

Summary: In this article a method for estimating plasma drift around active aurora is presented using multi-spectral imaging and modelling. This builds on previous work on inferring electric fields in the ionosphere using imaging of the aurora. Two significant advances are made here. One is presenting several important considerations and improvements—such as being able to actually do this during the brightening of the arc which is critical. The other is the thoughtful charting of the necessary future steps. The current steps are clearly explained, including possible errors and future improvements and the conclusions are consistent with the analysis. Moreover, it is easy to understand why the high spatial and temporal resolution is paramount in understanding auroral arc formation and why we are still not there. This work makes an essential contribution to that path and should be published with the most minor of adjustments.

- It is important to include a statement explaining the motivation to invest in this method. It is hinted at but not explicitly stated (one might ask why not just use radar, having missed the point). Explicitly stating it in the abstract and conclusions would be sufficient to clarify the potential impact of this work.

Very Minor:

- 1) line 19: Please quantify or qualify "close".
- 2) line 30: Missing reference. Perhaps Clayton'18?
- 3) line 109: Year missing from last reference.
- 4) line 65: Please add a short explanation as to why that was not possible in order to make a better connection to your next point.
- 5) line 66: It would be good to add the specifics of the emissions as relevant in at least (1), (4), (5) for easier reference, particularly for the un-initiated.
- 6) line 148: Please check for consistency against lines 90, 102, 103. Maybe further clarification is needed in one or all of those places.
- 7) line 150: Are these not W-E keograms? Is there another reason why they are called stack plots and the term keogram is not avoided (is it because we usually see N-S and E-W)? Either way is fine of course.
- 8) line 214: Extra parentheses and some step missing?
- 8) line 278: Should this have been referenced in line 126?