

THE GREENLAND ICE SHEET

SERMERSUAQ

Located on the Greenland Ice Sheet (Sermersuaq in Greenlandic), the U.S. National Science Foundation's Summit Station is the only high-latitude, high-altitude, year-round research platform offering unparalleled opportunities for scientific research with implications across Greenland and the globe. From this remote location, ice cores have revealed past climates, while ongoing atmospheric and geophysical studies monitor Earth's present conditions and hint at our future.

Sermersuaq at a Glance:

 -69.6° C: coldest temperature ever recorded in Northern Hemisphere (1991)

 Ice surface: 1.71 million square kilometers (about the size of Alaska)

 Global sea level would rise 7.4 meters if the entire Greenland Ice Sheet melted

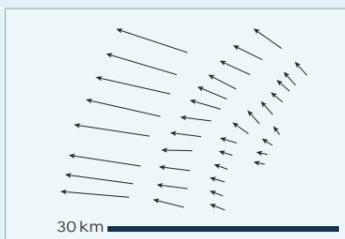
Petermann Glacier

With melt rates up to 80 meters per year, Petermann Glacier is one of the largest, fastest receding, and most studied tidewater glaciers that regularly sheds large icebergs (up to 32 square kilometers) into the ocean.

Humboldt Glacier

With a width of 110 kilometers, this is the widest tidewater glacier in the Northern Hemisphere.

Ice Flow Velocities Around Summit Station



Summit Station is flowing westward at about 1.6 meters per year.

Northeast Greenland Ice Stream

The NGIS drains nearly 12% of the Greenland Ice Sheet. This relatively fast flowing section of the ice sheet is both accelerating and thinning, with some regions declining by two to four meters per year.

0 meters (ice surface below the snow layer): ice is ~100 years old.

Greenland Ice Sheet Project 2 (GISP2) Ice Core

The GISP2 ice core was the deepest ice core in the world at the time of extraction in 1993, and it is an invaluable record that is critical for interpreting past climates. The age of the ice at the bottom of the GISP2 ice core is over 110,000 years old.

3052 meters (bottom): ice is 110,000+ years old.

Illulisat Icefjord

This icefjord produces over 10% of all icebergs around Greenland. Sermaq Kujallaq, the glacier that feeds into the fjord, moves approximately 40 meters per day, or 14,600 meters per year.

Helheim Glacier

Helheim is the largest glacier in eastern Greenland. On average, Helheim is a massive 6.5 kilometers wide.

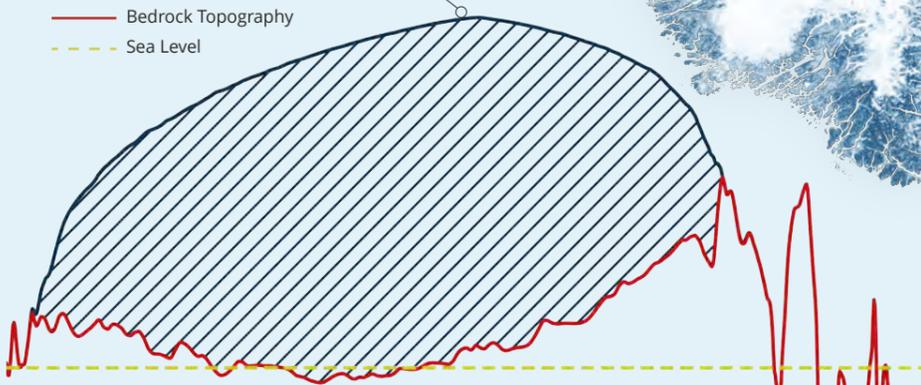
East-West Topography and Ice Thickness at Summit Station

Bed and Ice Sheet Thickness data from: Community Ice Sheet Model.

Sermersuaq is shaped like a scoop of ice cream! Near Summit, the ice is over 3 kilometers thick, while the average thickness is around 1.5 kilometers.

Summit Station, 3260m

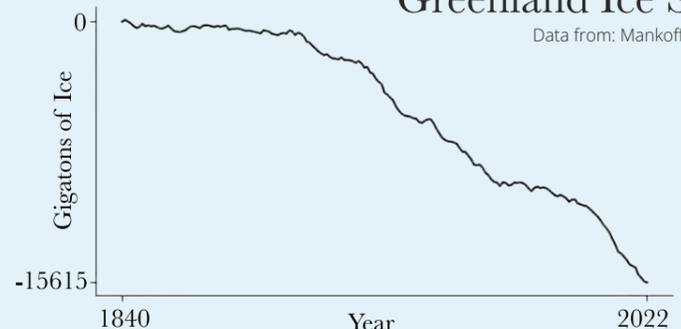
— Ice Surface
— Bedrock Topography
- - - Sea Level



Topographic data from: MEaSURES Greenland Ice Mapping Project (GIMP) Digital Elevation Model

Cumulative Mass Balance of the Greenland Ice Sheet

Data from: Mankoff et al. 2021



The Greenland Ice Sheet is shrinking due to the ice sheet melting faster than it is gaining mass with snowfall. Currently, the melting of the Greenland Ice Sheet contributes ~3 millimeters per year to global sea level rise.

300 km



Adapted from original poster created by Derek Pickell June 2023