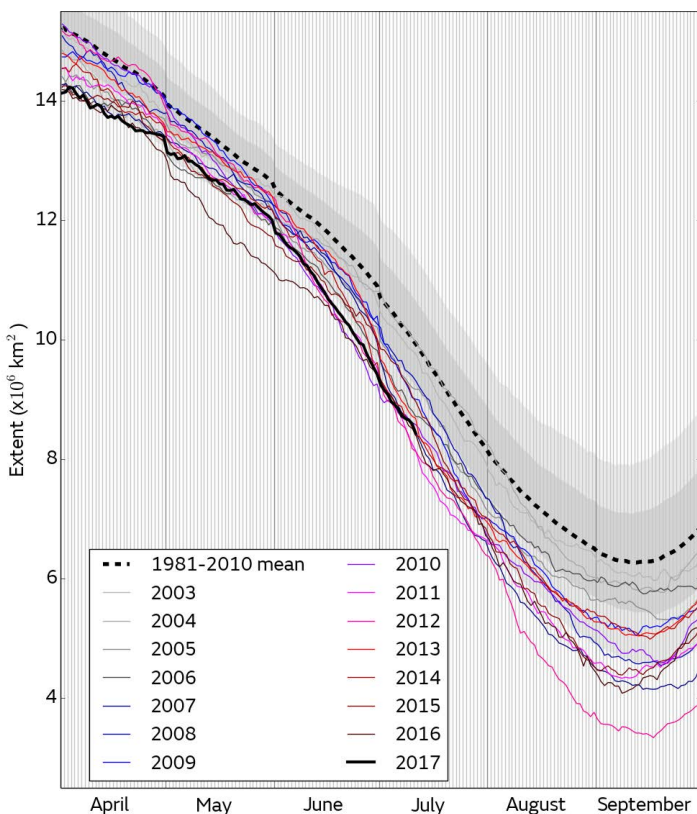


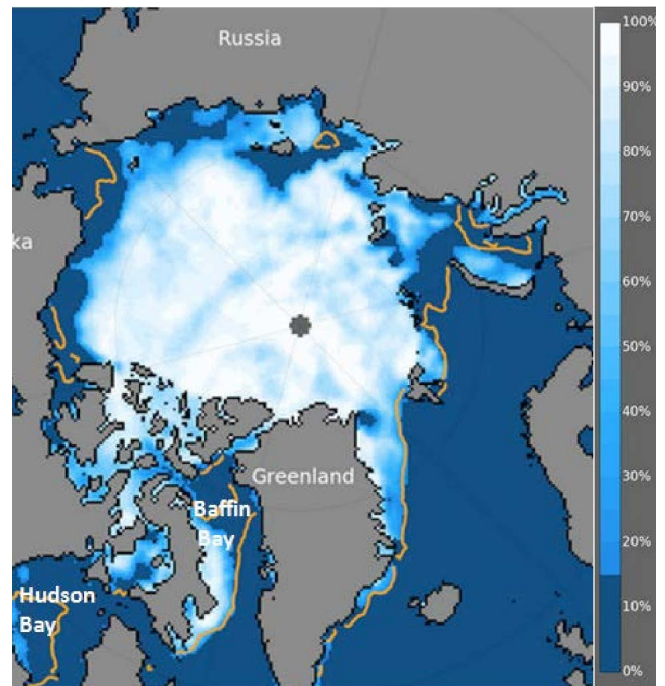
## Briefing on the state of sea ice

# Current Arctic sea ice extent

Arctic sea ice extent on 11 July 2017 was 8.43 million square km (Figure 1), according to data from the National Snow and Ice Data Center (NSIDC).



▲ **Figure 1:** Daily Arctic sea ice extent for 2017, compared with recent years and the 1981-2010 average with +/- 1 and 2 standard deviation intervals indicated by the shaded areas. Data are from the National Snow and Ice Data Center (NSIDC).



