

Changing Landscapes: Glaciated Landscapes

What are glaciers?

What you need to know

Types of ice mass at a range of scales including cirque glaciers, valley glaciers, highland ice field, piedmont glaciers, ice sheets and sea ice

Different types of ice mass

Glacier – a mass of land ice that deforms under its own weight and flows downslope

Glaciers are generally classified by size (in ascending order):

- [Cirque](#) (or corrie) glacier
- [Valley glacier](#)
- [Piedmont glacier](#)
- [Highland ice field](#)
- [Ice sheet](#)

Sea ice

What are the characteristics of sea ice? How and why is it different from land ice?

Why is it important? Research and make notes to answer these questions.

This is a good starting point: <http://nsidc.org/cryosphere/seaice/index.html>

CIRQUE (CORRIE) GLACIERS

These develop from snow patches in sheltered depressions at high altitude

Their size ranges from 0.5-10km²

As they flow downslope, they deepen the depression eventually producing an armchair-shaped hollow called a cirque (France/Switzerland), corrie (Scotland/Northern England) or cwm (Wales).



Chugach Mts,
S. Alaska



VALLEY GLACIERS

When cirque glaciers grow too big for their cirques, the ice flows downslope following pre-existing valleys – becoming a **valley glacier**.

Many cirque glaciers can join together to form a valley glacier – and small valley glaciers can join to form very large valley glaciers.

Present-day valley glaciers can be tens of km in length and cover tens to thousands of km².

E.g. the Aletsch Glacier is the largest glacier in the Alps – c. 23 km long in 2014 with a surface area of c. 81.7 km² (2011). It's made of 4 smaller valley glaciers that converge at Konkordiaplatz.



