



A Summary of the Global Glacier Landscape: The Largest Glaciers in the 19 Glacial Regions of the World

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<https://nsidc.org/noaa>

Introduction

Studying glaciers helps to inform our knowledge of climate change and helps biologists and water and energy resource managers plan for the future. Researchers have performed many regional studies of glaciers; however, global studies are scarce. In addition, there is no formal record of the largest glaciers on Earth. To fill this gap, this global assessment of glaciers strives to further our knowledge of these important natural resources on a worldwide scale. This poster presents a systematic assessment of the largest glaciers and glacier complexes in the 19 primary glacier regions of the world as defined by the Global Terrestrial Network for Glaciers (GTN-G), excluding the Greenland and Antarctic ice sheets.



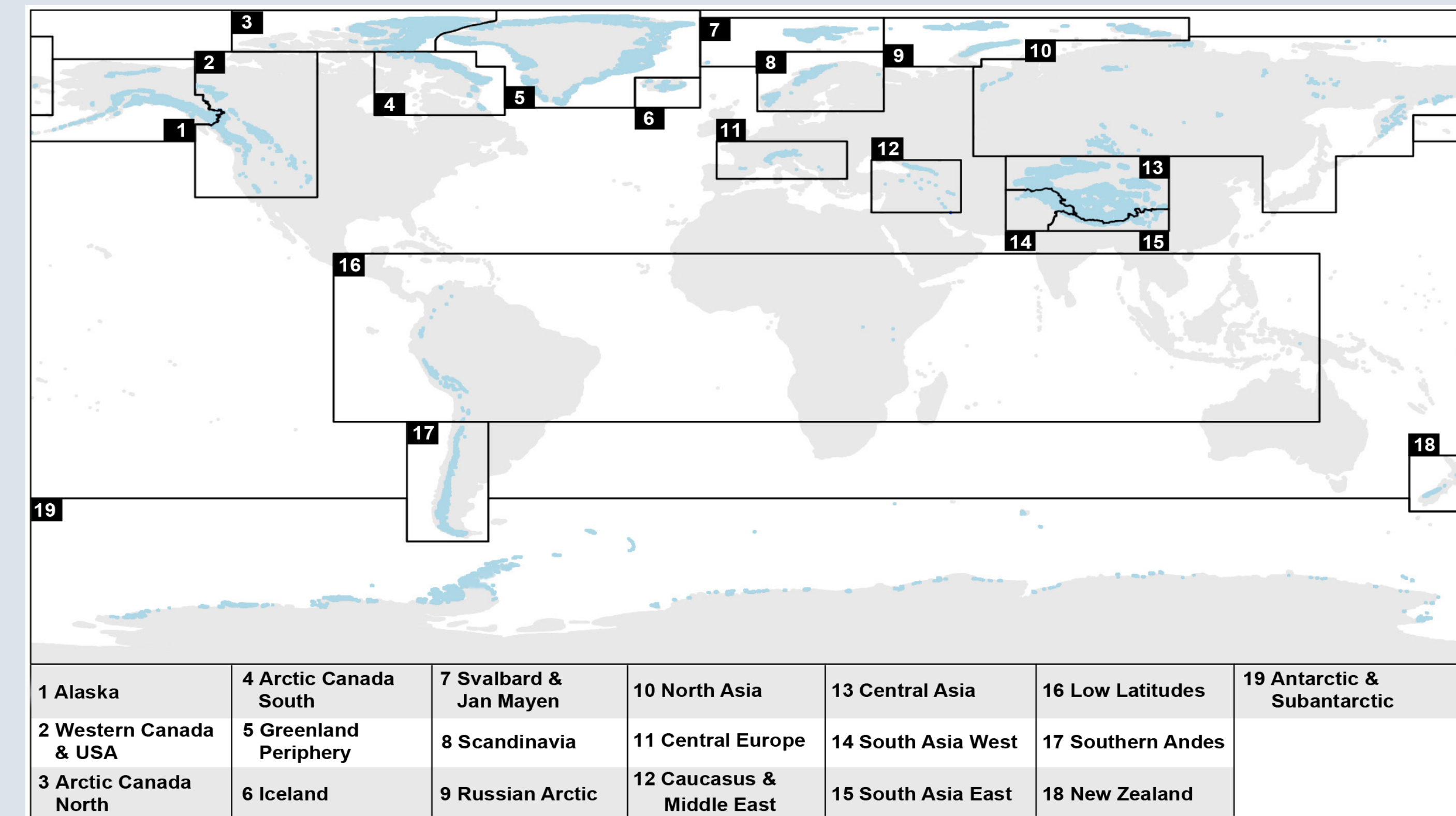
Malaspina-Seward Glacier in Alaska photographed in September 1966 (photographer unknown). It is the sixth largest glacier in the world with an area of 3,363 km² and the first largest outside the polar regions.
-Credit: NSIDC Glacier Photograph Collection

