

## ***Interactive comment on “Velocity increases at Cook Glacier, East Antarctica linked to ice shelf loss and a subglacial flood event” by Bertie W. J. Miles et al.***

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Review, Miles-Stokes-Jamieson TCryo Cook Glacier This is a good observational paper on the detailed recent history and unique events occurring on the Cook Glacier / Ice Shelf system. The system provides a number of insights into Antarctic glacier systems as additional examples of processes seen elsewhere.

I recommend publishing the paper with minor revisions. Mostly I would like to see some additional information and a few adjustments to the figures. The paper could almost go in as is, but a few extra steps would present the work better and satisfy the curiosity of the reader a bit more.

L22 'subglacial' should be capitalized.

L92 Kääb will need its umlauts.

L140-147 – Note the implications for the current calving of Larsen C. Some have jumped on this retreat into the embayment as an indication of the beginning of an irreversible retreat, and yet Cook East appears to be cycling back. The Larsen C stability question is an important debate these days, and may intensify with an upcoming Rignot paper.

L148 – with your error bars, just say 'approximately 20%'. Your 1989 estimate has an error bar of  $\pm 12\%$ .

L178 change to '...measurement is high (don't need to repeat error here), the pair of measurements still demonstrates a major increase in velocity, which ...'

L187-188 you already said part of this. How about: "The calving of the Cook East Ice Shelf between 1963 and 1973 was unusual in the context of large Antarctic ice shelves where calving events..."

L199-200 Similar note - - just move on: "The increase in velocity between 1989 and 2000-2001 (416 to 496 if you want) coincides with an increase in the ice front advance rate. Notably, most of this increase is concentrated between..."

L253 – '...which use(d) to flow into...' this is colloquial, not for written text. '...which formerly flowed into.'

L281-285 as you know, Landsat 8 acquisitions since 2013-2014 are far better than annual now; the next fast ice break-out will be an interesting study for you (note that GoLIVE data may help as this future event unfolds, <https://nsidc.org/data/golive>)

L350-353 this section is a good walk through the available climate information and related studies. One thing that would support a sub-ice-shelf melting explanation for the 1970s retreat of Cook West I.S. would be channeling or a change in the character

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of the bottom crevasses and rifts. This could be discussed in a bit more detail (is there evidence or no evidence) with the early images in a figure related to Figure 7 (see below).

Figure 1 - I'm feeling a bit too 'zoomed in' here, although it covers the study area well, I think for Figure 1 a slightly larger view would be good, or perhaps a third panel – Antarctica outline, then coast and near-coastal Wilkes Land from Adare to Dumont D'Urville with Bedmap data (in more detail than the current inset) and then the flow speed figure as you have it.

Figure 4 and 5 – consider combining these into one 3-panel figure.

Figure 6 – difficult to tell the difference between 2006/07 and 2015/16 in the graphic, although the text makes it clear that the jump in speed is in 2006/07. A different color scheme would solve this.

Figure 7 – I think you might want to include an extra figure, with the best-contrast versions of the 1947, 1963, 1973 or 1974, and 1989 images – I think the structural details in the ice shelf and the grounded portion of the lower Cook West glacier might provide some insight into the break-up causes – or at least eliminate some.

Figure 8 —lower panel, I would adjust the y-scales to separate these two data sets slightly. The graphic is confusing with such close overlap. It's nice to see the correlation, and the point of the graphic is well taken, but the graph appears at first to be showing some kind of fit or second data set for velocity. The ice front retreat curve is a repeat of the upper panel data for 1973 – present?

Figure 9 – please show the proposed drainage path as determined by Flament et al. 2014 m (their figure 7) – this can be as a grey shaded strip on the bedrock mapping.

Figure 10 please provide the source of the image data (Landsat 7 and Landsat 8?)

Figure 12 interesting plot. An image or line map of Dumont D'Urville as an inset or additional panel would be good to see, with directions (0, 90, 180, 270) marked un-

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obtrusively. The image or line map should include the coast of Cook Glacier as well. Checking the available AWS in the area – it appears that there may be some data from the Russian base Leningradskaya that is closer (a little) than Durmont D’Urville.

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Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2018-107>, 2018.

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