

Sea-Ice Concentration

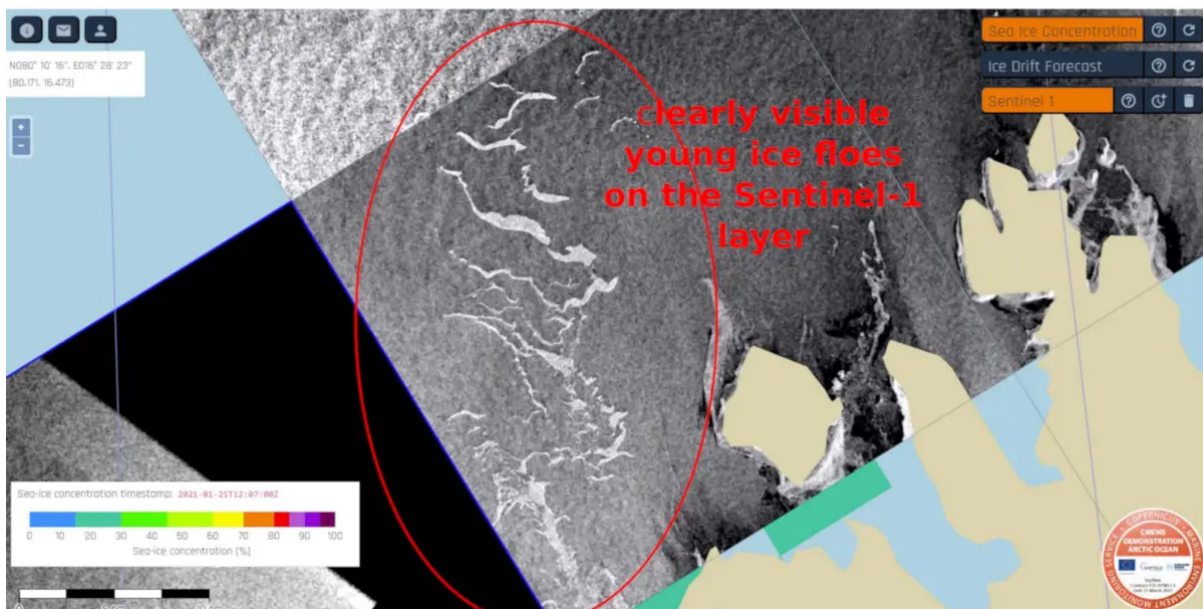
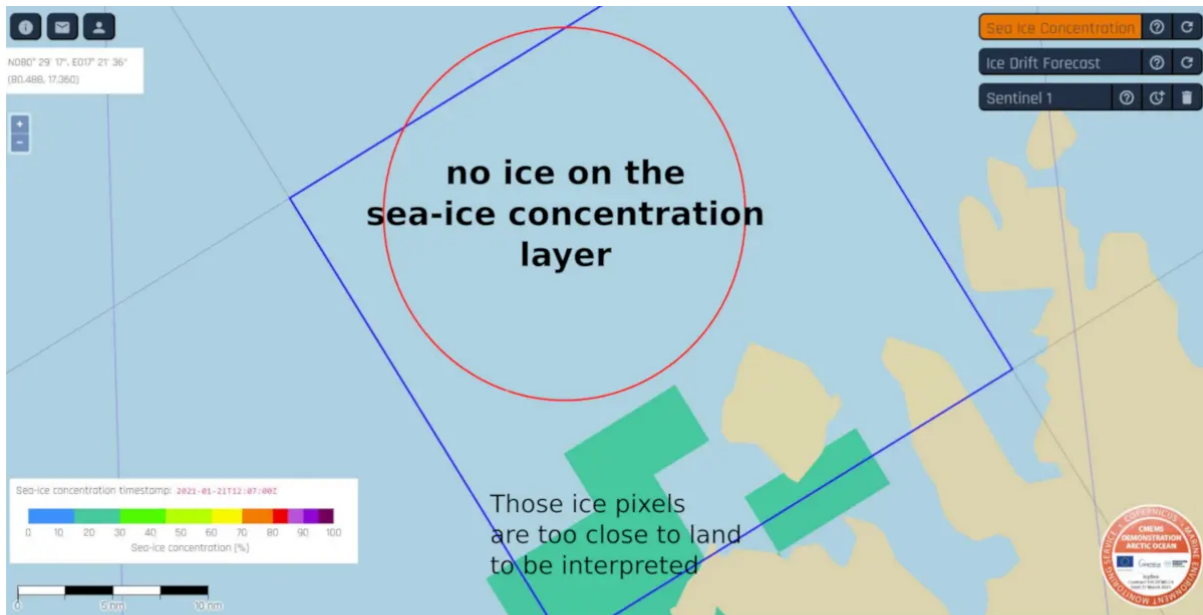
Sea-ice concentration is a low-resolution information layer for strategic planning purposes and to assist the interpretation of Sentinel-1 radar images. It is updated several times a day, automatically created and therefore to be used with care. Each pixel covers an area of 6.25 x 6.25 km². Colours refer to the fractional area in percent (%) which is covered with ice, meaning that 100% refer to an area completely covered with ice. For a correct use of the sea-ice concentration layer the following guidelines should be considered:

The 10% Rule

Sea-ice concentration below ~10% is not resolved by the sensor. I.e. a region showing no sea-ice concentration can still have enough ice floes remaining a significant navigational hazard.



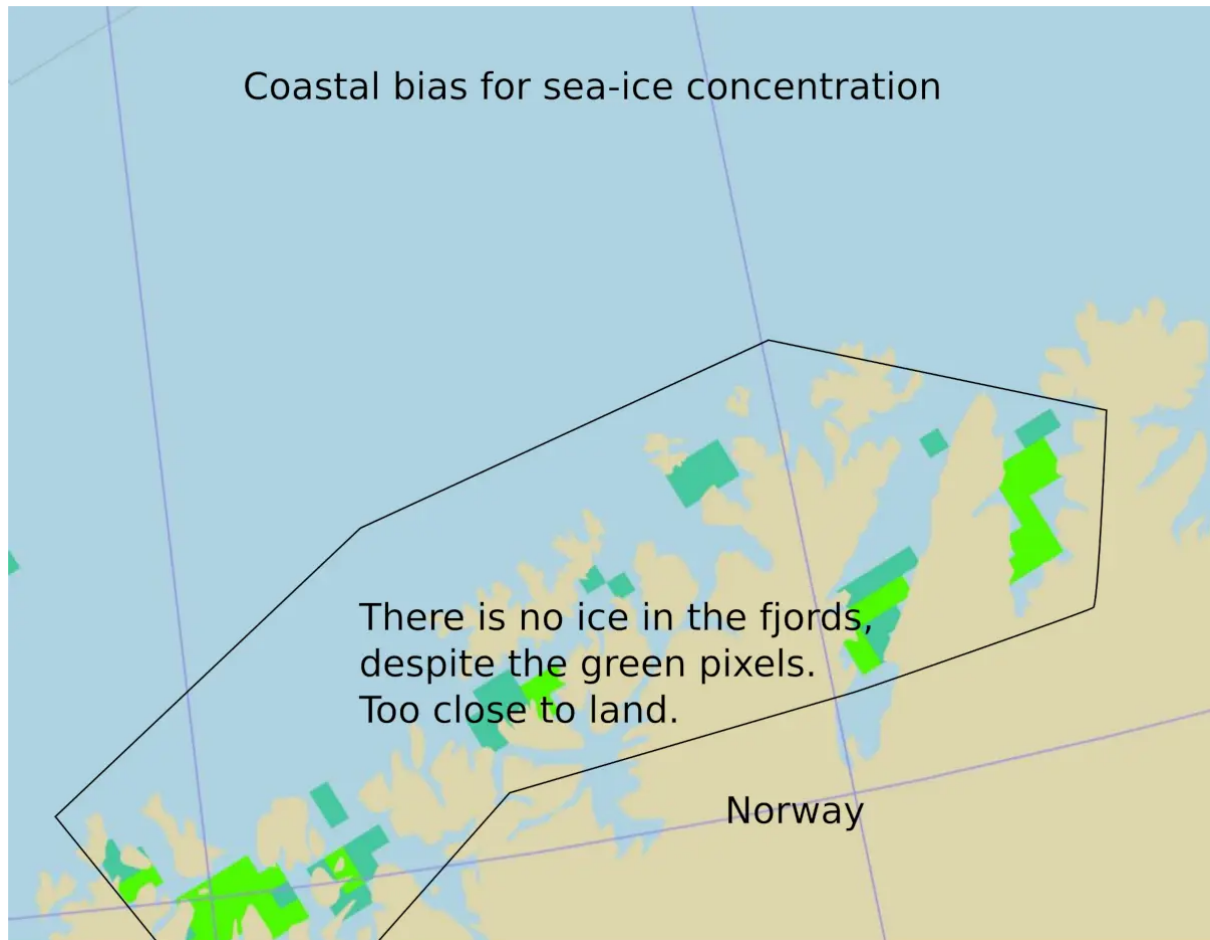
Sea-ice floes in the Hinlopen Strait in May 2018: It is possible that this ice situation appears as open water on the sea-ice concentration information layer.