References

Cogley, J.G. & 10 others. (2011). Glossary of glacier mass balance and related terms. IHP-VII Technical Doc in Hydrology No. 86, IACS Contribution No. 2. UNESCO-IHP, Paris, France.
Windnagel, A., R. Hock, F. Maussion, F. Paul, P. Rastner, B. Raup, and M. Zemp. (2022). Which glaciers are largest in the world? *Journal of Glaciology*, 1-10. doi: <https://doi.org/10.1017/jog.2022.61>

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19 GTN-G Regions

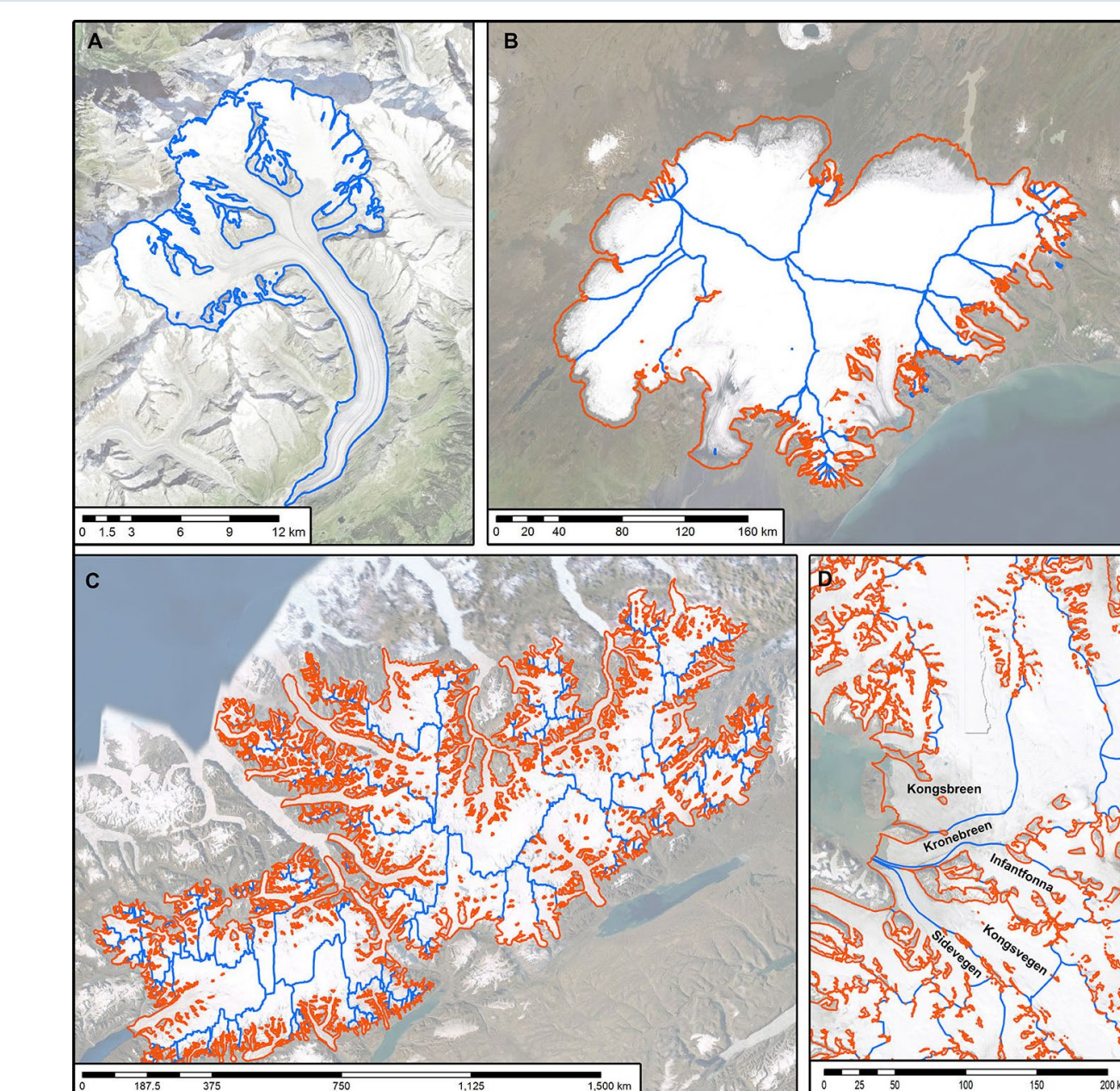


Definitions

From Cogley et al. (2011)

Glacier: A perennial mass of ice, and possibly firn and snow, originating on the land surface by the recrystallization of snow or other forms of solid precipitation and showing evidence of past or present flow.

Glacier complex: A number of contiguous glaciers; a generic term for all collections of glaciers that meet at divides (e.g., icefields or ice caps).



Examples of glaciers and glacier complexes: (A) Aletsch Glacier in Switzerland, (B) Vatnajökull Ice Cap in Iceland, and (C) Northern Ellesmere Icefield in the Canadian Arctic. Subplot (D) shows the Holtedalfonna-Isachsenfonna Icefields in Svalbard with a zoom to its contiguous outlet glaciers. Outlines of the glaciers and of glacier complexes are shown in blue and red, respectively; and the background image is the ESRI base map. From Windnagel et al. (in review).

