



QGreenland

A Greenland GIS Research & Education Tool with Impact

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QGreenland.org

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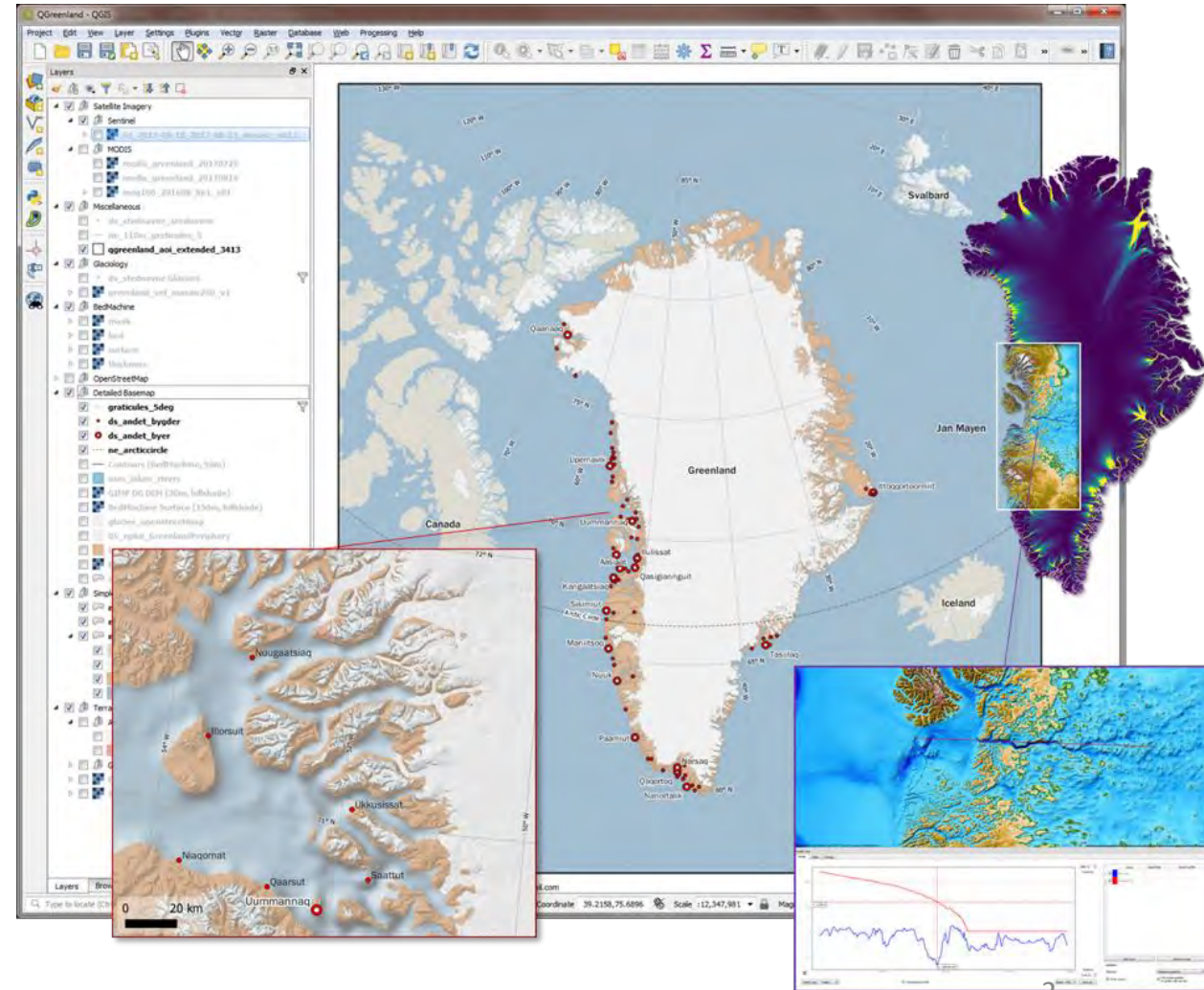


