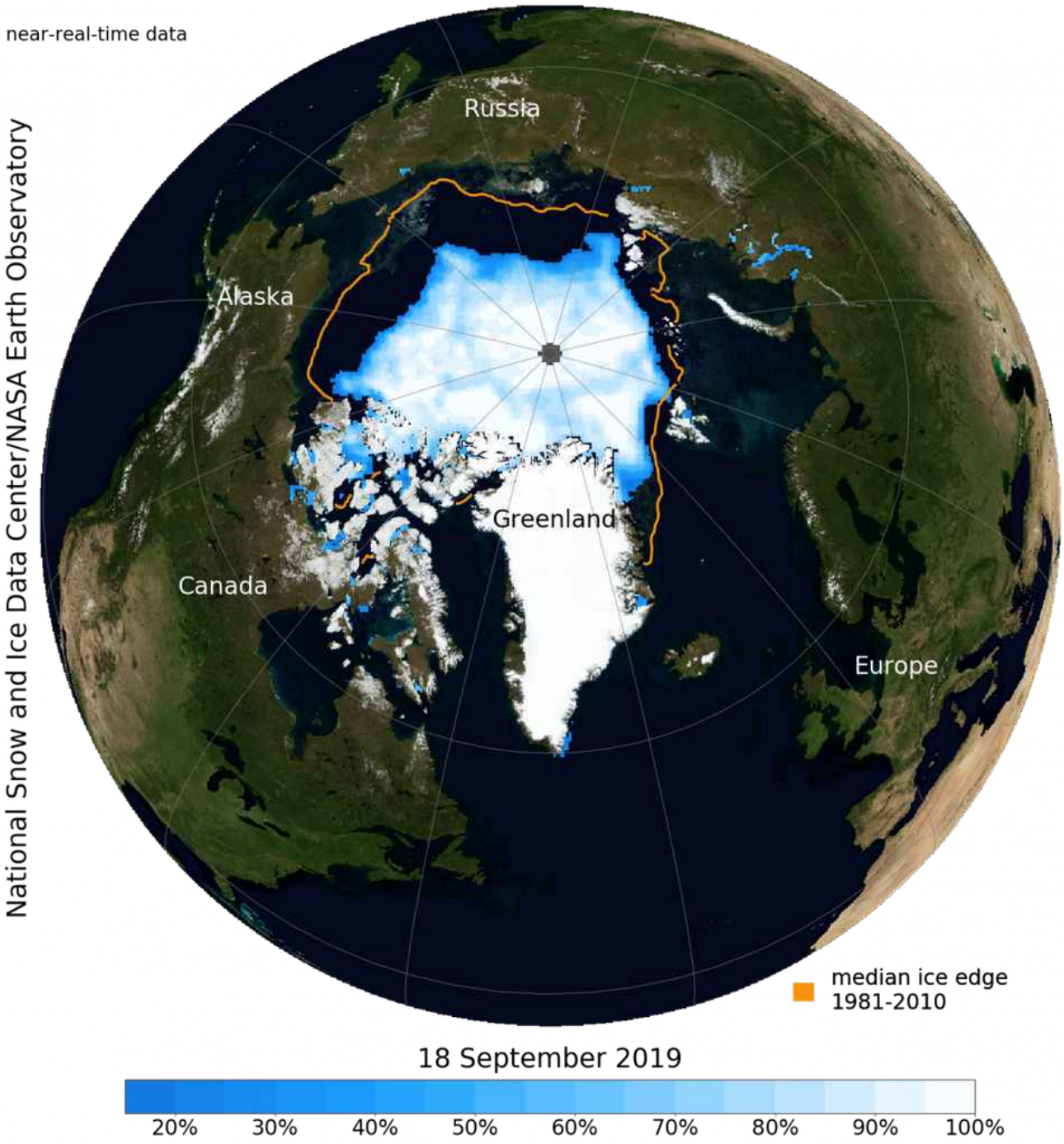
Prime Meridian

(112) September 25, 2019

As we passed through the Autumn Equinox (Sept. 23), days became shorter than nights and colder weather sets in in the Northern Equinox.

2019 saw the second greatest loss of Arctic Sea Ice on record.

