Greenland GLACIER ATLAS

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Initial Problem/Need

- Place Names are a mix of Greenlandic, Danish and other foreign languages
- Orthographies have changed over time
- Efforts to name glaciers and record their locations have come with many challenges
- Nunat Aqqinik Aalajangiisartut (NAA) and Danish Geodata Agency (GDA) created the database

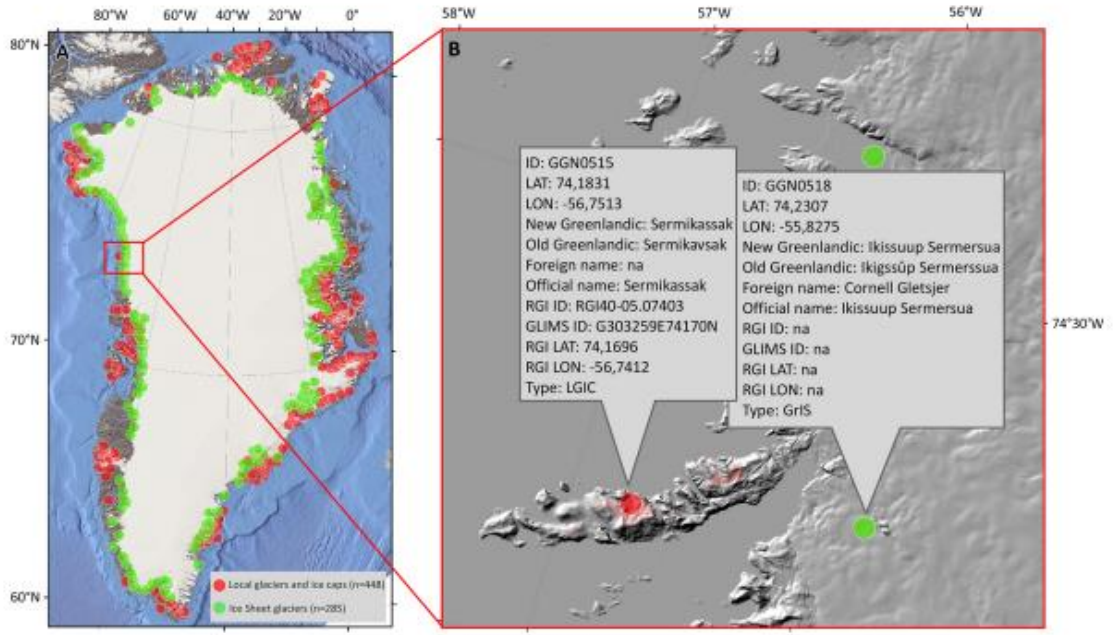

Figure 1. Distribution of official glacier names in Greenland and contents of new palace name data set. Local glaciers and ice caps (LGICs) are in green; glaciers from the Greenland Ice Sheet (GrIS) are in red. **(a)** The spatial concentration of glacier names is high in the populated areas and in areas that have been extensively explored – however, there are still fairly large stretches of coastline with no named glaciers (e.g., the southeast and north coasts). Background image: IBCAO ver3.0 (Jakobsson et al., 2012). **(b)** A zoom-in on the Melville Bay in northwest Greenland with examples of the contents of the new glacier name database. Background images are a GIMP hillshade (Howat et al., 2014).

Twila's Points

- Investigated decadal information on the rate of glacier / ice sheet flow change fluctuating
  - Accounts for the increase of glacier discharge into large waters, sediment
- There exists a potential link to past behavior that can prove to beneficial in accurately plotting glaciers and their tendencies.
- Ultimately, these observations are key to having accurate readings in the change of glacier flow in due time