QGreenland:

Enabling Science Through Open GIS



- A **free & open data package** for interdisciplinary Greenland-focused research, learning, decision making, and collaboration
- Organize and style **publicly-archived** geospatial datasets, **region-wide to local**, into a **unified, all-in-one GIS environment** for **offline and online use** with QGIS,  free & open source, **cross-platform** software
- Leverage **open source tools and methods** for **reproducible package creation**





An international Editorial Board provides data and user community input



Yarrow Axford

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Specialty: Paleolimnology



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Specialty: Ecology



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Eva Mätzler

Asiaq
Specialty: GIS



Rene Forsberg

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Specialty: Ice dynamics



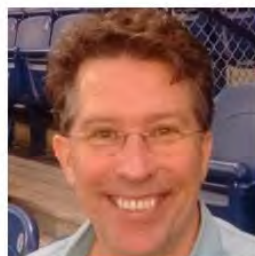
Ruth Heindel

Kenyon College
Specialty: Biogeochemistry



John Kamper

Asiaq Greenland Survey
Specialty: Geodata and mapping



Vinton Valentine

University of Southern Maine
Specialty: Coastal geography



Karl Zinglensen

Greenland Institute for Natural Resources
Specialty: GIS



Christian Brogaard Pedersen

Geologic Survey of Denmark and Greenland
Specialty: GIS





Collaborations expand our data and user knowledge

- Greenland Ecosystem Monitoring Program
- Asiaq
- Pinngortitaleriffik
- Isaaffik

- Norsk Polarinstitutt

- U.S. Polar Geospatial Center
- Greenland Ice Sheet Ocean Science Network
- N.S.F. Polar Computing RCN
- N.S.F. Arctic Data Center
- National Snow & Ice Data Center

Your data!

- De Nationale Geologiske Undersøgelser for Danmark og Grønland
- Danmarks Tekniske Universitet
- Danmarks Meteorologiske Institut
- WWF-Danmark

- Arctic Data Committee
- International Arctic Science Committee

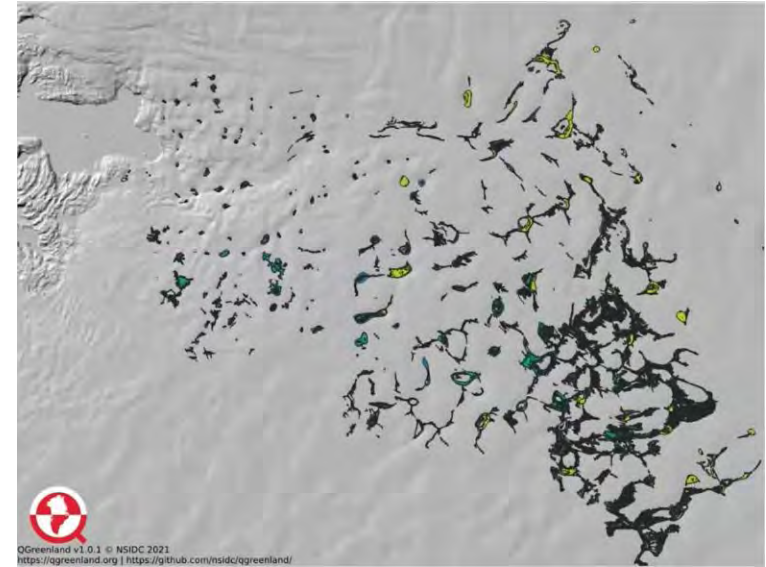


Background image: Google Earth



Impact: Exploration...digitally

Glaciology
Glacier terminus positions 2000-2017
Retreat 2000-2017 (m)
• 24 - 5000
• 5000 - 10000
• 10000 - 15000
• 15000 - 20000
• 20000 - 21206



