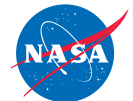


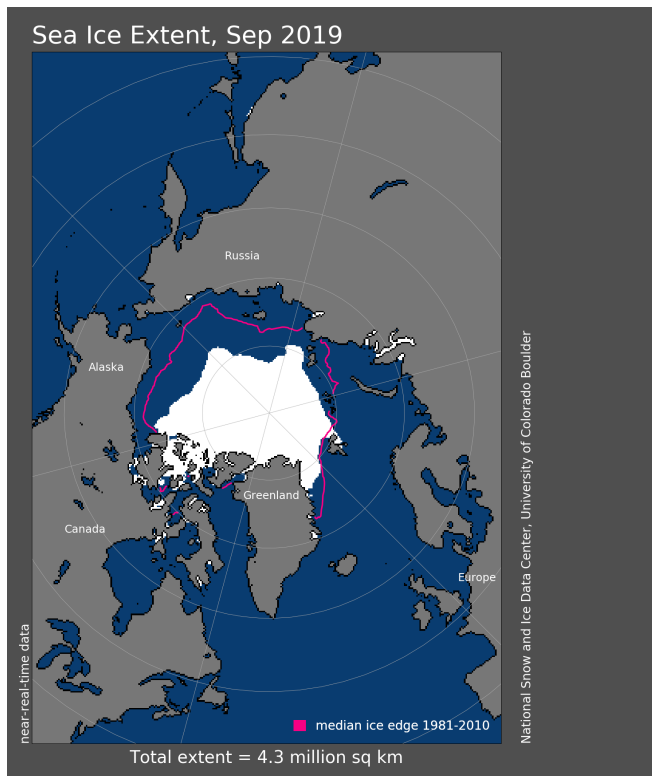


The 2019 Arctic Sea Ice Wrap-Up

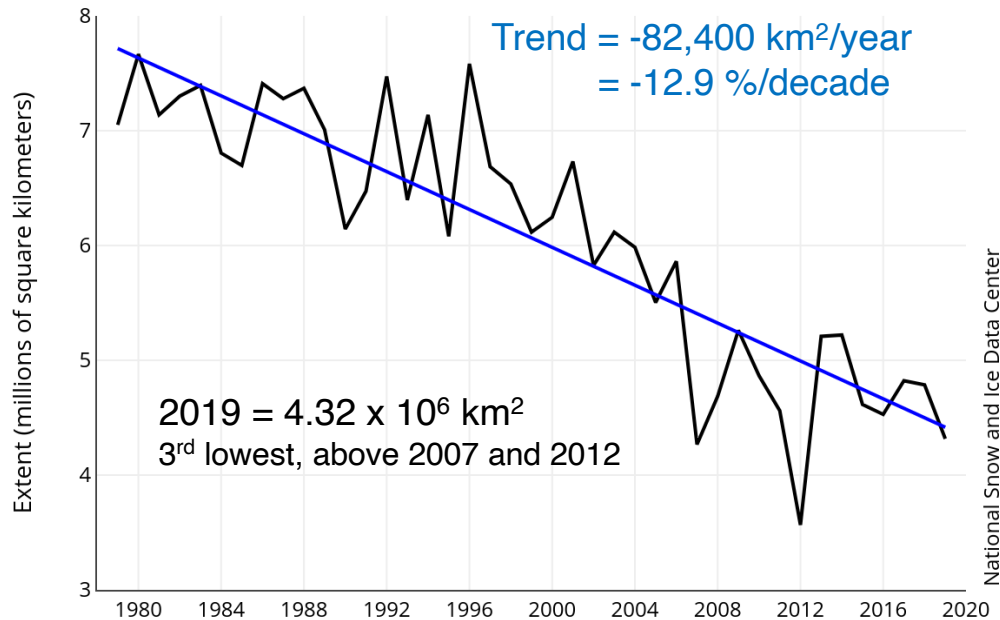
Walt Meier, National Snow and Ice Data Center



