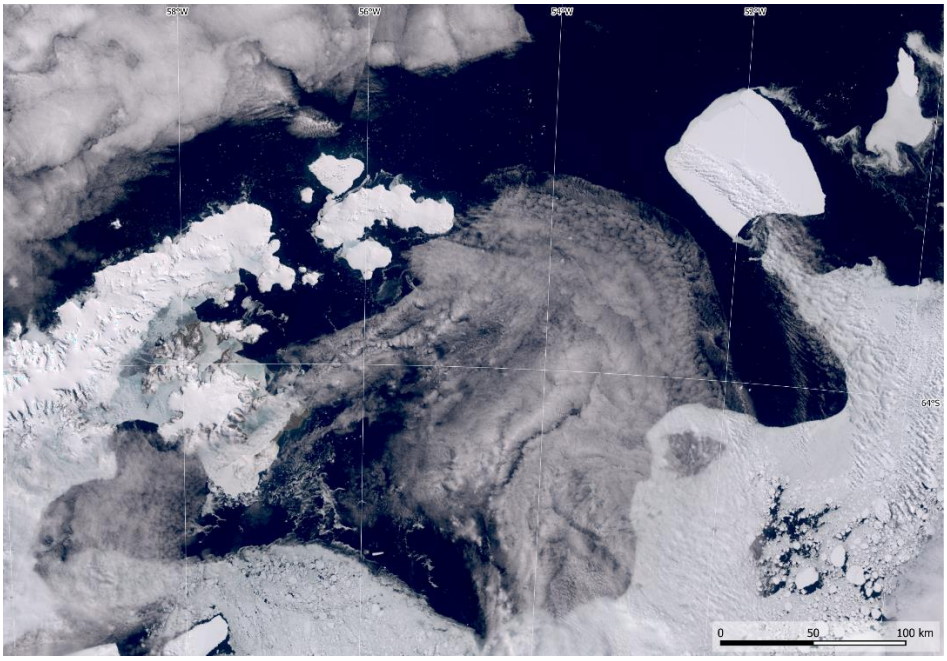
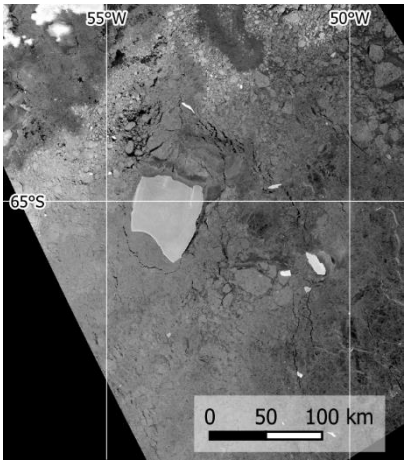
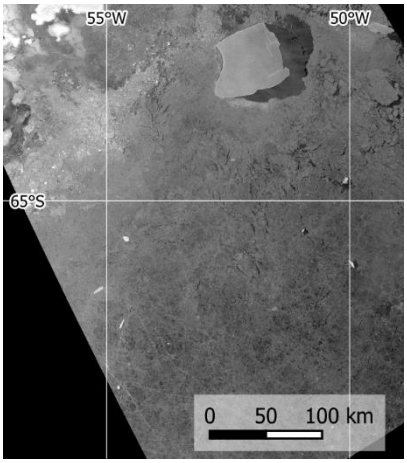
CRY02.1
A23a – An Iceberg on the Move



True colour image of the iceberg A23a (right). The tip of the Antarctic Peninsula can be seen at the left. (Sentinel-3, 2023-05-23).



2023-09-13 Sentinel-1 radar image of iceberg A23a



2023-10-19 Sentinel-1 radar image of iceberg A23a

Icebergs on the Move

The large tabular iceberg A23a calved from the Filchner–Ronne Ice Shelf in 1986. After its calving, the research base Druzhnaya I, which was placed on this iceberg, had to be removed and was renamed to Druzhnaya III. For many years the iceberg remained stuck on the seabed before it started moving in 2020. With an area of almost 4,000 square kilometres, it was by 2024 one of the largest icebergs ever monitored.

Late in 2020, A23a started its journey towards north, roughly following the coastline of the Antarctic Peninsula. In November 2023, the iceberg moved past the northern tip of the Antarctic Peninsula, heading toward north. During its tour away from Antarctica, A23a will reach warmer waters and will subsequently melt.

While the dissolution of the ice shelves does not directly contribute to the seawater level (the melted water replaces only the volume of the submerged part of the ice), it plays an important indirect role as the shelves function as a stabilising barrier for the glaciers flowing towards the sea. A loss of this barrier can lead to an enhanced ice flow.

.Exercises

- Look at the true colour Sentinel-3 image of the iceberg. Which different features and landcover types can you identify? How can you discern them? Hint: open water appears in very dark blue, drifting ice in a blueish white, and large icebergs in white; ice and snow on land can be identified by the relief they show. Additionally, clouds cover parts of the image.
- Look at the iceberg A23a in the upper part of the map. Use the scale bar to determine (i) its width and (ii) estimate its area. Compare the measured values with features in your home region, e.g. your home town.
- Look now at the Sentinel-1 radar image layers and compare them with the optical Sentinel-3 image. How are ice and water surfaces represented in the radar images?
- Look at the map below showing the path of the iceberg. Using the value of the width of the iceberg determined above, give an estimation of the length of the way the iceberg drifted during 2022 and 2023.

Additional Material

Map: Path of the iceberg A23a in 2022 and 2023.

Links and Sources

- Collection of Sentinel-1 images of iceberg A23a: https://www.esa.int/ESA_Multimedia/Images/2023/12/Iceberg_on_the_loose
- ESA video on iceberg A23a: https://www.esa.int/ESA_Multimedia/Videos/2024/01/World_s_largest_iceberg_drifts_beyond_Antarctic_waters
- A23a is not the only iceberg starting from the Antarctic ice shelves, as the Sentinel-1 image of iceberg A76 shows: https://www.esa.int/ESA_Multimedia/Images/2021/05/Meet_the_world_s_largest_iceberg