QGreenland v1.0.1 © NSIDC 2021
<https://greenland.org/> | <https://github.com/nsidc/greenland/>

Area Statistics: Features Total: 108, Filtered: 108, Selected: 0

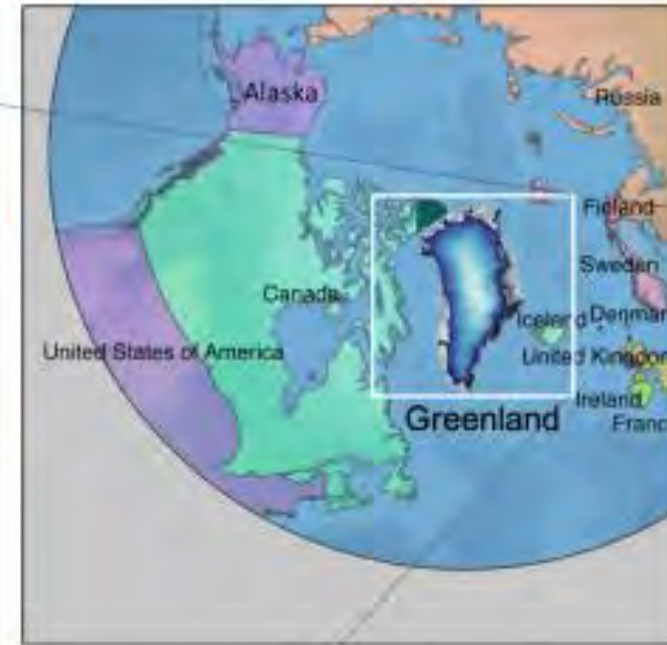
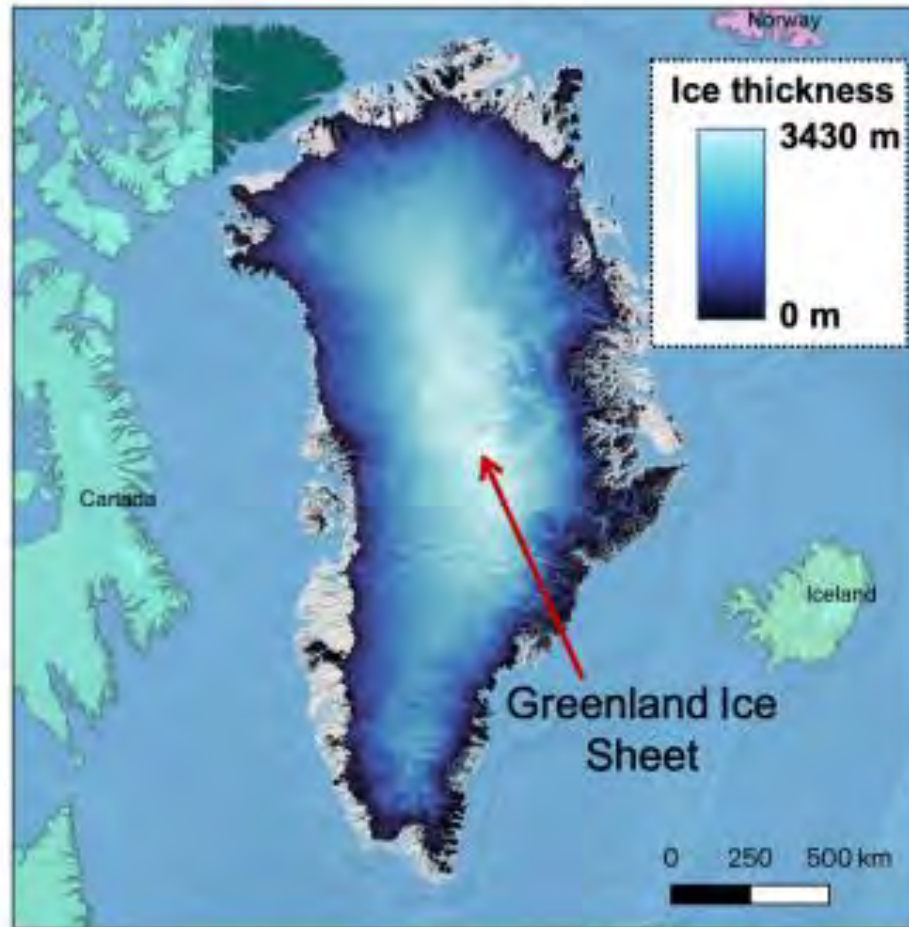
	date	count	unique	min	max	range	sum	mean	median	stddev	minority	majority	q1	q3	qpr
1	2019-05-01	2	2	0.0547	0.0885	0.0338	0.1432	0.0716	0.0716	0.0169	0.0547	0.0547	0.0547	0.0885	0.0338
2	2019-05-02	6	6	0.0539	0.1658	0.111869999	0.496300000	0.082716666	0.062300000	0.039800055	0.0539	0.0539	0.0611	0.0608	0.029700000
3	2019-05-04	1	1	0.0628	0.0628	0	0.0628	0.0628	0.0628	0	0.0628	0.0628	0.0628	0.0628	0
4	2019-05-05	1	1	0.0245	0.0245	0	0.0245	0.0245	0.0245	0	0.0245	0.0245	0.0245	0.0245	0
5	2019-05-06	29	29	0.0251	1.4593	1.434200000	5.8341	0.20460714	0.13065	0.291671527	0.0251	0.0251	0.041550000	0.187	0.14545
6	2019-05-09	57	57	0.0134	0.5578	0.5444	4.842999999	0.084964912	0.0316	0.06131028	0.0134	0.0134	0.0307	0.0903	0.0596
7	2019-05-10	23	23	0.032	0.35	0.317999999	2.3545	0.10236086	0.0917	0.075708067	0.032	0.032	0.05075	0.1336	0.080849999
8	2019-05-11	11	11	0.0356	0.1391	0.103500000	0.815000000	0.07400909	0.0602	0.03882031	0.0356	0.0356	0.0513	0.08795	0.03665
9	2019-05-12	79	77	0.0136	0.3759	0.362	8.240105627	0.104305134	0.0734	0.087792804	0.0136	0.0256	0.03825	0.14215	0.103899999
10	2019-05-14	29	28	0.0228	0.4941	0.4713	4.4919	0.160425	0.11195	0.136350911	0.0228	0.0228	0.04055	0.2374	0.19075
11	2019-05-15	16	16	0.0361	0.373	0.3369	1.845299999	0.115311249	0.06085	0.045133663	0.0361	0.0361	0.05885	0.1306	0.07175
12	2019-05-16	10	10	0.0513	0.4173	0.3662	1.808999999	0.183099999	0.12925	0.104511903	0.0513	0.0513	0.0976	0.1938	0.0862