September extent

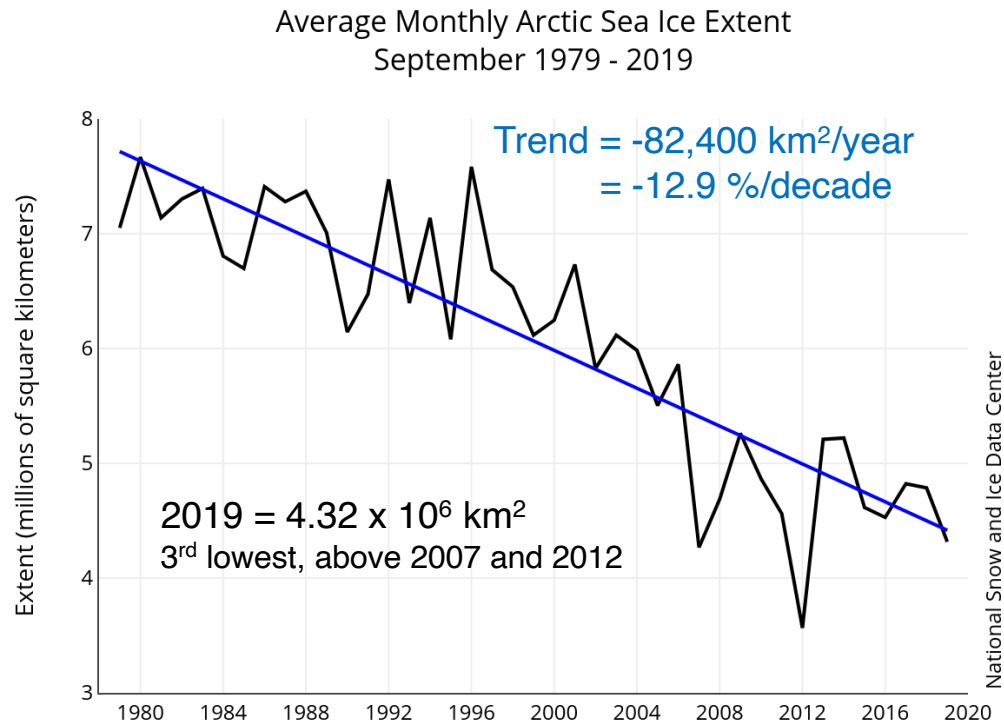
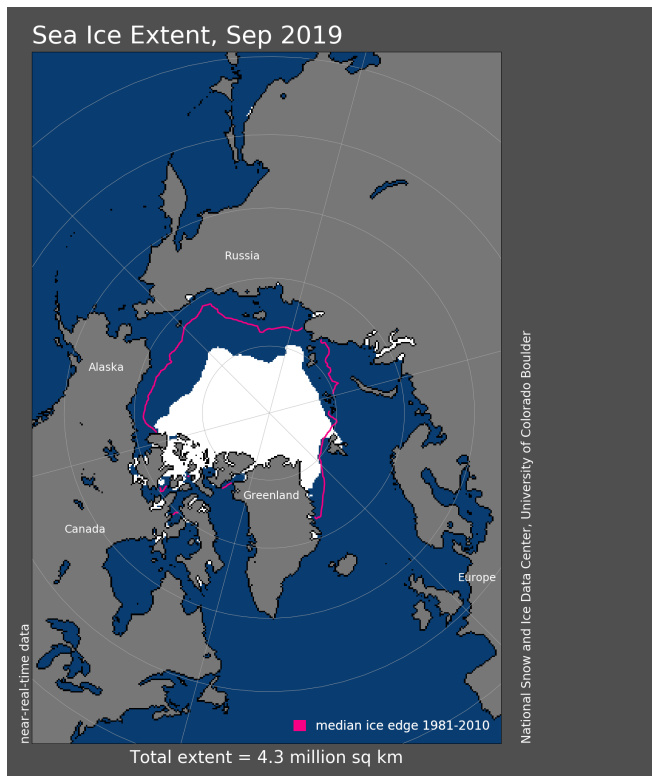


