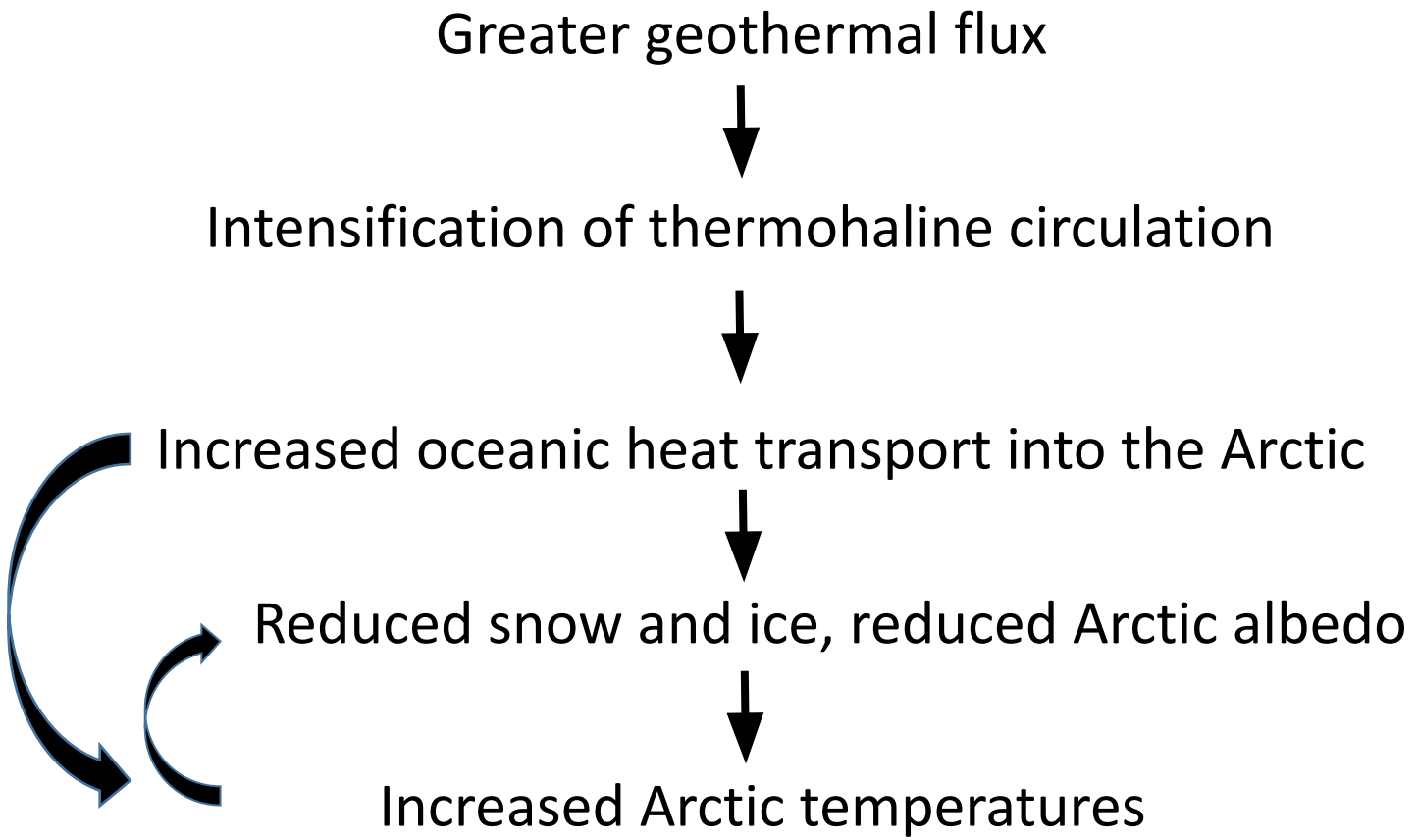
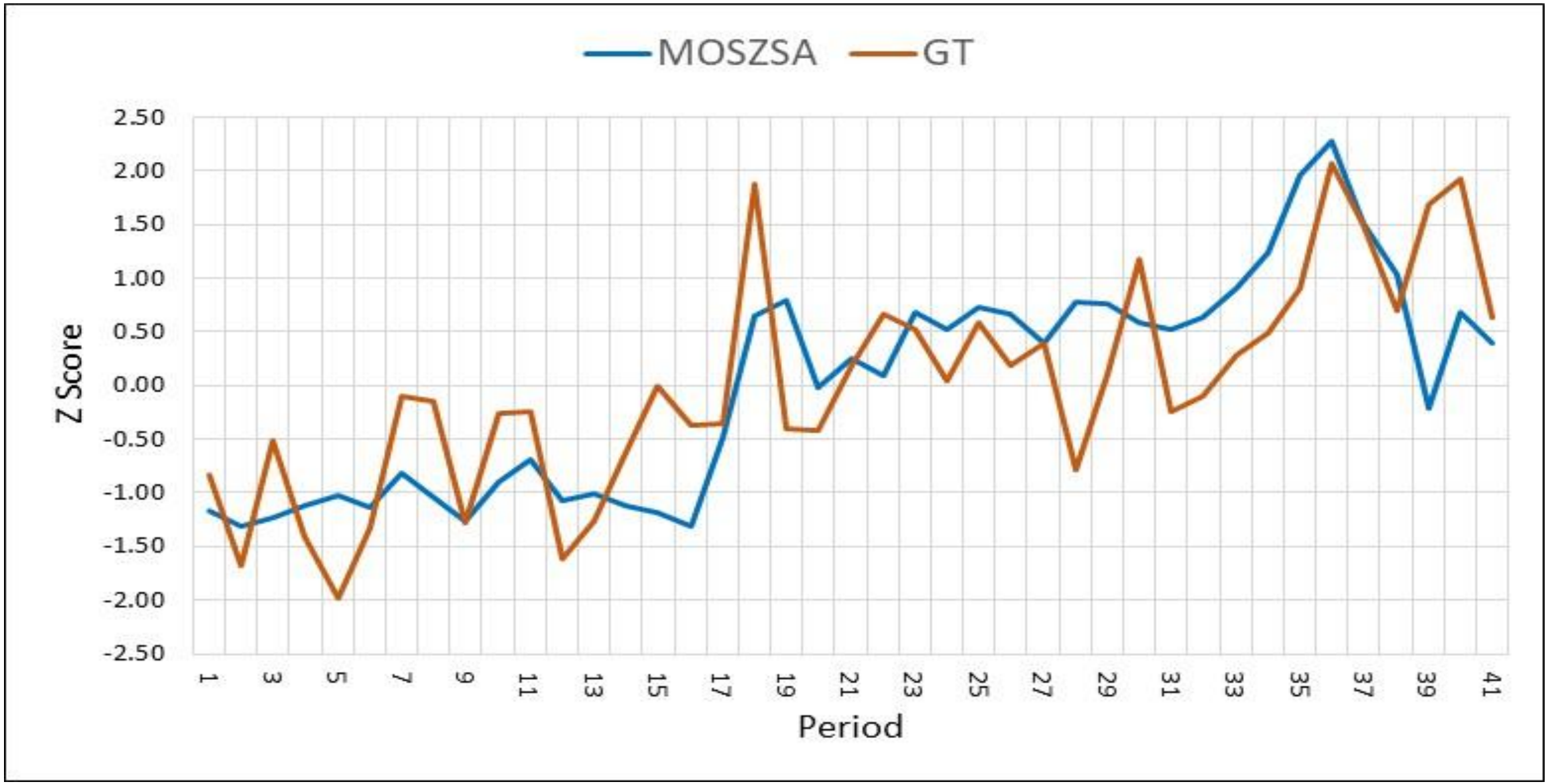
“1995: An Important Inflection Point in Recent Geophysical History”