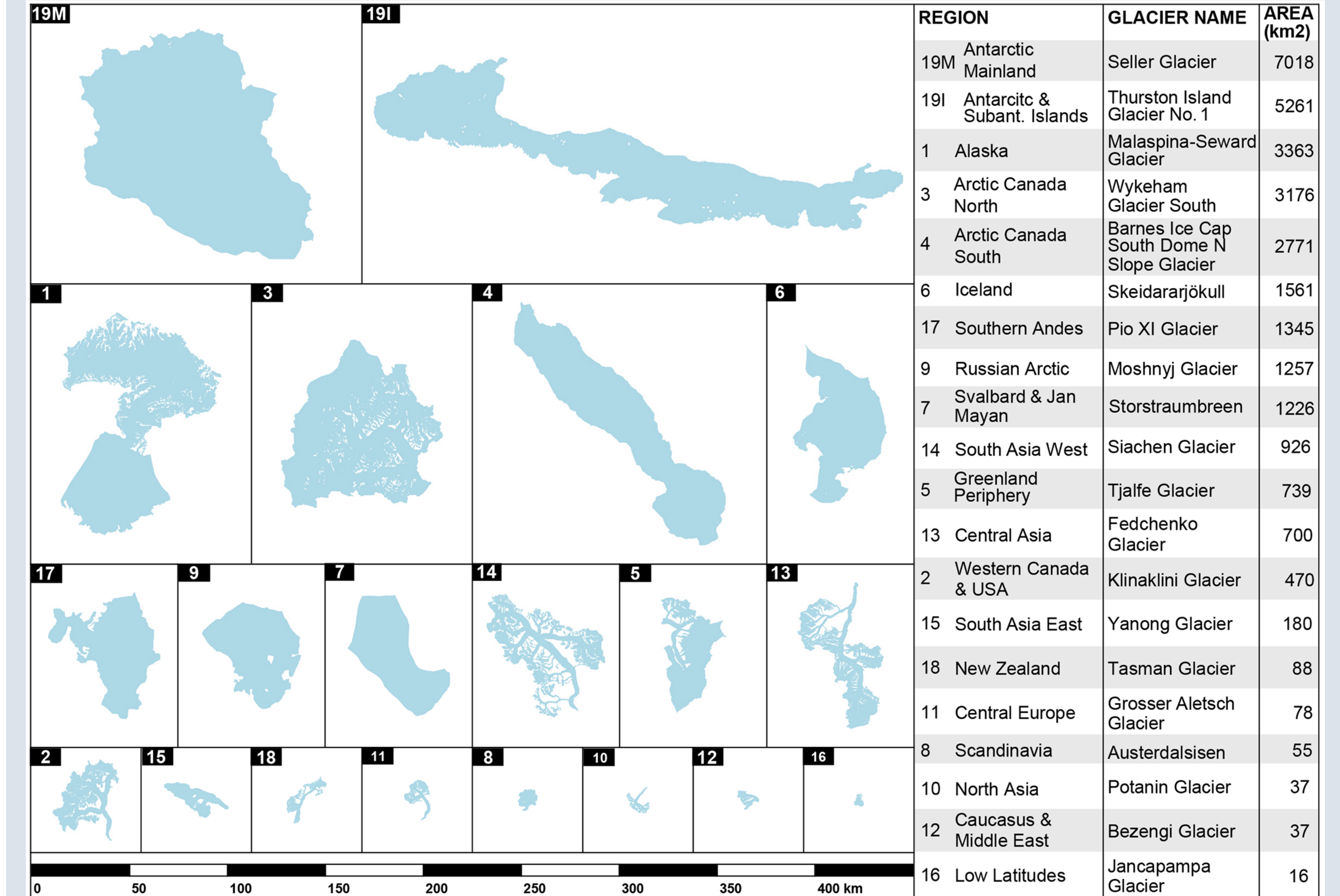
Methods

Two databases were used for this analysis: the Global Land Ice Measurements from Space (GLIMS) Version 20190304 and the Randolph Glacier Inventory (RGI) Version 6.0. Area (km²) is used as the measure of glacier and complex size.

Glaciers: The area attribute was extracted from both databases and then compared. The three largest glaciers per region were obtained. In cases where a glacier's size differed between GLIMS and RGI, the dates of the measurements were compared and the one with the more recent date was chosen. If the measurement dates matched (same year), the areas were averaged.

Glacier Complexes: The glacier complexes had to first be identified. Glaciers that shared common boundaries with one or more neighboring glaciers were dissolved (merged) at their common ice divides to create a glacier complex outline. The area of each was then determined using a Python planar area function in an equal-area projection and then the three largest were selected.

Largest Glaciers in the 19 Regions



Largest Glacier Complexes in the 19 Regions