Average Monthly Arctic Sea Ice Extent
September 1979 - 2019



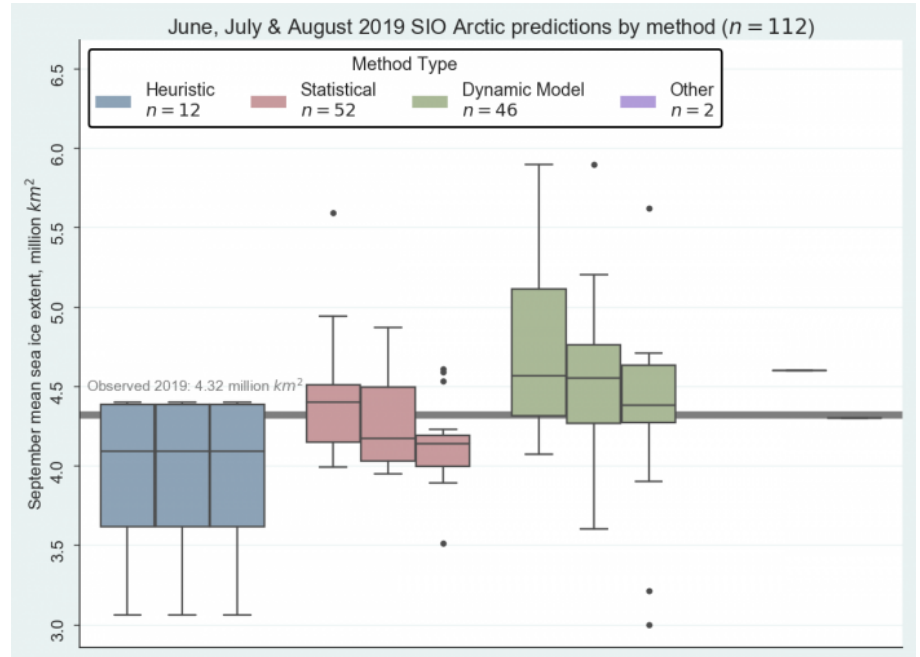
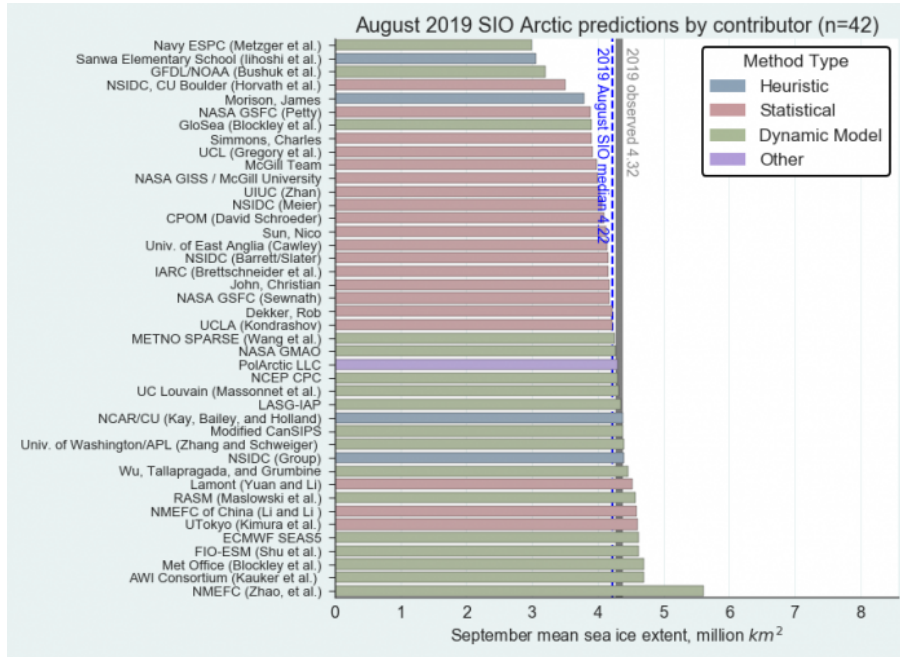
The last 13 years (2007-2019) are the lowest 13 years in the 41-year record