Above: Close to sunset on September 24, 2019, after rains. To the right we see a sundog, caused by hexagonal ice crystals high in the cirrostratus clouds, can be glimpsed above lower clouds.

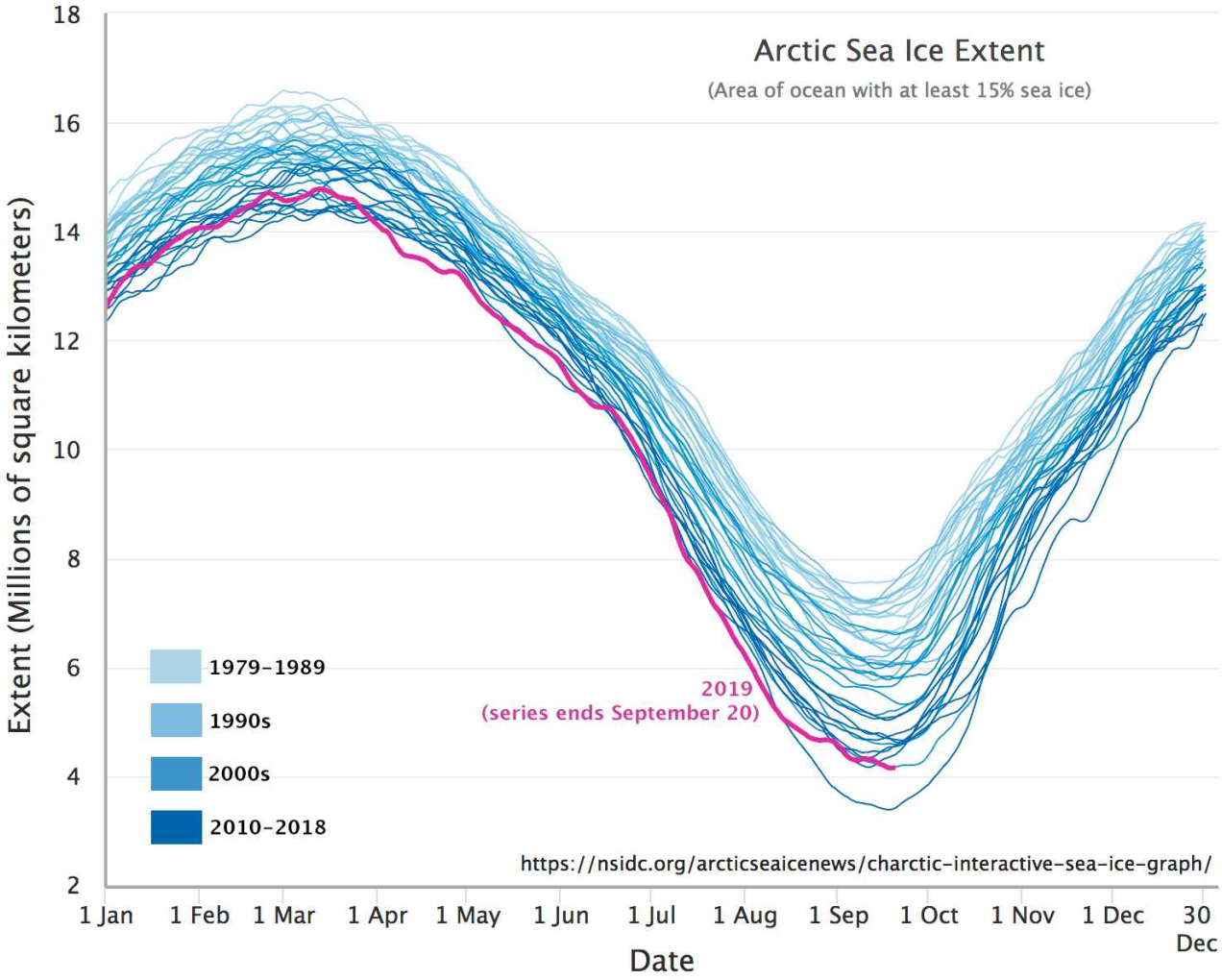


The USA's National Snow & Ice Data Center has provisionally announced that this year's smallest extent of sea ice was on September 18, 2019.