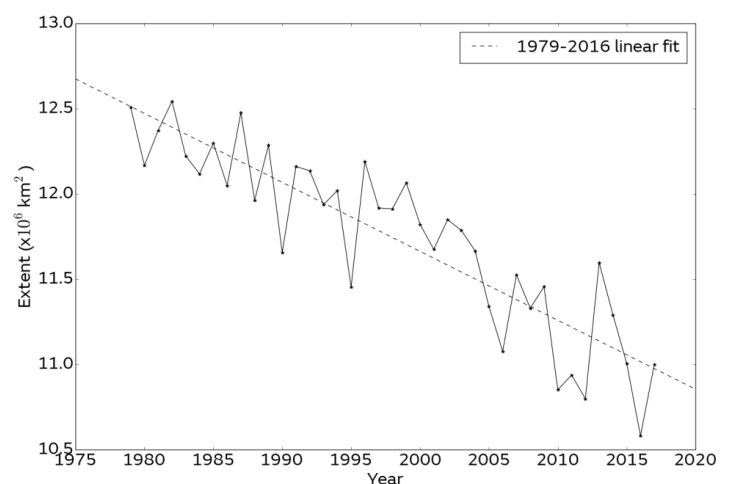
▲ **Figure 2:** Sea ice concentration on 11 July 2017, with 1981-2010 extent for this date indicated in orange. Underlying map and data courtesy of NSIDC.

Extent is 1.50 million square km below the 1981-2010 average for this date and 0.40 million square km above the record low for the time of year, which occurred in 2012. Extent is currently close to the 1981-2010 average in the Greenland Sea, and below average in the marginal seas of the Arctic Basin and in Hudson and Baffin Bays (Figure 2).

The conditions in the Pacific sector are likely to be associated with a continuation of the above-average air temperatures over the East Siberian, Chukchi, and Beaufort Seas during June.

## June 2017 in context

The average June Arctic sea ice extent was 11.0 million square km. This is 0.87 million square km below the 1981-2010 average, and close to the 1979-2016 linear trend. It is the joint 5th lowest June extent on record (Figure 3). The average rate of ice loss for June was 81,800 square km per day, which is faster than the 1981-2010 average of 56,300 square km per day.



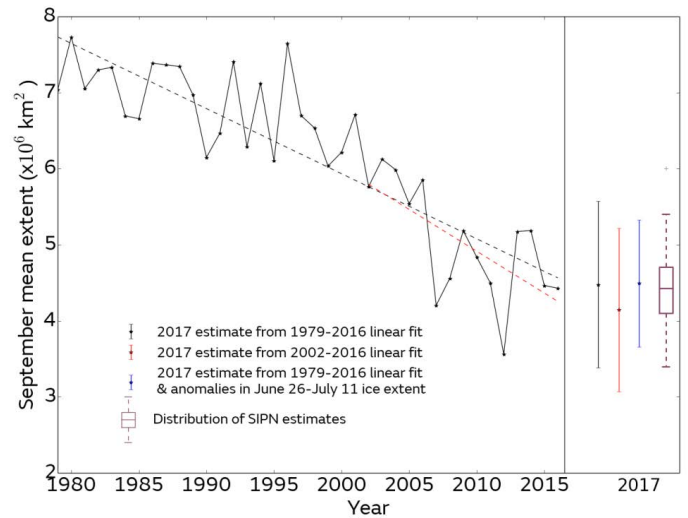
▲ **Figure 3:** Average June Arctic sea ice extent according to the Hadley Centre Sea Ice and Sea Surface Temperature (HadISST) 1.2 dataset (Rayner et al, 2003)

# Outlook for September 2017

A number of projections of this year's seasonal minimum (September) ice extent are displayed in Figure 4, and described below:

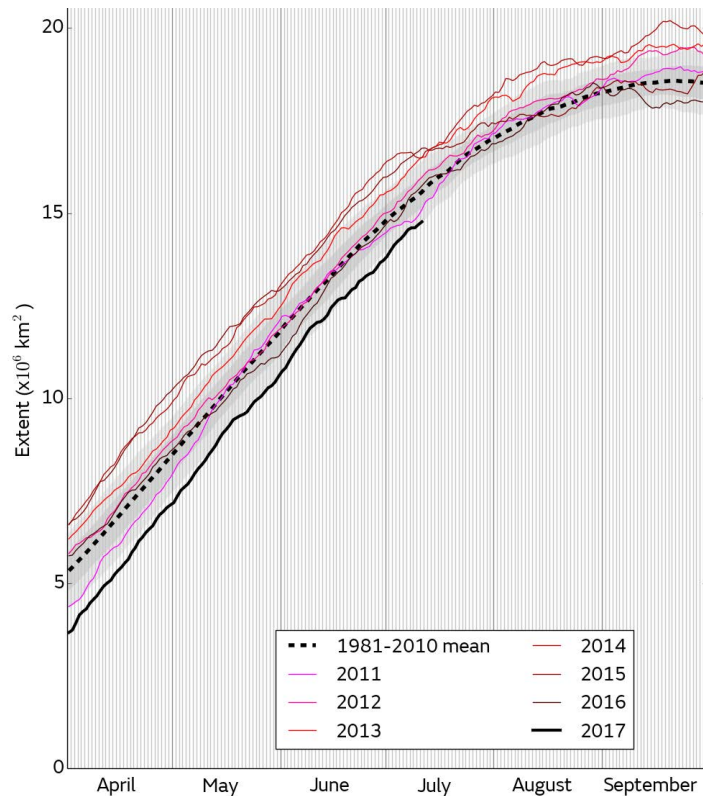
- The Sea Ice Prediction Network (SIPN) June Outlook report includes 33 predictions of mean September ice extent based on a variety of methods and from centres around the world. The predictions range from 3.40 to 6.0 million square km, with a median estimate of 4.43 million sq km. The median, inter-quartile range and max/min projections are shown on the right-hand-side of Figure 4.
- Other statistical predictions based on an extrapolation of the linear trend for the entire satellite period from 1979-2016 (black), and most recent 15 years (red) suggest a mean September sea ice extent of 4.48 ( $\pm 1.09$ ) and 4.14 ( $\pm 1.07$ ) million square km respectively.
- There is a reasonable correlation between mean September ice extent and the extent for 26 June to 11 July (the most recent 15 days of data available at the time of writing). Applying simple statistical methods to the anomalies for these dates gives a prediction of September mean extent of 4.49 ( $\pm 0.83$ ) million square km.