Data of Glaciers

	ID	LAT	LON	New Greenlandic name	Old Greenlandic name	Foreign name	Official name	Alternative names	RGI_ID	GLIMS_ID	RGI_CEN_LON
2	GGN0001	60.1166	-43.37	Sermeq Kujalleq	Sermeq Kujatdleq		Sermeq Kujalleq		RGI40-05.04361	G316578E60159N	-43.4217
3	GGN0002	60.1349	-43.5125	Sermeq Avannarleq	Sermeq Avangnardleq		Sermeq Avannarleq		RGI40-05.04363	G316482E60158N	-43.5182
4	GGN0003	60.1627	-43.7278	Sermikasik Avannarleq	Sermikasik Avangnardleq		Sermikasik Avannarleq		RGI40-05.04356	G316285E60178N	-43.7154
5	GGN0004	60.1639	-43.7038	Sermikasik Kujalleq	Sermikasik Kujatdleq		Sermikasik Kujalleq		RGI40-05.04356	G316285E60178N	-43.7154
6	GGN0005	60.2171	-43.337	Sermeq Avannarleq	Sermeq Avangnardleq		Sermeq Avannarleq		RGI40-05.04332	G316577E60220N	-43.4229
7	GGN0006	60.2352	-43.2644	Sermeq Qeqqarleq	Sermeq Qerqardleq		Sermeq Qeqqarleq		RGI40-05.04331	G316702E60261N	-43.2980
8	GGN0007	60.2505	-43.2445	Sermeq Kujalleq	Sermeq Kujatdleq		Sermeq Kujalleq		RGI40-05.04331	G316702E60261N	-43.2980
9	GGN0008	60.3098	-43.948	Paarliit Sermiat			Paarliit Sermiat	Paarliit Sermia	RGI40-05.04309	G316193E60315N	-43.8066
10	GGN0009	60.3114	-45.2736			Napasorsuaq Gletsjer	Napasorsuaq Gletsjer		RGI40-05.03779	G314725E60307N	-45.2749
11	GGN0010	60.3479	-44.1093	Sermikasik			Sermikasik		RGI40-05.03889	G315849E60344N	-44.1513

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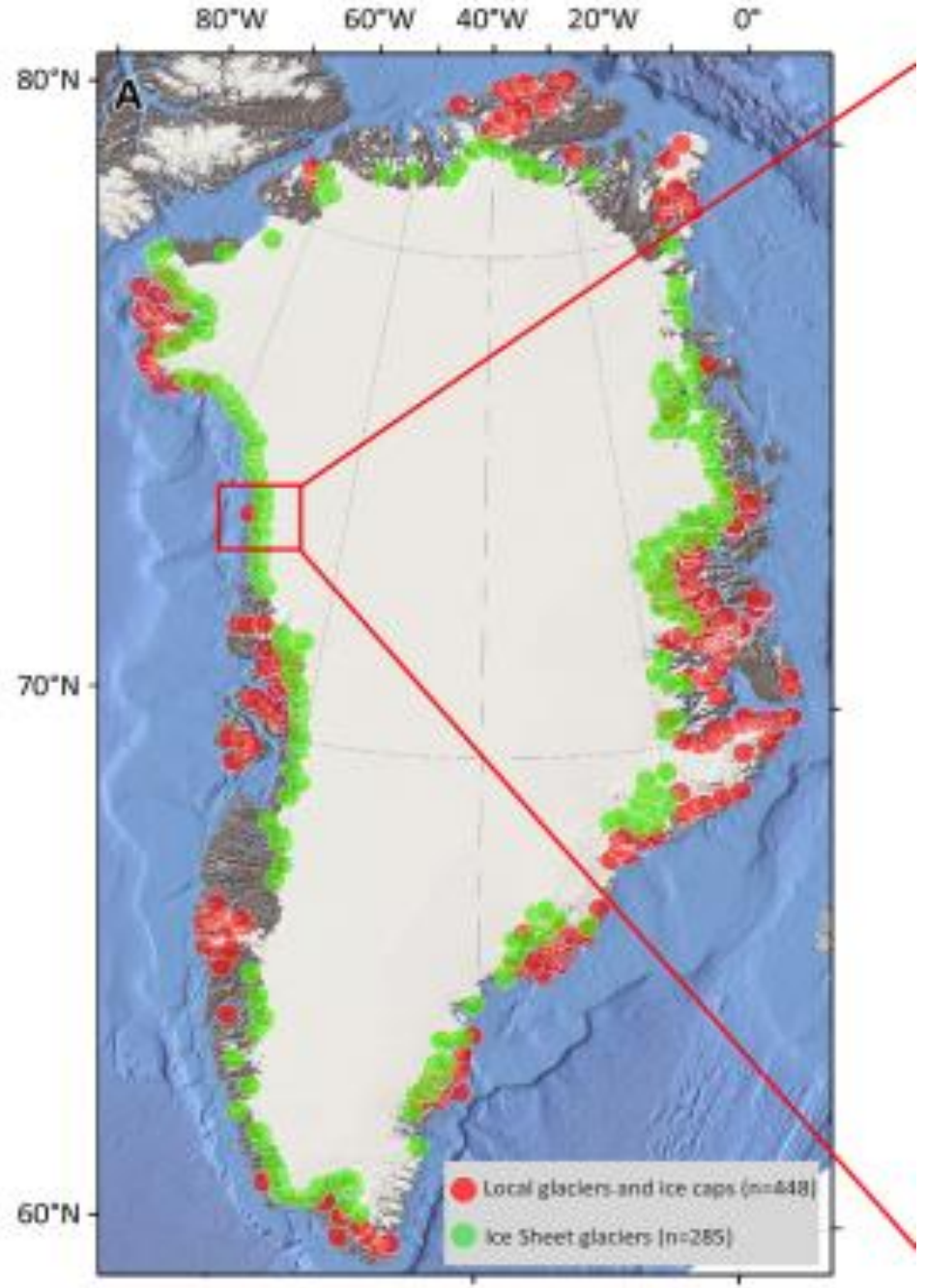
Feature	210	Point	-44.13884229	60.4374885
Feature	205	Point	-44.27676618	60.63495506
Feature	204	Point	-44.2141118	60.6539409
Feature	200	Point	-42.89146941	60.68093424
Feature	201	Point	-43.56403349	60.68808292
Feature	211	Point	-44.67891966	60.68851816
Feature	203	Point	-43.8085519	60.70170306