Comparison between sea-ice concentration and Sentinel-1 image: Although the sea-ice concentration layer shows open water (upper image), on the Sentinel-1 scene (lower image), same time and place, individual smaller ice fields are identifiable.

The Coastal Bias

Close to the coast the sea-ice concentration is overestimated due to the influence of land. You can best see this by looking on the Norwegian coast, which never has ice. The sea-ice concentration you see close to the Norwegian coast is the expected error for all coasts.



Coastal bias in the sea-ice concentration layer: Although the Norwegian coast is ice free, the sea-ice concentration layer shows pixels with ice. This is due to the coastal bias.

No Ice Types

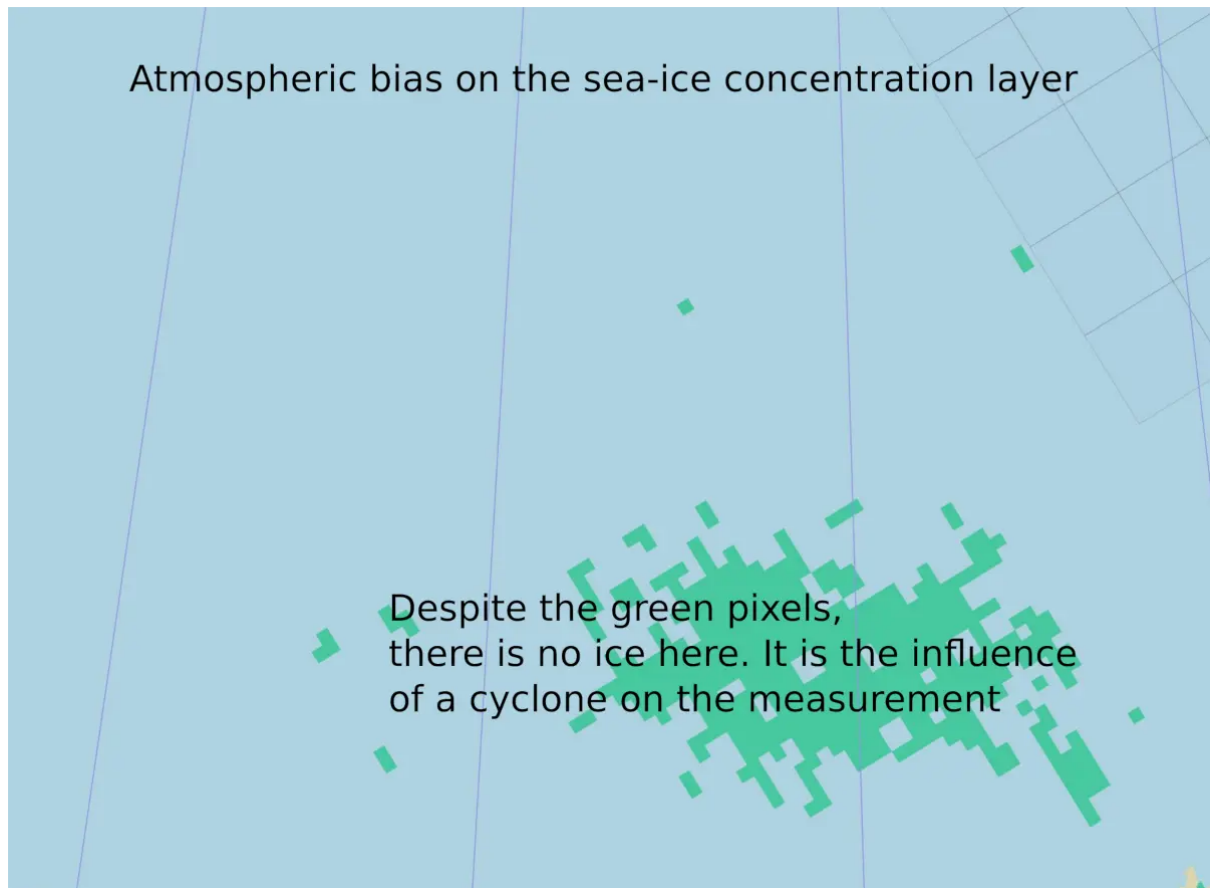
Sea-ice concentration does not indicate the type of ice. A 100% ice cover might be old multi-year ice, first-year ice or even a thin refrozen ice layer only. To clarify this, use additional radar images and/or ice charts, if available.