September extent



Trend 2007-2019 = $-1200 \text{ km}^2/\text{year}$

Sea Ice Outlooks

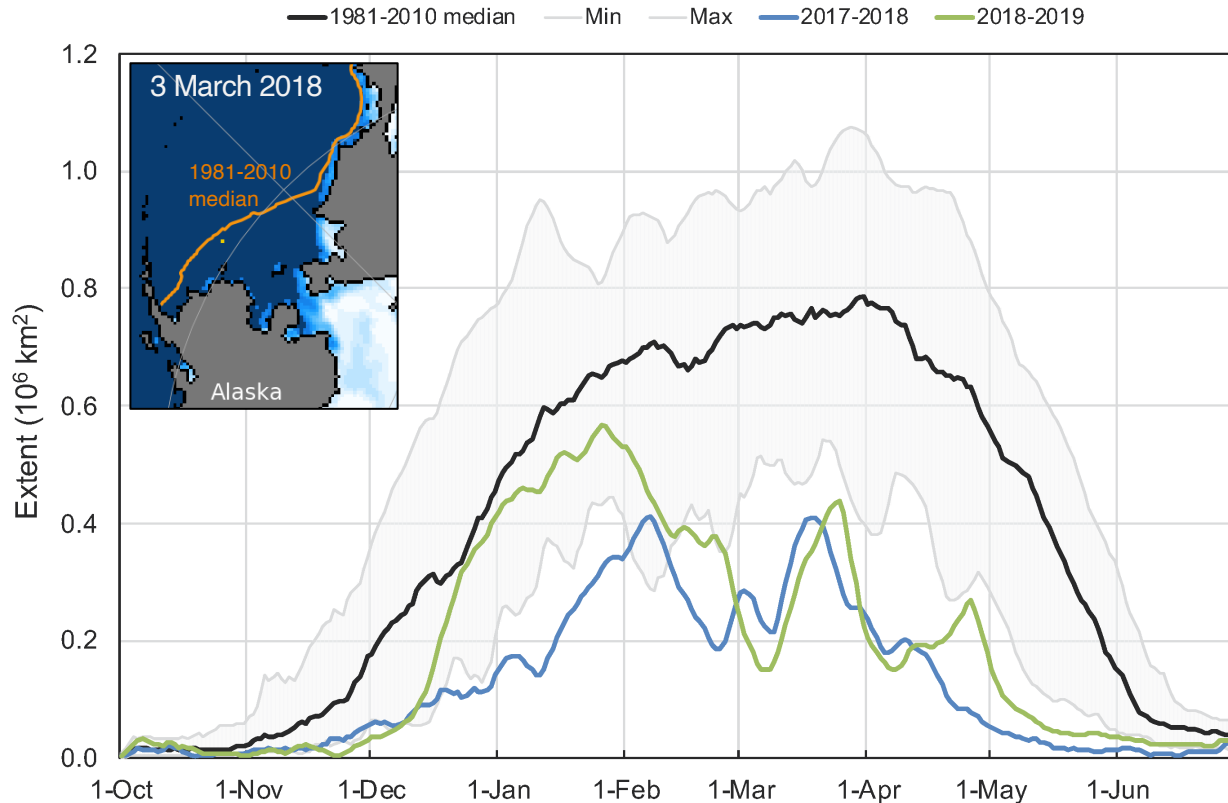


From Sea Ice Outlook Interim Post-Season Report, <https://www.arcus.org/sipn/sea-ice-outlook/2019/interim>