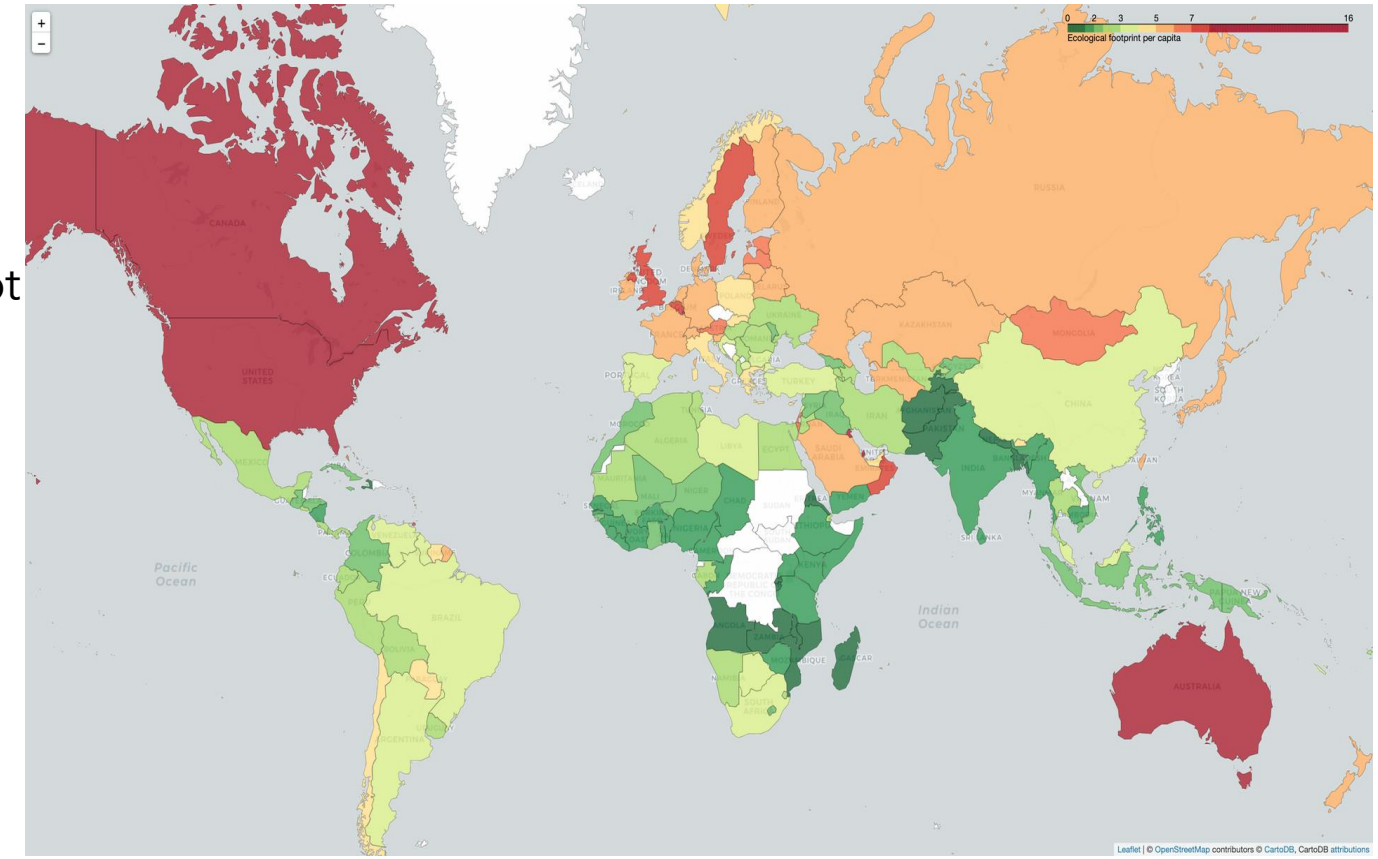
Problem to solve

- Correctly match the coordinates with the Greenlandic Name that it is associated with
- Create a user-friendly atlas that will allow users to navigate through each glaciers (with the name and coordinate associated with it)



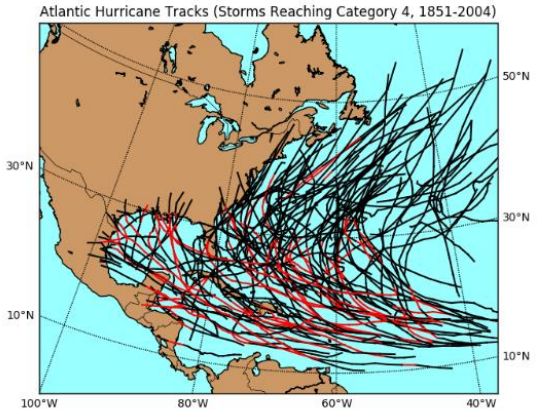
Method

- Folium