While the range of projections above may suggest this year is relatively unlikely to go below the record low minimum extent of 3.6 million square km set in 2012, there is a high level of uncertainty in projections at this stage in the melt season.



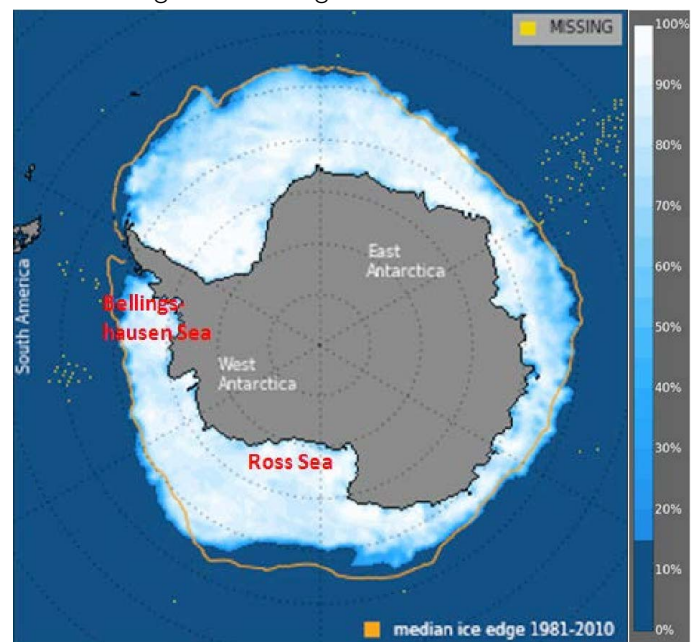
▲ **Figure 4:** September median Arctic sea ice extent since satellite records began in 1979 from the HadISST1.2 dataset (Rayner et al., 2003), with predictions from the SIPN Sea Ice Outlook and statistical estimates for September 2017. For the statistical estimates, error bars represent twice the standard deviation of September mean ice extent about the trend lines with respect to which the estimates are taken. The Sea Ice Outlook is shown as a boxplot indicating range, median and quartiles of the 33 estimates submitted.

# Current Antarctic sea ice extent



▲ **Figure 5:** Daily Antarctic sea ice extent for 2017, compared with recent years and the 1981-2010 average with  $\pm 1$  and  $\pm 2$  standard deviation intervals indicated by the shaded areas. Data are from the National Snow and Ice Data Center (NSIDC).

Antarctic sea ice extent on 11 July was 14.77 million square km (Figure 5), according to data from NSIDC. Extent is 0.81 million square km below the 1981-2010 average for this date, and is the second lowest on record for the time of year, just above the record low observed in 1986. Extent is currently below average in the Bellingshausen and Ross Seas.



▲ **Figure 6:** Sea ice concentration on 11 July 2017, with 1981-2010 extent for this date indicated in orange. Underlying map and data courtesy of NSIDC.

Rayner, N. A.; Parker, D. E.; Horton, E. B.; Folland, C. K.; Alexander, L. V.; Rowell, D. P.; Kent, E. C.; Kaplan, A. (2003) Global analyses of sea surface temperature, sea ice, and night marine air temperature since the late nineteenth century J. Geophys. Res. Vol. 108, No. D14, 4407 10.1029/2002JD002670