13	2019-05-17	88	88	0.0196	0.5109	0.491100000	11.96059999	0.136254618	0.098200000	0.10027406	0.0196	0.0196	0.06485	0.139549999	0.120999999
14	2019-05-19	92	91	0.0232	0.5593	0.5361	14.44898182	0.157054155	0.1291	0.121877123	0.0232	0.0409	0.06875	0.216849999	0.148199999
15	2019-05-20	42	42	0.0249	0.5947	0.5698	7.951800000	0.189326571	0.1582	0.13028215	0.0249	0.0249	0.0768	0.2587	0.1819
16	2019-05-21	67	67	0.0225	0.6571	0.6346	12.64600000	0.189356716	0.147	0.143811948	0.0225	0.0225	0.084049999	0.27945	0.195400000
17	2019-05-22	115	114	0.0214	0.6733	0.6519	20.82661290	0.181100981	0.1443	0.147640004	0.0214	0.1205	0.070399999	0.243300000	0.172900000
18	2019-05-24	117	115	0.019	0.731	0.712	23.05300000	0.19613675	0.1347	0.173896993	0.019	0.0381	0.0569	0.2657	0.2283
19	2019-05-25	73	73	0.0187	0.8067	0.787999999	16.8449	0.2286301	0.1814	0.19276691	0.0187	0.0187	0.0608	0.3605	0.299899999
20	2019-05-26	54	54	0.0192	1.01	0.9908	14.38537543	0.258510275	0.19325	0.217180012	0.0192	0.0192	0.0905	0.41855	0.328049999
21	2019-05-27	126	126	0.0185	1.842	1.8435	27.48300000	0.218123899	0.14155	0.227852526	0.0185	0.0185	0.0639	0.387	0.243899999
22	2019-05-29	104	102	0.0196	1.3261	1.3261	24.04489999	0.231200961	0.14615	0.230800933	0.0196	0.0332	0.05905	0.311949999	0.2542
23	2019-05-30	62	62	0.018	0.9025	0.8845	13.74310000	0.221642903	0.12105	0.225830999	0.018	0.018	0.0431	0.3043	0.243
24	2019-05-31	79	78	0.0162	1.199	1.1828	17.95484282	0.230187728	0.150051523	0.23919496	0.0162	0.0162	0.0655	0.2934	0.2209
25	2019-06-01	90	90	0.0144	1.2386	1.2244	22.21522219	0.248080802	0.15199	0.243900790	0.0144	0.0144	0.0708	0.3291	0.2583