This year, sea ice extent was reduced to 4.15 million km^2.

NSIDC: "the second lowest minimum in the satellite record along with 2007 and 2016. This appears to be the lowest extent of the year. In response to the setting sun and falling temperatures, ice extent will begin increasing through autumn and winter. However, a shift in wind patterns or a period of late season melt could still push the ice extent lower."

https://nsidc.org/arcticseaicenews/



Although this year did have not the lowest minimum ice extent, it showed dramatically the overall loss of sea ice in summer over a period of decades.

The five smallest sea ice extents were as followed: 3.39 million km^2. Sept. 17. 2012; 4.15 million km^2. Sept. 18. 2019; 4.16 million km^2. Sept. 18, 2007; 4.17 million km^2. 2016; 4.34 million km^2. Sept. 11. 2011.

The long term reduction in ice volume continues.

The extent of sea ice is the area within which floating ice covers a minimum of 15%. Another important measure is the actual ice volume.

Ice volume is measured by the Polar Science Center.

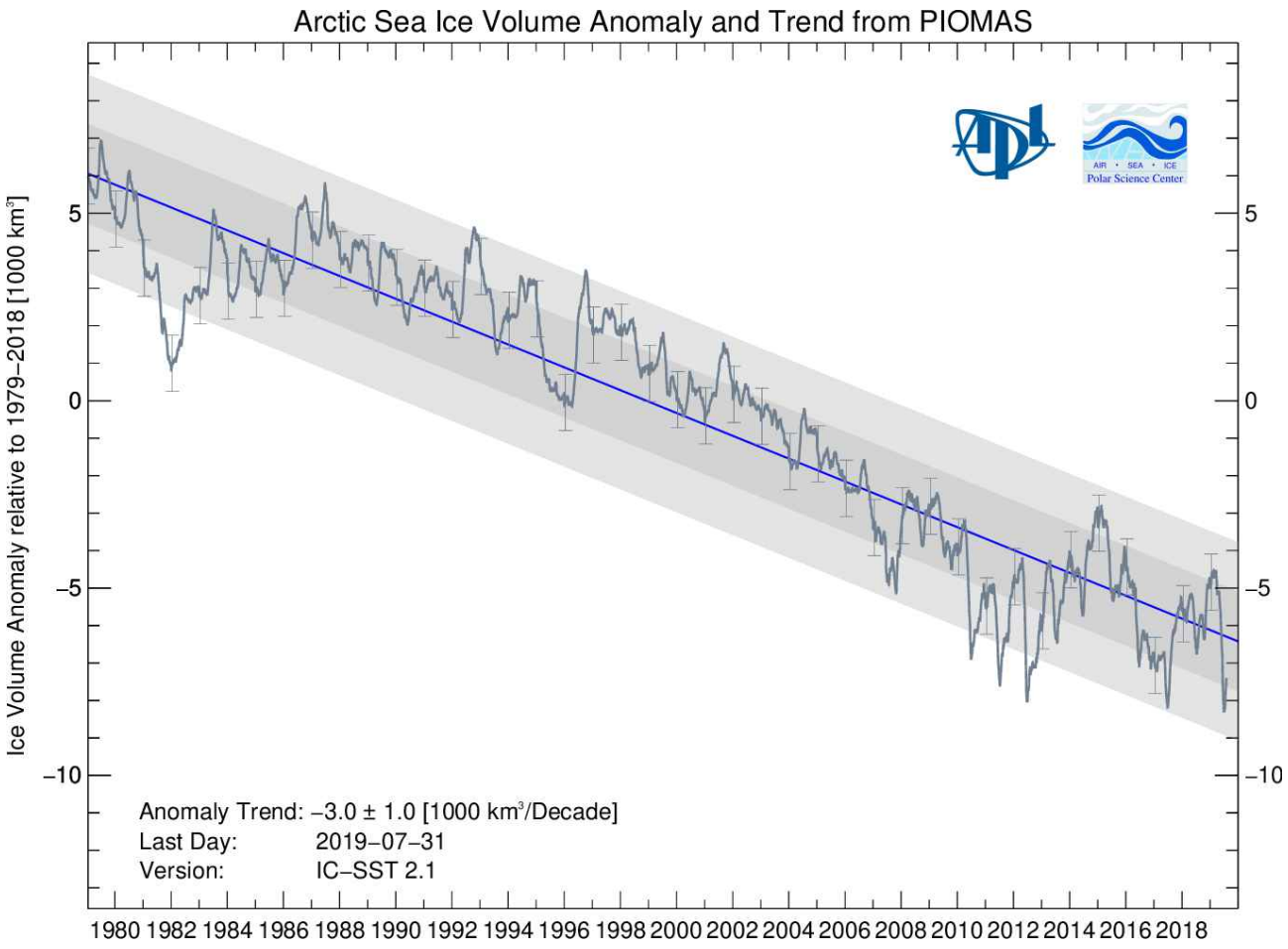
The long-term trend in volume is evident over decades, but with inevitable ups and downs due to natural process.

