



Time series of lake size changes in Northeast Greenland

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Surface processes will play an ever increasing role in the evolution of the Greenland Ice Sheet, as future atmospheric warming (e.g. CMIP5 projections) will lead to increasing surface melt and with that increasing appearance of supraglacial lakes potentially lubricating the base of the ice sheet affecting ice discharge. Within this task we will analyse Sentinel-1 satellite acquisitions in order to produce a time series of lake areas for a key region in north-eastern Greenland. These estimates will be supported and validated by optical satellite images from Sentinel-2 and Landsat-8. Following *Miles et. al., 2017* we will build our approach on thresholding methods in order to classify lake areas in the radar images. Here we will focus on an automatic processing chain. In a first step Sentinel-1 radar acquisitions will be downloaded, calibrated and geocoded (Fig. 1a). Based on this product optimal thresholds will be found and the lake area will be classified (Fig. 1b). These results will then be validated by optical satellite imagery (Fig. 1c) and will be made available for further analyses on the timing and duration of e.g. lake filling and draining.

References

Miles Katie E., Willis Ian C., Benedek Corinne L., Williamson Andrew G., Tedesco Marco, 2017: Toward Monitoring Surface and Subsurface Lakes on the Greenland Ice Sheet Using Sentinel-1 SAR and Landsat-8 OLI Imagery. Frontiers in Earth Science. 5/58.

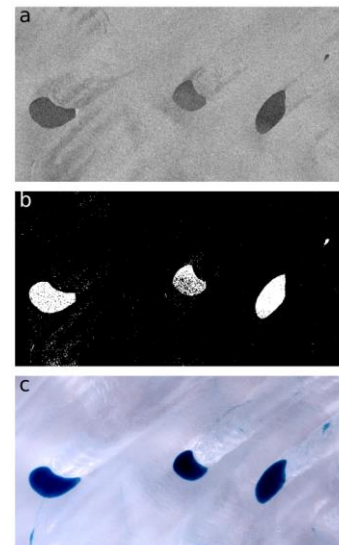


Figure 1. Supraglacial lake detection from Sentinel-1 radar data (a). Preliminary results of lake mask (b). Sentinel-2 acquisition of the same date for visual comparison (c).