- The paper builds upon previous research I have done linking changes in underwater seismic activity and global temperatures
- In a 2016 paper titled The Correlation of Seismic Activity and recent Global warming, I established the link between the seismic activity along the mid-ocean ridges and global temperatures. Rationale: More earthquakes = more geothermal heat release.
- Well established in the literature that geothermal heating of ocean bottom intensifies the thermohaline circulation.
- Net effect is to transport more heat into the Arctic. Transporting more heat into the Arctic kicks off a sequence of events that amplify warming in the Arctic.
- That cascading of effects leads us to conclude that much of the recent warming is caused by this thermohaline intensification.
- The sudden jump in temperatures occurred in 1997, 2 years after there was a corresponding jump in mid ocean seismic activity.
- We tie in the 1995 jump in mid ocean seismic activity with a number of other geophysical processes.

In 2016, I hypothesized that increased geothermal heat from the Mid-Ocean Spreading Zones would cause a concomitant rise in global temperatures. The mechanism for this is as follows: Increased geothermal flux from the Mid-Ocean Spreading Zones destabilizes the bottom waters, causing the ocean's overturning (i.e., thermohaline) circulation to intensify, transporting more heat into the Arctic. This would, in turn, increase melting of snow and ice, lowering the Arctic's albedo, and trigger a positive feedback known as the "Arctic Amplification." Here is a flowchart of that process:



Recent temperature changes match up well with changes in Mid-Ocean seismic activity, a proxy for geothermal heat release.

