

A New Normal for the Sea Ice Index

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The NSIDC Sea Ice Index is a popular data product that shows users how ice extent and concentration have changed since the beginning of the passive microwave satellite record in 1978. It shows time series of monthly ice extent anomalies rather than actual extent values, in order to emphasize the information the data are carrying. Along with the time series, an image of average extent for the previous month is shown as a white field, with a pink line showing the median extent for that month. These are updated monthly; corresponding daily products are updated daily.

The Sea Ice Index was first published online in 2002. A baseline period of 1979-2000 was used for calculating means and medians. In July 2013, we changed the product to use a 30-year baseline period (1981-2010). This new normal, by including the first decade of the 21st century with its record low extent years, changed the scale on the extent trend plots so the overall loss of ice looked less anomalous than before the change, and each month's median extent line generally moved further north in the Arctic (in Antarctica, the position of the median extent line did not change much).

A 30-year period is the standard used by organizations like the World Meteorological Organization (WMO) and NOAA for climatologies and climate normals. Thirty years is used because it is deemed a sufficiently long time to average out most interannual variability but short enough to clearly show longer-term climate trends. These maxims about climate normals come from the world of weather and climate. Sea ice responds to climate forcing differently, and the assumptions behind the use of 30-year normals for meteorology may not hold true for sea ice.

We moved to a longer baseline, but with reservations.

Should we have changed the baseline? If the baseline includes periods of significant change, the resulting means or medians do not necessarily represent "normal" conditions for comparisons. In other words, ideally the baseline period should be relatively stable with small or no trend. This is not the case for sea ice in the Arctic, particularly since 2000. The loss of Arctic sea ice may now appear less significant to casual users of the product.

Another consideration is that features that were once common may be lost in updated climatologies. The most notable example is the Odden ice tongue (Figure 1) that once routinely formed off the east coast of Greenland during winter. Associated with outbreaks of cold air temperatures along with the interplay of bathymetric features and ocean currents, the Odden has not formed frequently enough in the first decade of the 21st century to show up in the new monthly median extent line at all. The recent absence of the Odden illustrates an important change in the sea ice system, but without a median extent line from a "more-normal" normal period, information about the loss of the Odden is not carried by the Sea Ice Index data product as obviously as was the case before.

At this workshop, with its theme of the Arctic's new normal, we have an opportunity to hear and gather opinions, suggestions and ideas about how to better understand and explain the use of a "normal" in a sea ice product intended for a wide audience.

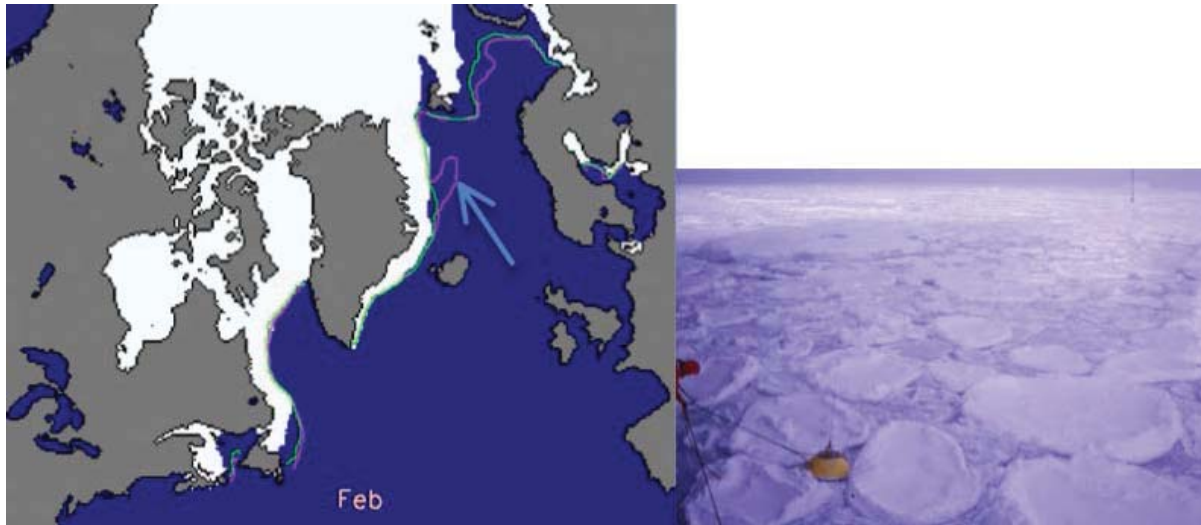


Fig 1.

Left: February 2013 ice extent with the 1981-2010 median extent and 1979-2000 median extent lines overlain in green and pink respectively. The Odden feature in the 1979-2000 median is marked by the arrow. Right: Pancake ice within the Odden. Credit: Peter Wadhams