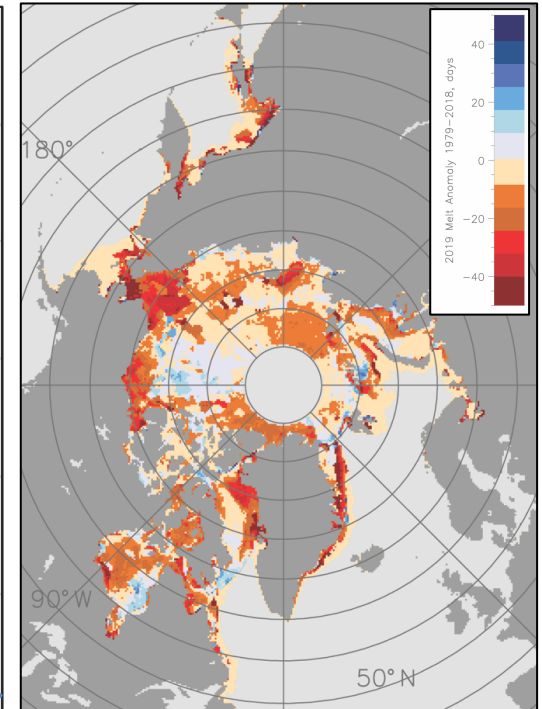


Precursors: low Bering, early melt onset

Bering Sea Ice Extent



Melt onset date anomaly

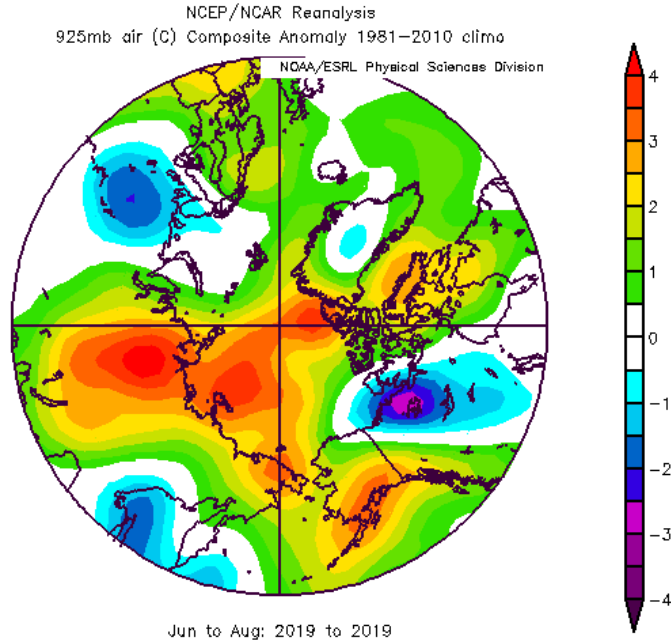


Melt onset data courtesy J. Miller, NASA Goddard; image by J. Stroeve, NSIDC/UCL/UManitoba

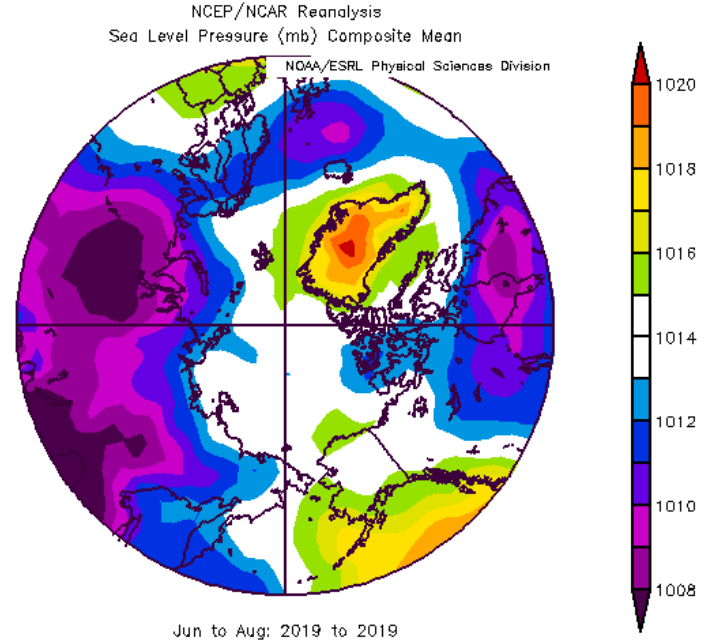


Warm temperatures, SLP meh?