  - Python folium library gives access to the mapping strengths of the Leaflet JavaScript library though a Python API
  - Allows to create geographic visualizations
    - Interactive
    - Can be share to a website

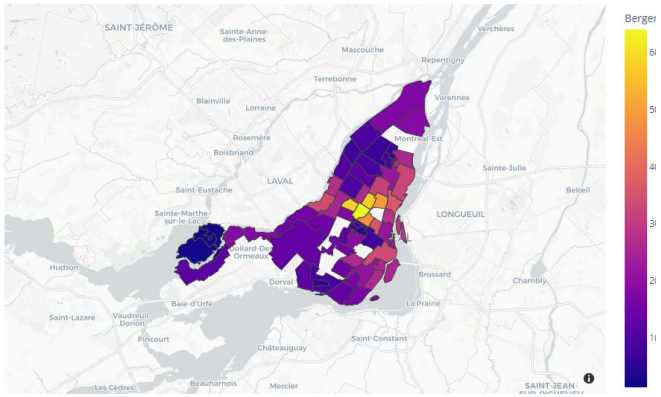


Alternatives

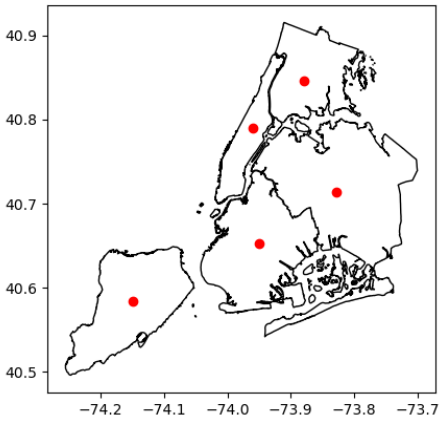
Matplotlib



Plotly



Geopandas:

