some of the most common DCCs detection algorithms for missed and falsely detected DDCs. In general, the manuscript lacks some data to support and justify certain affirmations. In the minor comments I added some parts that could benefit from a better context, in my opinion.

Minor comments:

- In the introduction, please briefly introduce the concept of DDCs.
- All the references to figures throughout the text should be if within the text or Figure if at the beginning of a sentence.
- L52-55 Maybe it would be useful to give some numbers here (e.g., the spatial resolution improved from ~5-7km to ~1km) to give an order of magnitude of the improvements with the newest generation.
- Acronyms need to be introduced only once. Please double check your manuscript for this (e.g. L107). On the other hand, some acronyms were not introduced (e.g. L130 LW)
- L121-122 Please add again some numbers here for SNR to give an order of magnitude of the improvements.
- L140-141 This sentence is not clear, please reformulate
- L176 What does sufficiently mean? Please give more data.
- L187-189 Please add references, numbers or data to support your affirmation that the Farnebäck algorithm is robust for the complex morphology of cloud fields.

- In Fig. 9 the histograms are barely visible, please regenerate them with better choice of the axis limit

Small typos and notes:

L16 this framework to be applicable

L37 how satellites operating in the visible and IR

L40 large area

L43 the Geostationary Lightning Mapper

L45 Column mean radar reflectivity [...] shows

L52-53 The newest generation [...] offers

L156 GLM has the same field [...]

L183 is used here for to

L183 [...] tracking of DDCs .

L197 based of of

L200 its

L204 include the effects

L251 and edge-based

L269 the detected anvil cloud begins

L306 FAR of 0.27