925 mb air temperature anomaly



Sea level pressure



June – August average

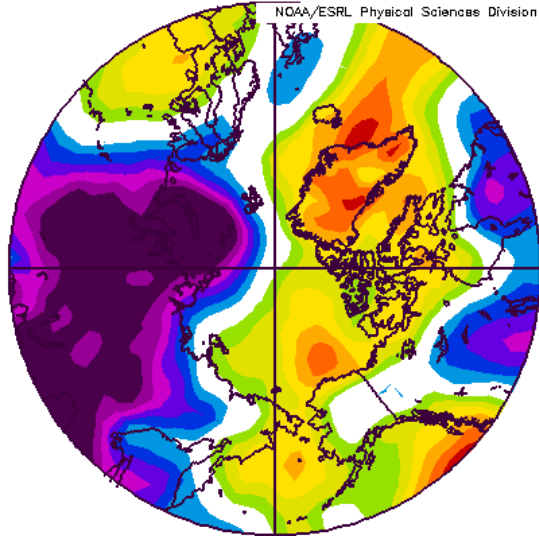
Decompression: summer sea level pressure

June

July

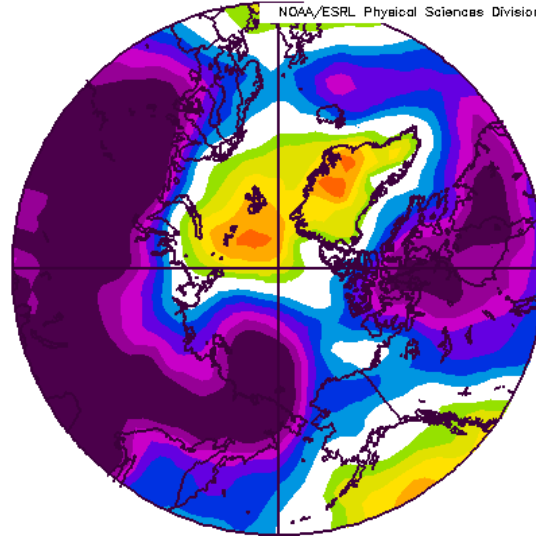
August

NCEP/NCAR Reanalysis
Sea Level Pressure (mb) Composite Mean



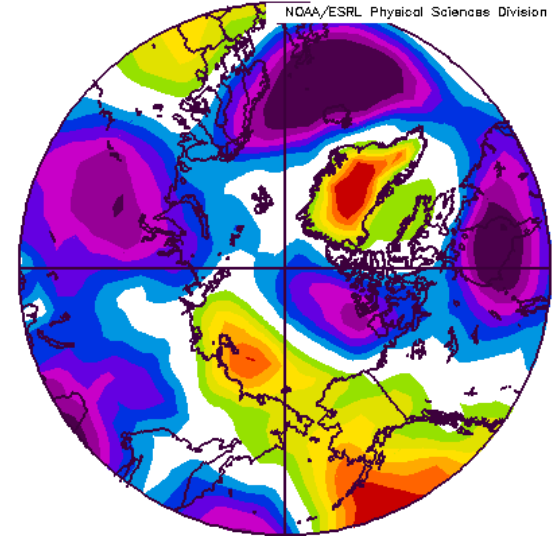
Jun: 2019 to 2019

NCEP/NCAR Reanalysis
Sea Level Pressure (mb) Composite Mean

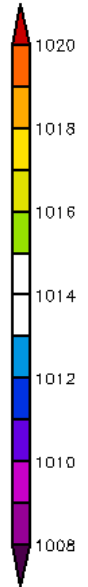


Jul: 2019 to 2019

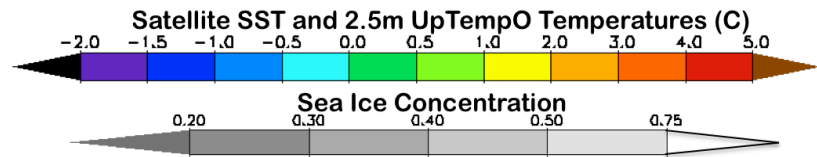
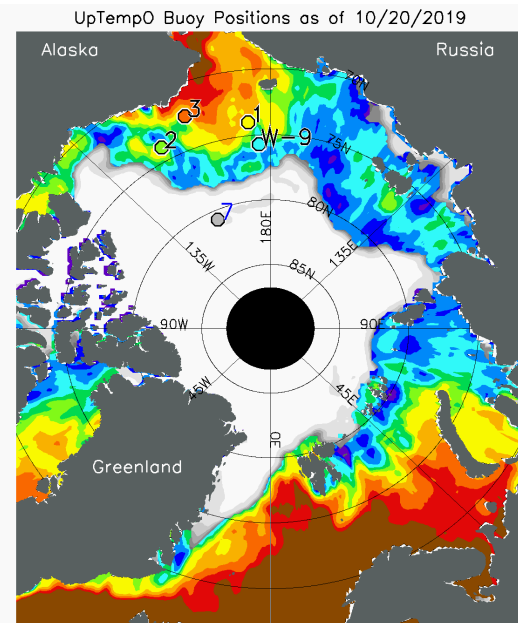
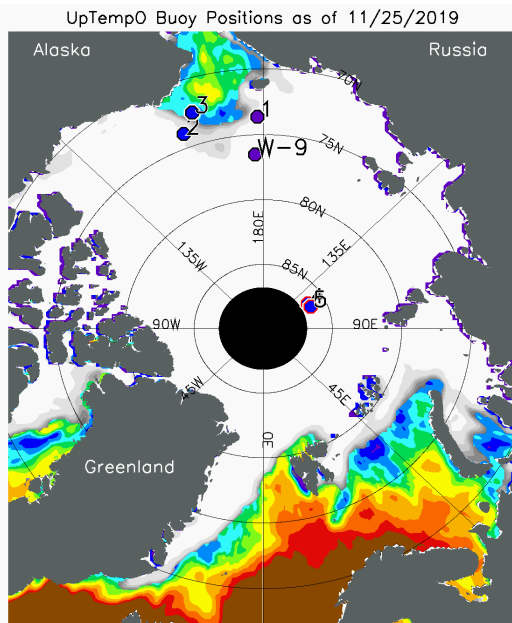