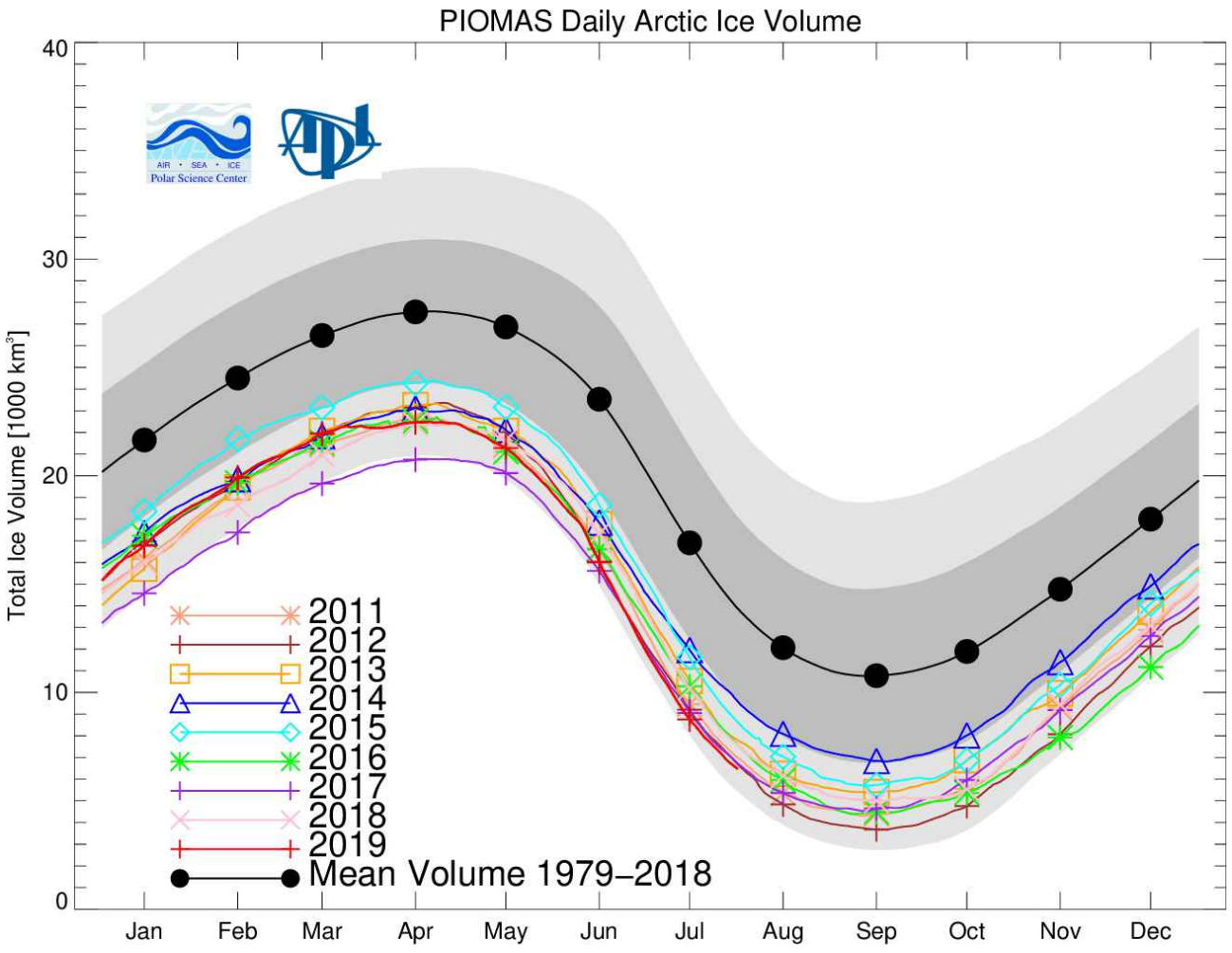
PIOMAS Arctic Sea Ice Volume Reanalysis Sea Ice Volume is calculated using the Pan-Arctic Ice Ocean Modeling and Assimilation System (known as PIOMAS; see Zhang & Rothrock, 2003) developed at APL/PSC.