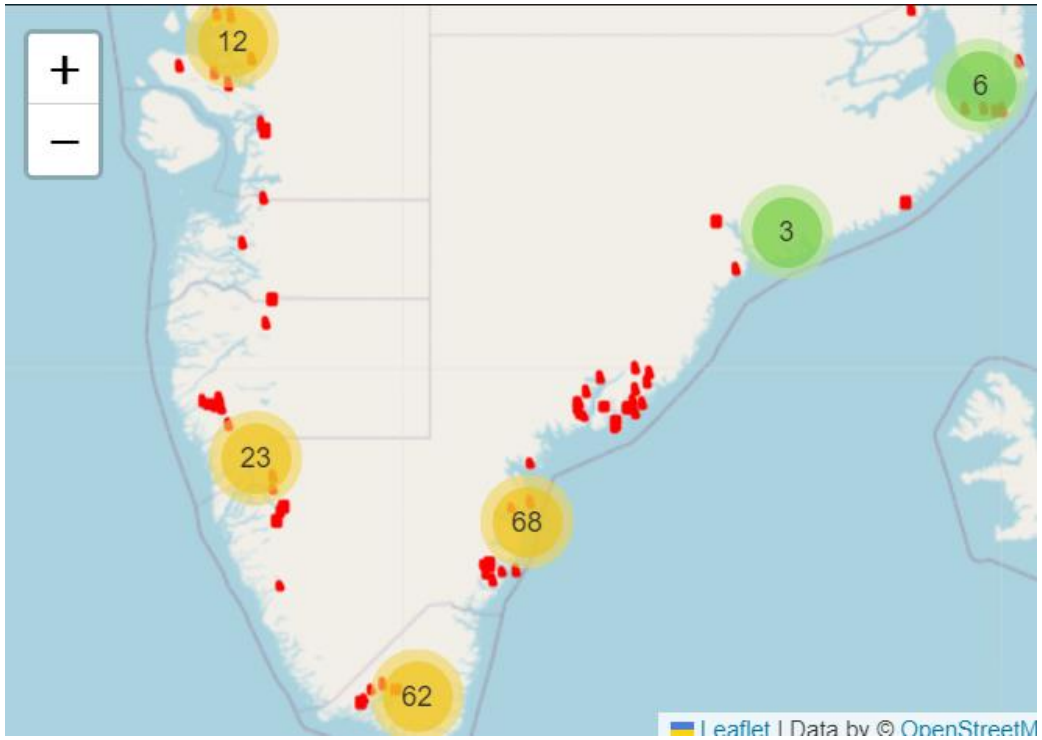


More on Alternatives

- Matplotlib: a plotting library with a list of functions to plot out data in the form of scatter plots, bar graphs, etc while geocoding on a map
- Plotly: more interactive in the sense that you can pan onto the map or zoom in/out
- Geopandas: a python addition to pandas and matplotlib that focuses on geospatial data. It can read, manipulate, and visualize geospatial data, including shapefiles and GeoJSON files, allowing the user to load and plot their maps.
- Basemap: a matplotlib toolkit for plotting maps and creating geospatial visualizations. It provides a wide range of map projections and customization options.