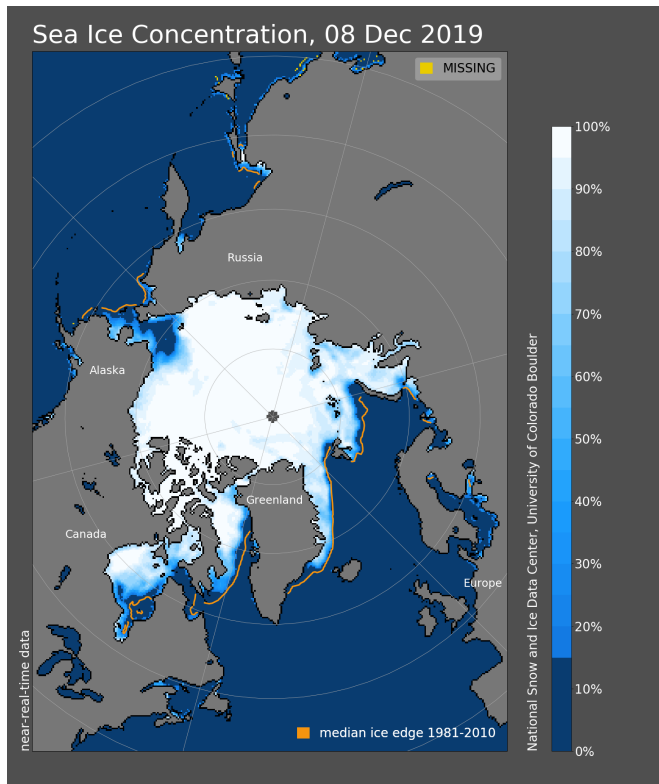
NCEP/NCAR Reanalysis
Sea Level Pressure (mb) Composite Mean



Aug: 2019 to 2019



The heat is on in the Chukchi (in the ocean)



Images from UpTempO
SST data from NOAA OISST
<http://psc.apl.washington.edu/UpTempO/>

Conclusion

- 2019 summer season typical of recent years
 - Early melt onset
 - Warm ocean (especially in the Chukchi) and air temperatures
 - No “perfect storm” of conditions as in 2012
- 2006/2007 seems be a step-change transition – Why?
 - Loss of old ice, thinning likely culprit – 2007 strong advection
 - Will there be another step-change? When?