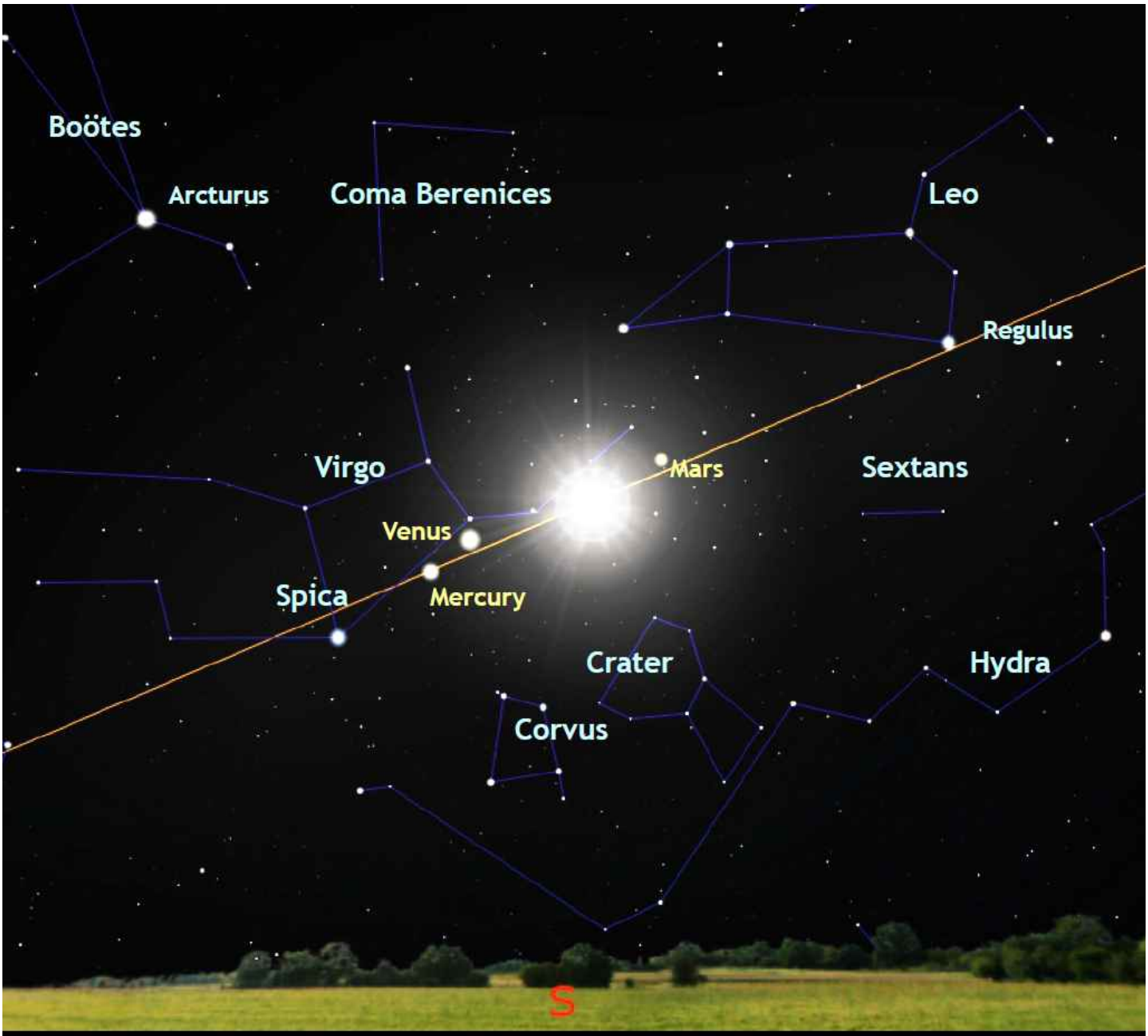
Zhang, J. L. & D. A. Rothrock (2003). Modeling global sea ice with a thickness and enthalpy distribution model in generalized curvilinear coordinates. *Mon. Weather Rev.*131: 845-861.