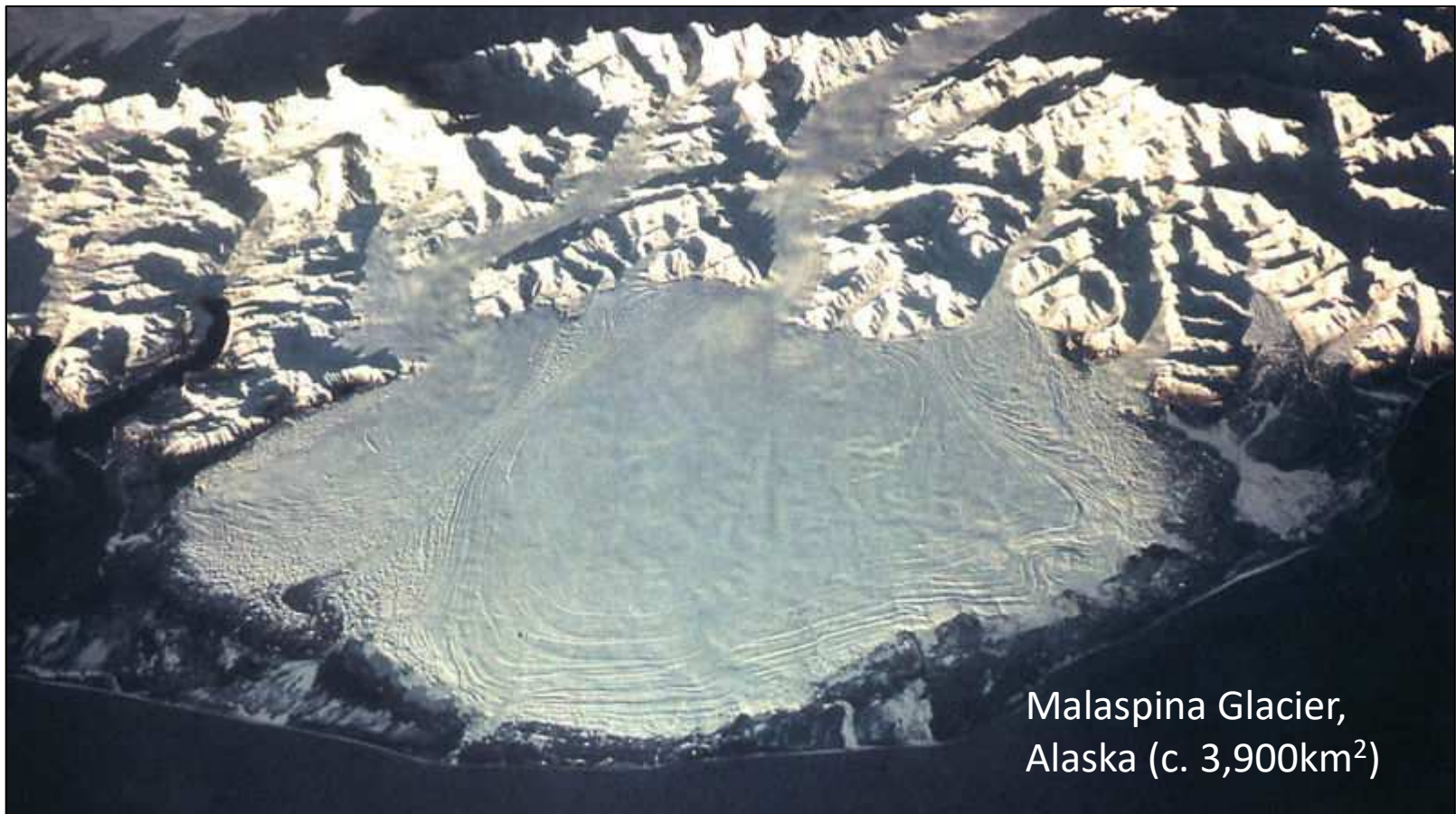


Aletsch Glacier looking towards Konkordiaplatz where ice thickness has been estimated to be 900m and ice flow to be c. 200m/yr (c. 50cm/day)



PIEDMONT GLACIERS

Literally 'mountain foot' or lowland glaciers, they form where ice flows out from an upland area onto a lowland. As it does so the ice spreads out and thins as it is no longer constrained by the valley sides.



Malaspina Glacier,
Alaska (c. 3,900km²)



HIGHLAND ICE FIELD

These develop when upland areas become virtually covered by glacial ice as glaciers grow and merge.

The largest can be many thousands of km² but are < 50,000km²

E.g. Columbia ice field, Canada is the largest ice body in the Rockies and covers about 325km²

The highest mountain peaks remain uncovered – these are called [nunataks](#)

[Outlet](#) glaciers flow outwards from the edge of the ice field



Patagonian ice field



...is the world's second largest contiguous extrapolar ice field and covers an area of 12,363 km²

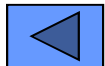


Nunataks



Antarctica

East Greenland



ICE SHEETS

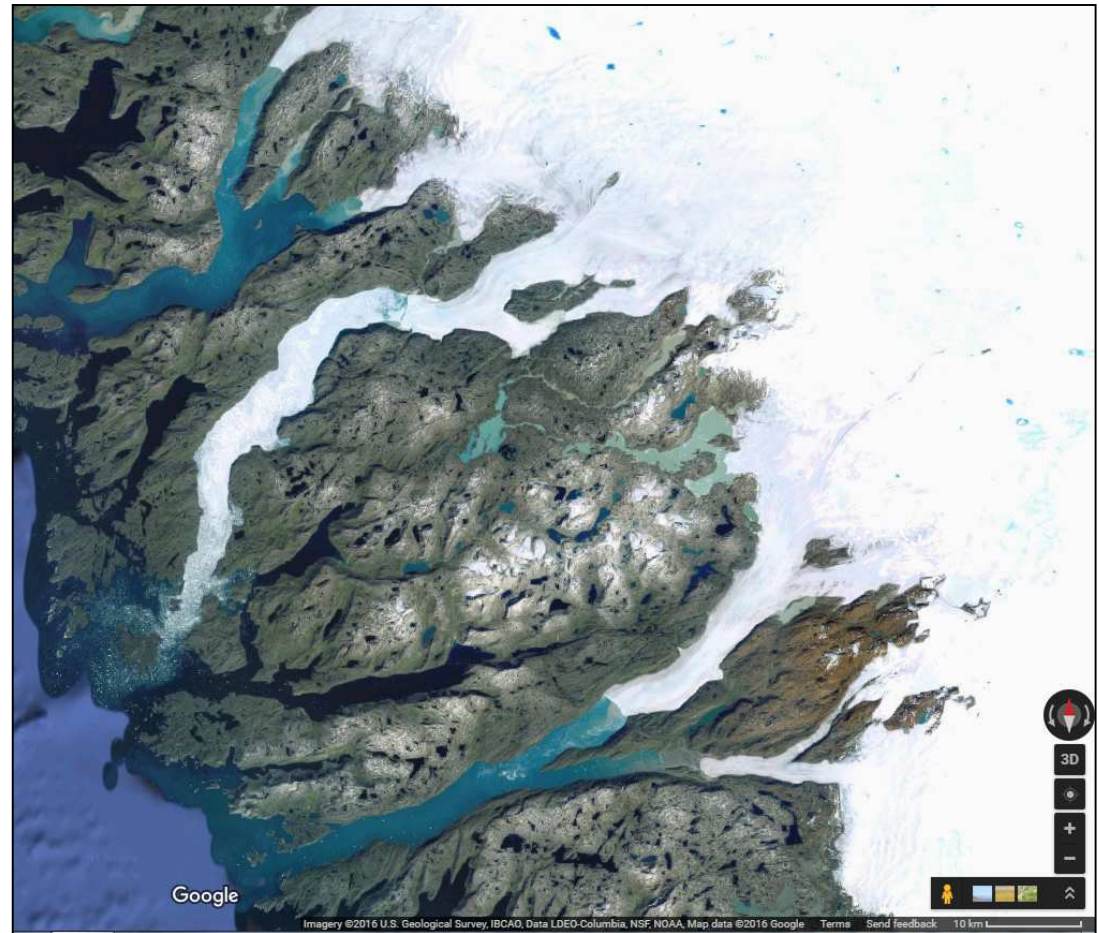
As highland ice fields grow beyond the confines of the mountains they become very large, continental-sized ice bodies, covering tens or even millions of km² of lowland.