Show All Features





Impact: Education – Data Puzzle



Graphic: CIRES
Education and Outreach
2021

The Greenland Ice Sheet covers 79% of the surface of Greenland. Greenland is located north of Canada and the United States. Map credit: QGreenland



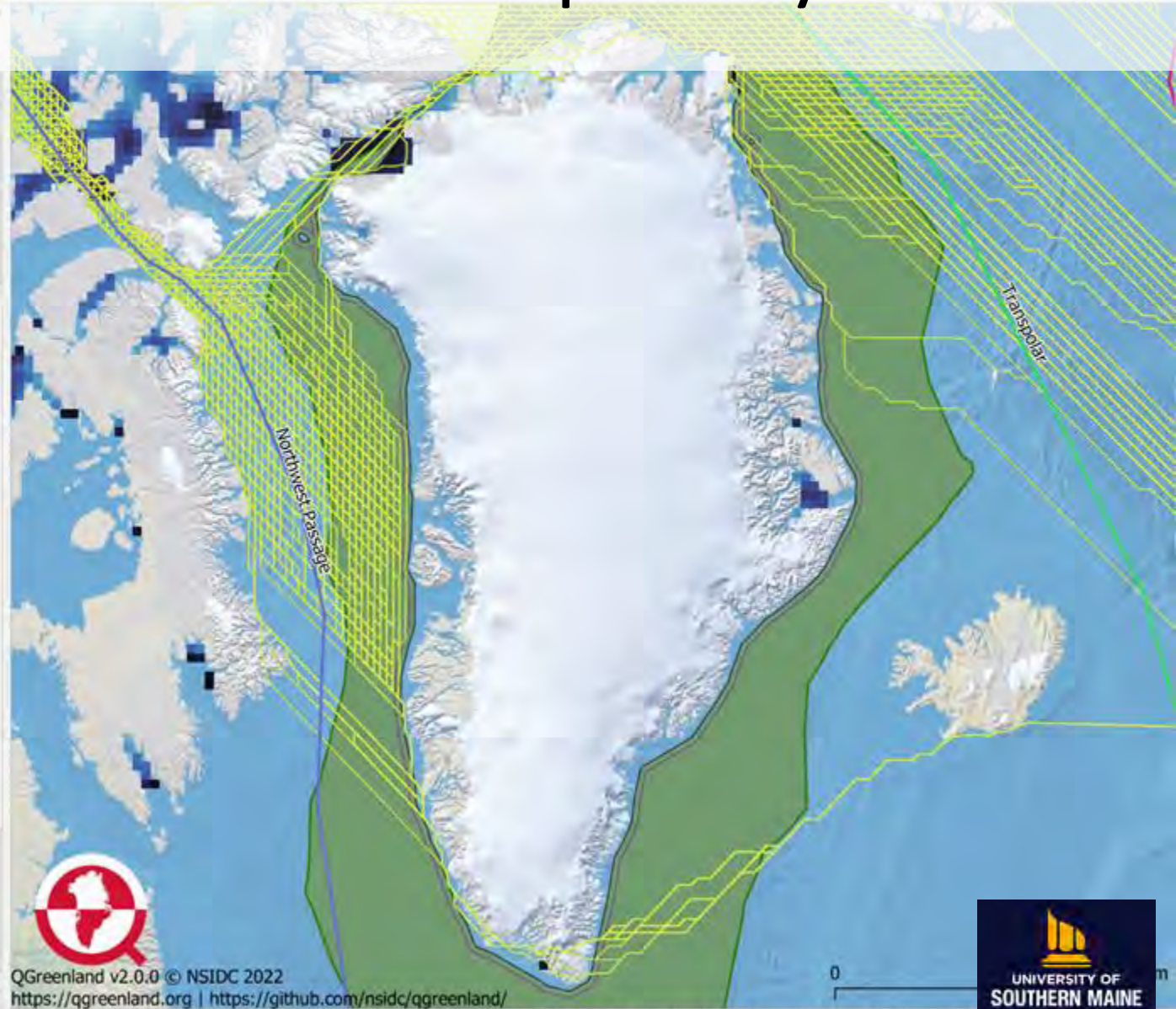
Data: Lynch,
Norch, Li
2022 PNAS

*qgreenland — QGIS

Project Edit View Layer Settings Plugins Vector Raster Database Web Mesh Processing Help