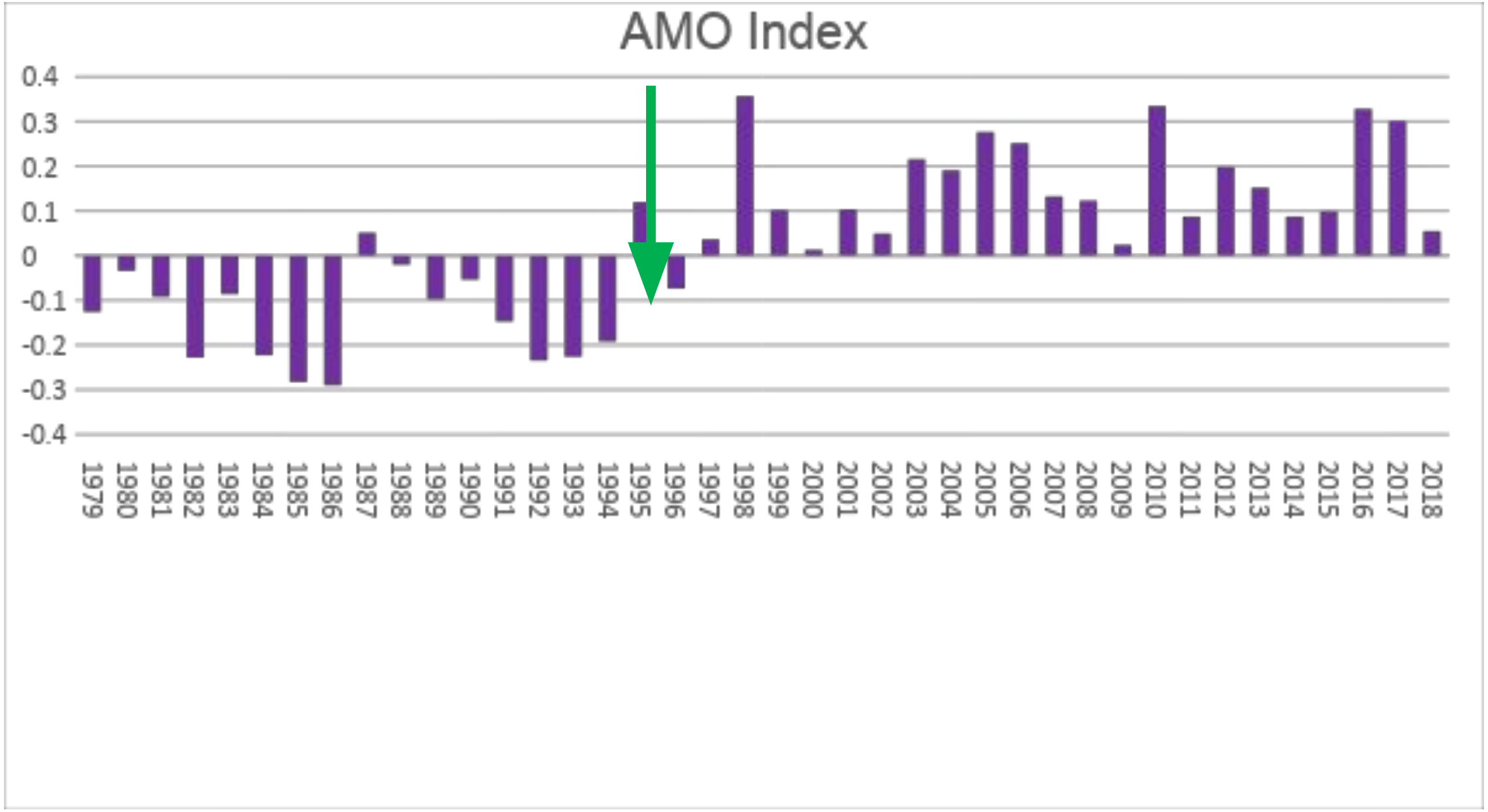


A review of the literature from a variety of geophysical specialties, to include seismology, marine geology, oceanography, climatology, glaciology, and geodesy, reveals that a number of geophysical systems saw significant change commencing in 1995

The documented shifts in the earth-atmosphere system include

a) An abrupt increase in mid-ocean seismic activity.
b) b) A lagged (two-year) increase in global temperatures.
c) c) A rapid shift of the AMO from negative to positive.
d) d) A punctuated increase in North Atlantic hurricanes and North Atlantic ACE.
e) e) A significant change in the dynamics and variability of the NHSM and the El Niño/Southern Oscillation.
f) f) A rapid strengthening of the AMOC.
g) g) Sudden changes in the spring and fall Arctic temperatures, followed by a large jump in winter temperatures.
h) h) Sharp sea ice declines in the Arctic and sub-Arctic.
i) i) Accelerated ice loss for the Greenland Ice Sheet.
j) j) An abrupt decline in cloud cover over Greenland during the summer months.
k) k) Sudden changes in the rate of movement of the northern dip pole.
l) l) Rapid directional drift in the earth's geographic ("true") North Pole

