



## **Seasonal and Intra-Seasonal Variability of Surface Streams over the West Greenland Ice Sheet from High Resolution Satellite Optical Data.**

Michael G. Brown and Marco Tedesco

Cryospheric Processes Laboratory, CUNY, City College of New York, New York, United States  
(michael.brown.city@gmail.com)

The surface hydrology of the Greenland ice sheet plays a crucial role on surface energy and mass balance, as well as on the en-glacial and sub-glacial environments. The spatial distribution of these surface streams is poorly understood and their temporal variability is (to our knowledge) unknown. One of the reasons for the lack of knowledge on the temporal variability of such streams is related to the historical unavailability of satellite data that could spatially resolve the presence and associated properties of the streams. In recent years, however, multi-spectral commercial satellite data in the visible and infra-red bands have been made available to the scientific community. These newly accessible data sets are provided at spatial resolutions of the order of 1-2 meters, therefore, allowing to perform accurate spatial and temporal analysis of surface streams (and small lakes and ponds that cannot be resolved with sensors such as MODIS or LANDSAT).

In this study, we report results concerning the seasonal and intra-seasonal variability of surface streams over a selected area on the west Greenland ice sheet. Using ArcGIS<sup>®</sup> software applied to multispectral high resolution imagery from World View 2 and Quickbird satellites, surface streams were identified through band math, threshold classifications, and morphological operations. Raster and vector maps of the surface hydrology network were created. Stream networks created during multiple melt seasons (at several different stages of the season) were compared and discussed as well as the networks mapped between consecutive years for proximate dates.