

# ***Interactive comment on “Towards Objective Identification and Tracking of Convective Outflow Boundaries in Next-Generation Geostationary Satellite Imagery” by Jason M. Apke et al.***

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This manuscript compares different optical flow methods to backtrack suspected outflow boundaries (OFB) to the edge of the source deep convection cell - primarily a "local" vs. a "global" method. The unprecedented temporal and spatial resolution of current geostationary imagery seems to have attained the threshold where objective detection of such motion becomes feasible (although it is not stated what the threshold is). It should be noted that the study relies on traditional means of identification (weather stations and radar observations), and that the ultimate goal is to decrease the reliance of OFB on non-imagery ancillary data. At this point though, it seems that

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the next objective would be the suppression of false positives, which arise from linear features in the convection itself (among others). This is mentioned by the authors in the study. They also emphasize that this may be the first step towards objective detection of these phenomena, but that much more work remains to be done. Despite these qualifications, it is impressive that semi-automated line detection with subsequent optical flow back-tracing "finds" the outflow boundary with such high fidelity (at least one of the methods), and the question is whether the best performing method always performs so well for different meteorological constellations. Also, as the authors mention, the remote sensing aspect of a future algorithm needs to be improved (by use of other spectral channels) to enhance contrast that will highlight linear features even for tell tale features that are less apparent than dust.

Comments: It was particularly hard to find reviewers for this paper, and in my capacity of associate editor for this paper, I therefore decided to provide this review as a substitute for a review, given the timeline of the process. I do not have any major comments except:

- 1) The description of the optical flow methods could be a bit more detailed and possibly be supported with graphs. Improving the manuscript in this regard is not a requirement, but in my opinion the somewhat dense text does prevent some readers from fully appreciating the manuscript, and why in the end one method "won out" over the other.
- 2) L247-250: These sentences are unclear. What is "calibrated to reflectance factor to isolate line features? First, "reflectance factor" should be clarified - is this simply reflectance in the native imagery? Second, what is calibrated to/by what, and how are line features actually isolated?
- 3) L299: Use of "low correlation coefficient" in the reflectivity to identify dust - can you briefly explain and/or provide a reference? This does not appear to be common knowledge.
- 4) L327: "Alternatively, storm= $\rightarrow$ relative motion from optical flow..." What is the motion

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relative to - the convective core?

5) L382-386: This statement is a bit hard to follow. What is "background", for example? (I think I know, but it would be good stating this explicitly.)

6) Check that the grammar is correct - there are a few missing "the"s in a few places.

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