Check the Timestamp

When you compare sea-ice concentration with a satellite image, be aware of the different time stamps. The time-stamp of the current sea-ice concentration layer is shown in the lower left corner in red letters just above the colour code legend. Usually sea-ice concentration is the newest layer.

Atmospheric Bias

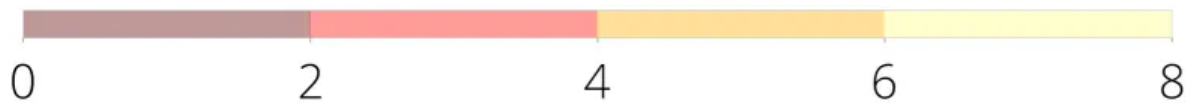
Large atmospheric cyclones influence the measurements as well. Sometimes you see large areas indicating a sea-ice concentration of about 20-30 % in the middle of the open ocean. This is very likely an error due to a cyclone.



Atmospheric bias: The shown medium ice concentrations in the middle of the open ocean is very unlikely to be sea-ice, but an atmospheric distortion of the measurement due to a cyclone.

Physical Background of the Data

The sea-ice concentration data layer is an automatically generated product on the basis of satellite based passive microwave measurements provided by the Japanese Space Agencies AMSR2 sensor of the [GCOM-W](#) mission. The GCOM-W satellite circulates the earth 14.5 times a day (=14.5 revolutions per day). Due to its polar orbit, it crosses the poles during every revolution. The AMSR-E sensor records the passive microwave radiation on a stripe of 1450 km width (so called swath width). The data are thankfully provided by JAXA after every revolution, which enables so-called swath updates several times a day. The physical parameters of the GCOM-W mission are available [here](#).



Sea-Ice Concentration Charts per Day (Average)

Daily updates of the sea-ice concentration layer: The number of updates of the sea-ice concentration layer per day depends on the latitude, the further north, the more often it is updated. The Svalbard archipelago is being updated 6 to 8 times a day.

The Sea-ice Concentration Algorithm

The conversion from passive microwave data to sea-ice concentration uses the ARTIST sea-ice algorithm from [Spreen et al. \(2008\)](#).