Ice sheets have areas of at least 50,000km²

Currently there are only two: [Greenland](#) and [Antarctica](#)

The Greenland ice sheet

This ice sheet contains about 6% of the Earth's ice.



The Antarctic ice sheet

Contains 70% of the Earth's fresh water and 90% of its ice.

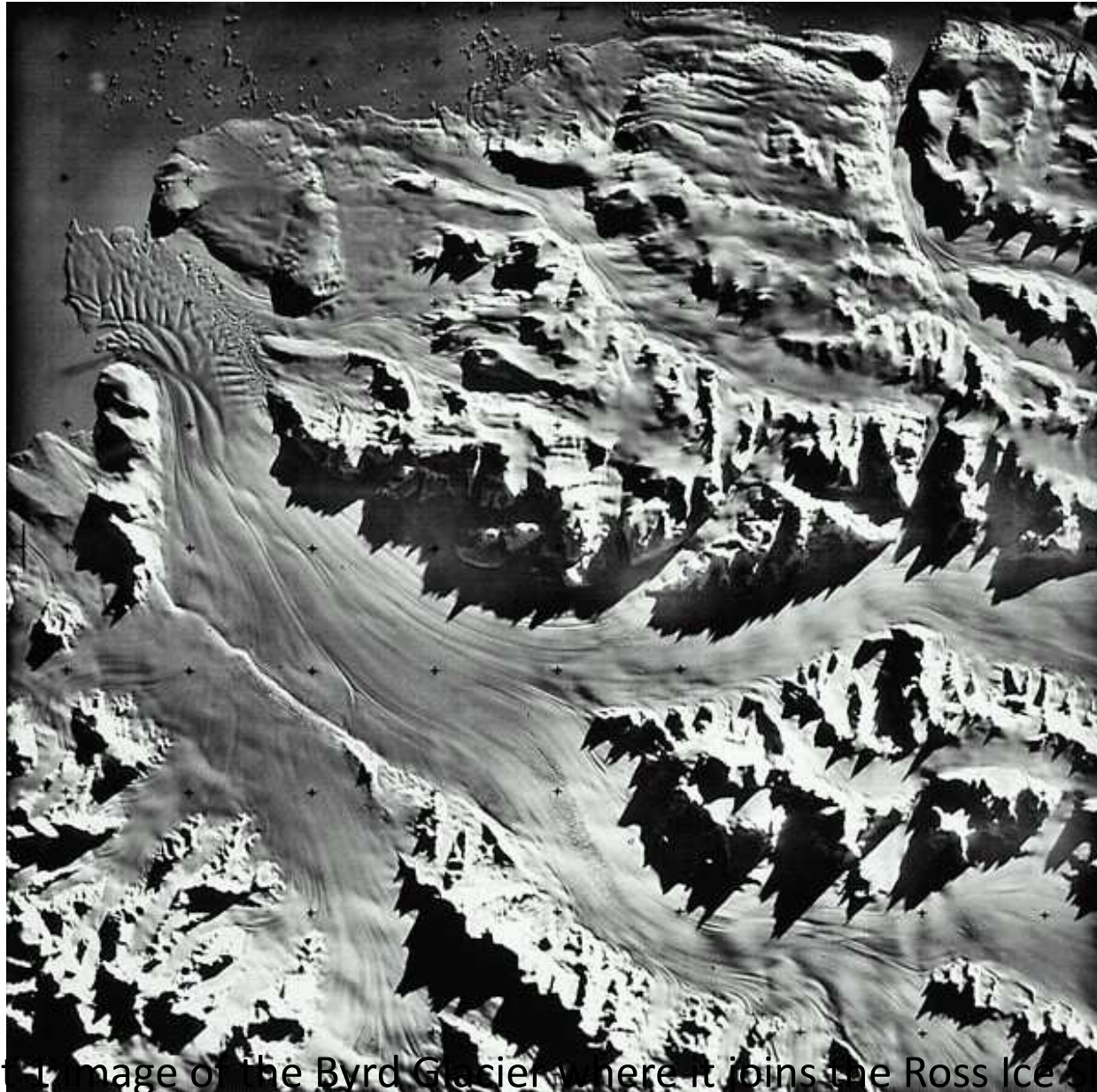
The East Antarctica ice sheet covers 10 million km² and is over 4km thick in places.

The Ross Ice shelf is a floating mass of ice about the size of France (487,000 km²).

Pieces break off the 600 km long ice front (which is between 15 and 50 m above the water surface) to form icebergs - in a process called calving.



The Antarctic ice sheet



Landsat image of the Byrd Glacier where it joins the Ross Ice Shelf