Results


200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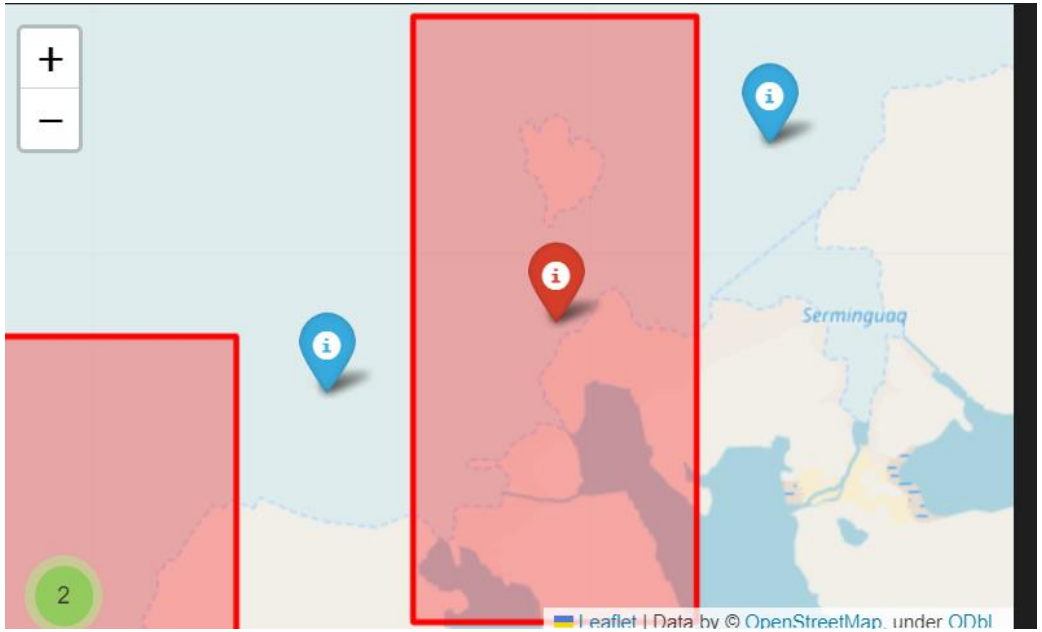
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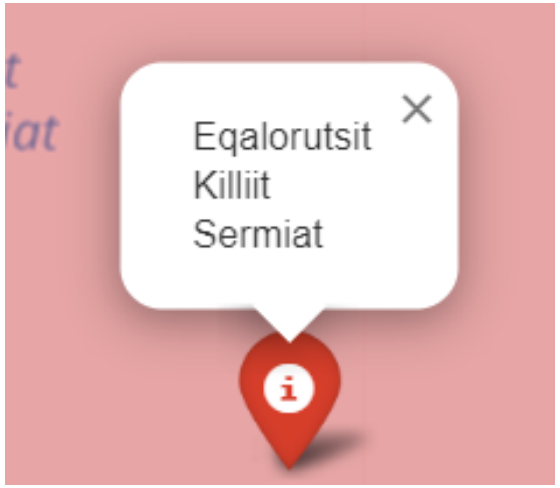
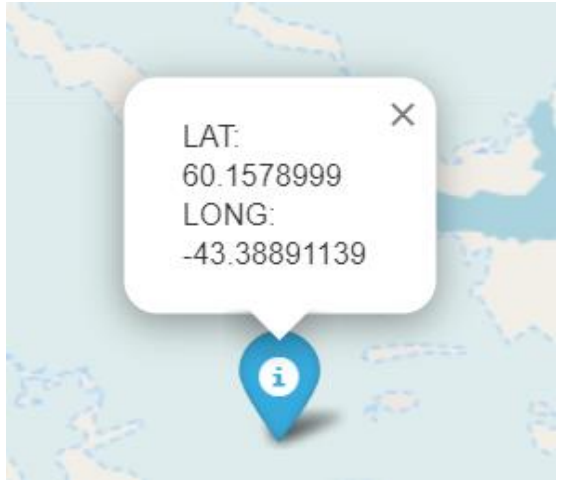
End Goal





- Share it as a website
  - User-friendly
  - Easy to access the different glaciers and coordinates
  - Add any relevant information regarding each of the glaciers

Demo

References

[1]

T. A. Moon, A. S. Gardner, B. Csatho, I. Parmuzin, and M. A. Fahnestock, "Rapid Reconfiguration of the Greenland Ice Sheet Coastal Margin," vol. 125, no. 11, p. e2020JF005585, 2020, doi: 10.1029/2020JF005585.

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[3]

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Questions?