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The Cryosphere Discussions

Interactive comment on "Automated iceberg detection using Landsat: method and example application in Disko Bay, west Greenland" *by* Jessica Scheick et al.

Anonymous Referee #2

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This manuscript aims to tackle an exciting and important problem in current cryospheric science: the automated detection and classification of icebergs from satellite imagery. The topic and scope of the manuscript are a good fit for The Cryosphere. The article is furthermore very well written. However, the manuscript in its present form contains a number of striking weaknesses.

In essence, I fully agree with the comments of Reviewer #1 (and do not believe that a line-by-line review is needed or helpful at this point). The main issues that I believe need to be addressed before this article could be reconsidered for publication are

1) Neither the cloud masking nor the iceberg detection components of the algorithm

are automated. At numerous stages along its execution, an operator has to manually intervene and perform time-consuming tasks (e.g. screen for too much clouds or sea ice, delineate the ROI, exclude regions of iceberg grounding, exclude scenes with too many false positives/negatives).

2) There appears to be substantial tuning of parameters and hand-picked exclusions of problematic zones required in order to make the algorithm work for the given example region. This makes me wonder how readily the algorithm could be applied to different regions. I would argue that such a test should be included in the study to illustrate the usefulness of the method.

3) This may be the main issue: even after substantial manual work, the algorithm does not appear to perform very well. (Which is also an illustration of just how difficult a task this is). The underestimation of the iceberg-covered area by 1/3 and of the number of icebergs by over 50% are, I would argue, unacceptably large errors. One might make the case that the algorithm is more designed to establish the shape of the size distribution (rather than the actual iceberg area/number), but that result is somewhat weak as well: while an underestimation of the slope by 16% might be acceptable, the range of slopes (-1.22 to -3.09) is much larger than in other published studies. As reviewer #1 discussed in more detail, the description of the machine-learning algorithm and the analysis of its performance are rather thin.

4) Beyond the methods aspect, the novelty of scientific insight is somewhat limited (as also pointed out by Reviewer #1). It would have been interesting to see the full timeseries from 2000-2015, for example. Presumably the algorithm, once set up, is rather fast and should be able to handle greater numbers of Landsat scenes with ease. Granted, there is the issue of SLC failure on Landsat 7, but even after that failure >75% of the data has still been collected and a number of methods have been developed to deal with the data gaps.

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