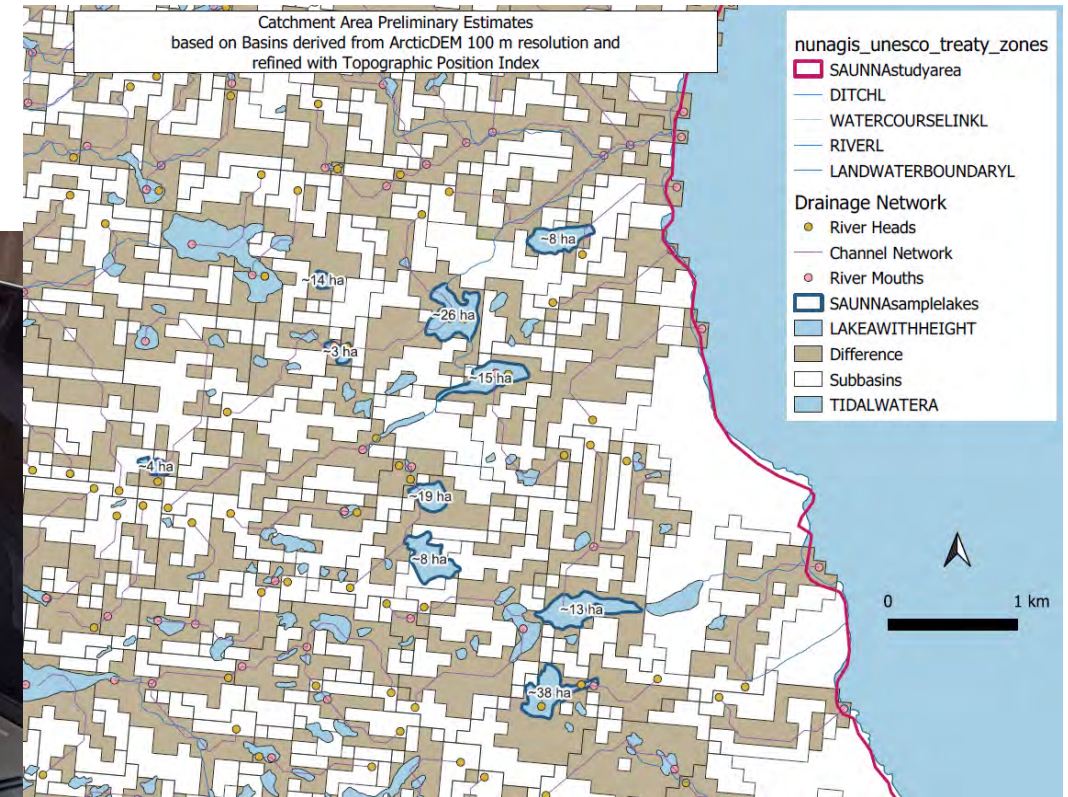
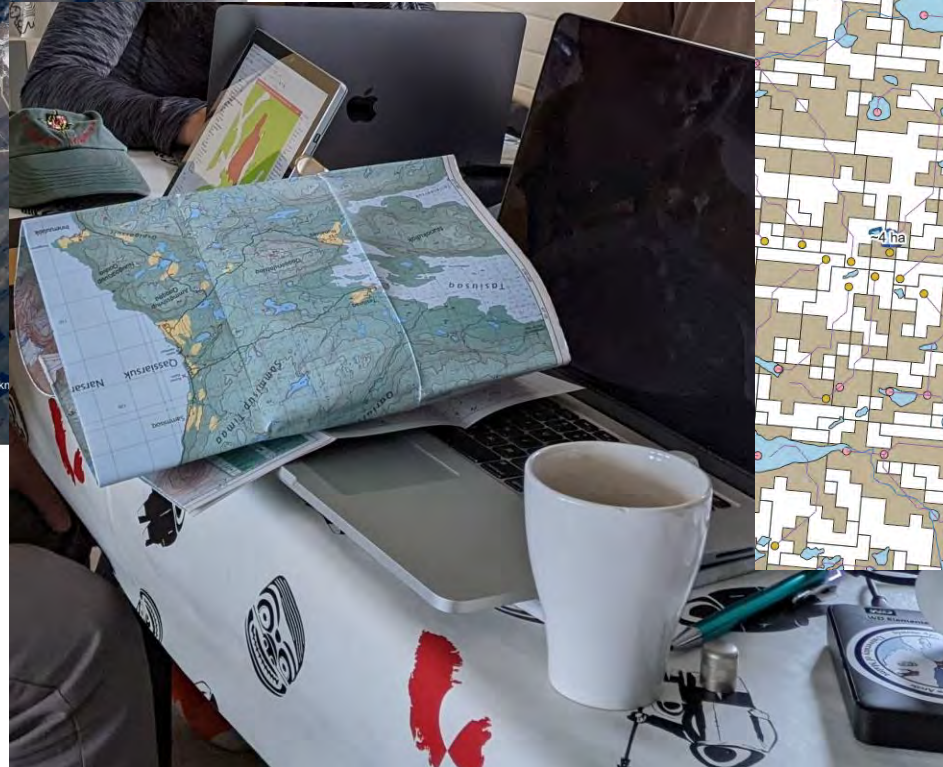
Impact: Context and relationships for your data

- Layers
- ✓ Human activity
 - Research sites
 - ✓ Arctic sea routes
 - ✓ Northern Sea Route
 - ✓ Northwest Passage
 - ✓ Transpolar
 - ✓ Routes_SSP585_2015_2065
 - ✓ Biology
 - ✓ Environmental management
 - Mineral and hydrocarbon licenses
 - NAFO divisions
 - Protected zones
 - ✓ Maritime boundaries
 - ✓ Exclusive economic zone (polyline)
 - Baseline (polyline)
 - 3NM (polyline)
 - ✓ 12NM (polyline)
 - 3NM (polygon)
 - ✓ Fishing zone (polygon)
 - Continental shelf
 - Regional climate models
 - Frozen ground
 - Glaciology
 - Geology
 - Geophysics
 - Hydrology
 - ✓ Sea ice
 - Median extent
 - Weekly age (12.5km)
 - ✓ Monthly mean concentration (25 km)
 - ✓ September (min monthly extent)
 - September 2010
 - September 2011
 - September 2012
 - September 2013
 - September 2014
 - September 2015
 - September 2016
 - September 2017
 - September 2018
 - September 2019





