

Evidence essay · Sea ice and ocean

How old is that sea ice?

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Fictional author and institute · Editorial demonstration, not peer reviewed

ABSTRACT

Sea-ice age is interpreted as a reconstructed history of survival and movement rather than a direct map of thickness or strength. The essay explains first-year and multiyear categories, parcel tracking, and the important product rule that retains only the oldest category within each grid cell. A hypothetical mixture demonstrates why identical colours need not imply identical fractions of older ice. Deformation, melt, snow, and travel history further limit age as a thickness proxy. The published decline in the oldest category is retained with its late-summer timing and comparison period, while the need for successive summer survival explains why a winter extent rebound cannot immediately rebuild old ice. The resulting reading method asks for product, week, categories, and compatible complementary measurements, not a promise about travel or habitat.

Keywords: sea-ice age · multiyear ice · ice motion · categorical maps · thickness proxies

Adapted from the Still North field journal. Original article. A source-based editorial text, not a report of original Still North research. Examples and imagery are illustrative.

An ice-age map looks like a census of birthdays. It is closer to a history of survival and movement. The colours describe ice carried through successive melt seasons, reconstructed across a changing pack. Understanding that history makes the map more useful, particularly when an older-looking patch is mistaken for a direct measurement of thick, stable ice.

The first distinction is seasonal. First-year ice has not yet survived a summer melt season. Multiyear ice has survived at least one. Age therefore describes experience, not simply the number of cold months since freezing. The [National Snow and Ice Data Center's sea-ice guide](#) also explains how brine drainage, melt, and repeated growth change the material as it ages.

Follow the parcel, not the coordinate

The ice at a particular latitude and longitude this winter is not necessarily the ice that occupied it last winter. A floe can travel, fragment, converge with others, or leave the Arctic through a gateway. Researchers must follow that movement rather than age the place on a stationary map.

For the age products used in the [NOAA Arctic Report Card 2025](#), ice parcels are tracked using weekly motion vectors. Surviving parcels advance through age categories. The report's methods contain an especially important detail: only the oldest age category is preserved in each grid cell. The coloured cell does not describe every floe inside it.

What one coloured cell can conceal

Imagine, as an analytical example rather than an observation, a cell containing a small remnant of four-year-old ice surrounded by younger floes. A product retaining the oldest category can label the cell with that remnant's age. A neighbouring cell with much more older ice could receive the same label. The two colours match, but the internal mixtures do not.

This is not a flaw to be corrected by guessing a younger colour. It is a property of the product. A reader interested in the fraction of older ice needs a method that actually estimates fractions, or a clear account of how the mapped categories are converted into an area statistic. Treating the categorical colour as a uniform surface silently adds information that the map never supplied.

The same caution applies to apparent precision at a boundary. Weekly tracking and a finite grid cannot resolve every narrow fracture, small floe, or mixing event. Motion uncertainty travels with the reconstructed history. A very detailed coastline beneath the overlay does not make the ice categories equally detailed.

Older often means thicker, not always

Age is useful partly because ice surviving several winters generally has opportunities to thicken. Yet deformation can pile young ice into a deep ridge, while summer melt can thin an older floe. Snow, ocean heat, and the route travelled also matter. Age is a proxy for thickness, not a substitute for measuring it.

A practical comparison would therefore put an age product beside thickness estimates from the same season and examine where they agree. An older category near a thinner-than-expected thickness estimate is a question to investigate, not permission to discard either result. Are the footprints comparable? Is snow treatment important? Has the ice undergone strong melt or deformation? Our [sea-ice programme guide](#) introduces those complementary measurements.

Read a changing distribution, not a single birthday

The 2025 NOAA assessment reports 95,000 square kilometres in the oldest, over-four-year category at the September minimum. It compares that with an average of 1.72 million square kilometres for 1985 to 2004, a reduction

of about 95%. Retaining those dates and the late-summer timing makes the comparison meaningful. It is not a statement that 95% of every ice type has disappeared.

Rebuilding an older component requires successive survival, not just a cold winter that expands the seasonal cover. New ice can replace part of a winter footprint quickly; it cannot acquire several summers of history in the same period. That explains why an extent rebound and a persistently young pack can coexist. [Arctic change in 2025](#) places the age result alongside other seasonal indicators.

For a journal caption, the useful wording is consequently specific: which age product, which week, which categories, and which comparison? Avoid translating an old-ice colour into a promise about travel, strength, or habitat. A map of survival is already a powerful account. It does not need to pretend it is every other kind of ice map as well.

References

1. National Snow and Ice Data Center's sea-ice guide (nsidc.org)
2. NOAA Arctic Report Card 2025 (arctic.noaa.gov)