http://psc.apl.uw.edu/research/projects/arctic-sea-ice-volume-anomaly/

The next page summarises the PIOMAS data. During part of 2019, ice volume was the lowest on record (early July, 2019).

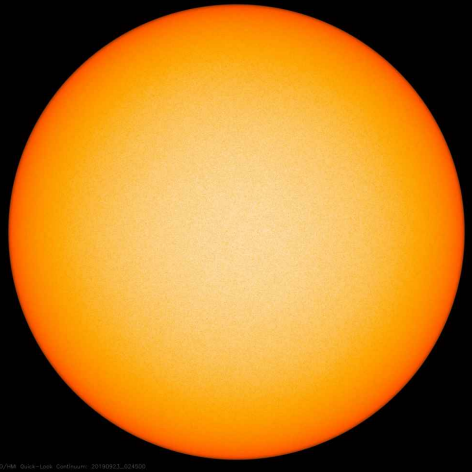

Arctic Sea Ice Volume Anomaly and Trend from PIOMAS
Ice Volume Anomaly relative to 1979–2018 [1000 km³]
5
0
−5
−10
Anomaly Trend: −3.0 ± 1.0 [1000 km³/Decade]
Last Day: 2019−07−31
Version: IC−SST 2.1
1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014 2016 2018


PIOMAS Daily Arctic Ice Volume
Total Ice Volume [1000 km³]
40
30
20
10
0
2011
2012
2013
2014
2015
2016
2017
2018
2019
Mean Volume 1979–2018
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec



Autumn Equinox: September 23, 2019

In the Northern Hemisphere, days have been shortening since the Summer Solstice on June 21 and from September 23, the days became shorter than the nights.



Our adapted *Stellarium* view shows the Sun, planets and stars as would have been visible around mid-day in the absence of the atmosphere. The precise moment of the Equinox was at 7:50 UTC (+GMT).

The Sun lies among the constellations that we would see in the spring sky around midnight. We see the stars Spica (in Virgo) and Regulus (in Leo). Three of the terrestrial planets, Mars, Venus and Mercury lay close to the Sun.

The Sun, **NASA's Solar Dynamics Observatory, (left,)**, as seen appeared devoid of sunspots, on September 23, 2019.

https://sdo.gsfc.nasa.gov/data/

Above: Around 2 pm, GMT, the Sun emerged, from time to time, in widespread clouds. New Ash Green, Kent, England. Below: The Sun had risen at the Amundsen-Scott South Pole Station. Image at 19:50:04 GMT. The 22° arc around the Sun is caused by ice crystals in the atmosphere. https://www.esrl.noaa.gov/gmd/obop/spo/livecamera.html

Update on CO_2.

Atmospheric CO_2, as measured by NOAA (Earth System Research Laboratory Global Monitoring Division), at its Mauna Loa observatory. Hawaii, was last updated on September 5, 2019. The monthly average for August 2019 was 409.95 ppm CO_2 (compared to 406.99 ppm for August 2018).

https://www.esrl.noaa.gov/gmd/ccgg/trends/

Prime Meridian.

Prime Meridian is published by the Ecospheres Project, a research and media collaboration. It follows global environmental issues alongside the cycle of the seasons in South East England. It steps back to look at the Earth in its astronomical context and it pursues the search for other habitable worlds.

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Right: Approaching autumn: red berries of bryony in a hedgerow on the hill at Hartley, Kent. September 21, 2019.