The Cryosphere Discuss.,
https://doi.org/10.5194/tc-2017-231-RC1, 2018

The Cryosphere Discussions
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Interactive comment on "Grounding line migration through the calving season of Jakobshavn Isbræ, Greenland, observed with terrestrial radar interferometry" *by* Surui Xie et al.

Anonymous Referee #1

Received and published: 2 February 2018

The paper presents terrestrial radar interferometry (TRI) measurements from Jakobshavn calving front. Three season of field measurements (measuring from 4 days to almost 2 weeks) of velocities and digital terrain models are presented. These radar data give new documentation/verification the dynamics of the calving front. Physical challenges and dangers connected to field measurements in the calving area are well known, and this project is a valuable contribution to possible future development of measuring programs for increased knowledge of calving dynamics. The dynamic of the mélange in front of Jackobshavn calving front is one aspect that can make measurements demanding. The paper describes and discuss the calving cycle, with advance of the glacier front which forms a floating ice tongues during winter, and the retreat

of the tongue by calving during summer. The data set documents the grounding line migration during the calving season from velocities clearly modulated by tides (well presented in fig. 6), and thus the flotation of the calving front in a convincing way.

The data analysis is thoroughly, and the paper is well written. The paper clearly demonstrates the potential of radar monitoring of calving events, which is relevant due to expected increased in calving activity due to global warming with warmed oceans.

The paper is very well written, with clear language, relevant references, good method description and uncertainty discussions. It provides an interesting discussions of the dynamics of the melange on p. 6 , l.4 .

The only concern are the relevance of the very many figures, both in paper and supplementary text. It seems that the main figures are Fig 1, 2, 6, 9 and 13.

I suggest the authors consider removing all the other figures, and possibly try to simplify the figures they keep, and maybe combine differently and simplify the information here. The paper must then be slightly rewritten – where referring to the figures.

Specific comments: On p. 4, l. 1, Other errors in TRI data, such as phase variations associated with variable atmospheric water vapor, are difficult to model. Is this true? Corrections of refraction could be calculated from meteorological data if available?

Fig. 1, caption line 1, An intensity image.. (Specify: intensity of radar backscatter from your own measurements?)

Fig. 2. Inserts in A,B,C, necessary info?

Fig. 3 – move to supplementary material?

Fig. 9 DEM from glacier front, derived from a one day average (please specify average of what)

Fig. 11. Necessary for readers of the Cryosphere? Quite simple principle.

Fig. 13 and 14, combine to one figure?

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