Impact: Fieldwork preparation, conduct, and use





Impact: Meetings and publications



Future of Greenland ice Sheet Science
fogss-workshop.org

- QGreenland used as a meeting tool to share, see, and discuss Greenland field project plans

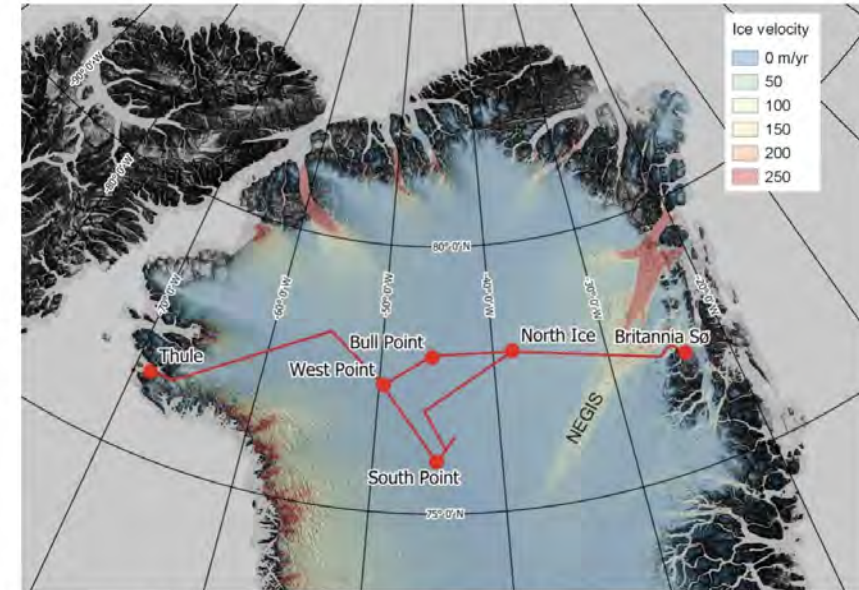


Figure 1. Map of the major field localities (red dots), including the BNGE bases at Britannia Sø and North Ice, and the approximate traverse route (red lines) of the British North Greenland Expedition (adapted from Hamilton 1956). North East Greenland Ice Stream (NEGIS) is indicated. Base map is a multidirectional hillshade of the 100 m Arctic DEM (25x vertical exaggeration) overlain by the ITS LIVE 120 m ice velocity dataset. Both basemap datasets were accessed via <https://qgreenland.org/> [credits: Neil Ross]

- QGreenland provides many useful basemaps and background data to create insightful data sharing and science communication



Impact: Testimonials

"...preference for using QGreenland for presentations because it is **presentation quality already** compared to using raw data"

"A QGreenland **project** is currently **being written up for publication.**"

"project has been **successful in locating field sites** in Greenland using QGreenland"

"Being able to use QGreenland at our field station was **critical to our research process!** We were able to calculate lake surface area and watershed size... These resources helped **guide our field days** and **find the best lakes to help answer our questions.**"

"QGreenland is making the sum of the vast spatial data productions of the international research community **easily available to researchers and educators in Greenland and internationally.**"

"In Greenland, people are often asking, 'how can we **find the data the foreign scientists bring back from Greenland?**' Now we can directly utilize much of it."



Thank you

QGreenland.org

github.com/nsidc/qgreenland/

Contact – qgreenland.info@gmail.com