an increase in MOSZSA in 1995 was indicative of greater geothermal flux along the globe's mid-ocean spreading zones. This heightened flux intensified the thermohaline circulation, resulting in ATL and a strengthening of the AMOC. This gave rise to higher Arctic and North Atlantic SST. These higher SST were expressed as a shift of the AMO from a negative to a positive phase, creating an environment that was conducive to an increased frequency of North Atlantic hurricanes, a significant jump in ACE, stronger monsoons, and amplified El Niño episodes. These changes initiated a diminution of Arctic Sea ice, reduced cloud cover in the Greenland sector, and rising Arctic temperatures in the fall, spring and winter seasons.


AMO Index
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
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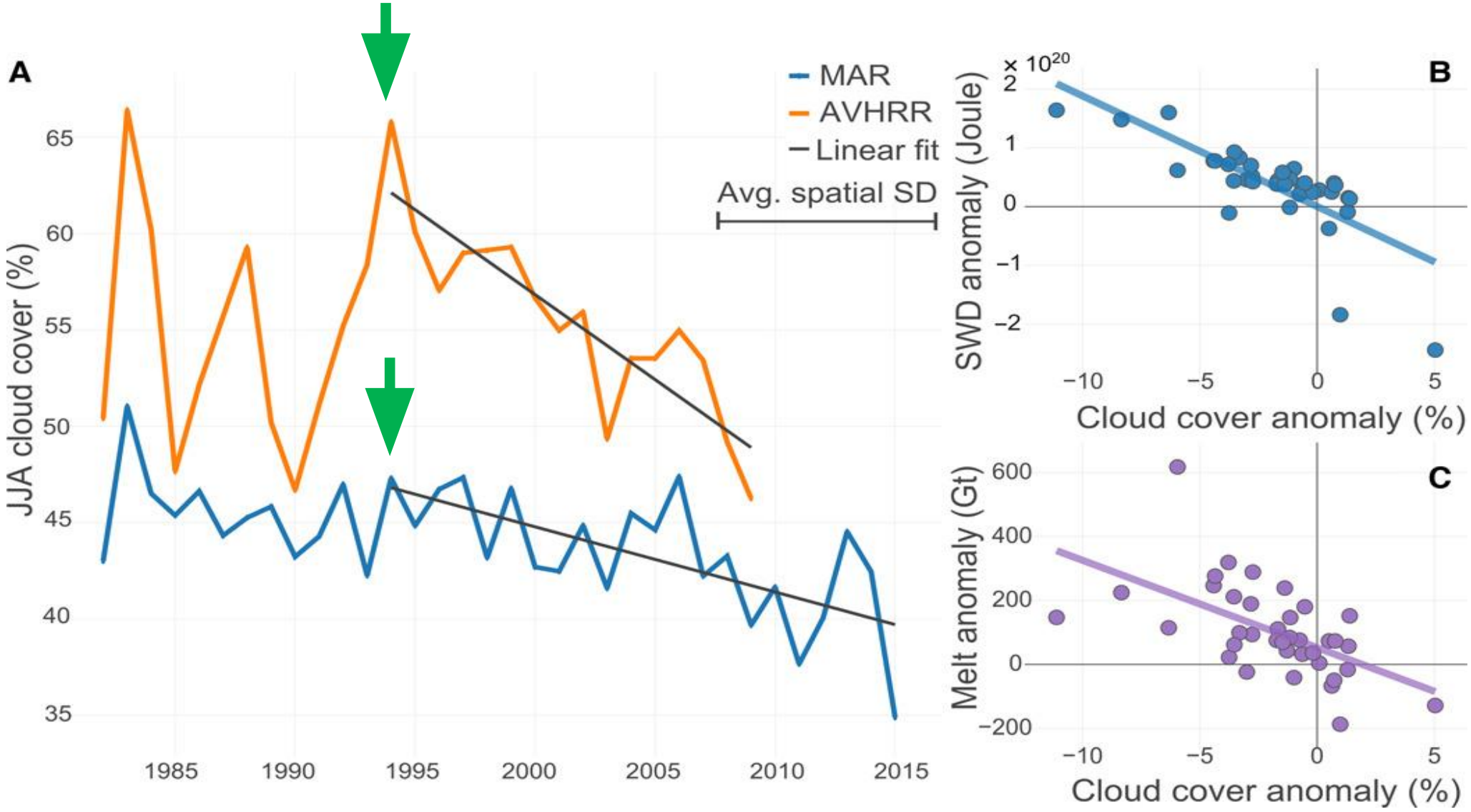
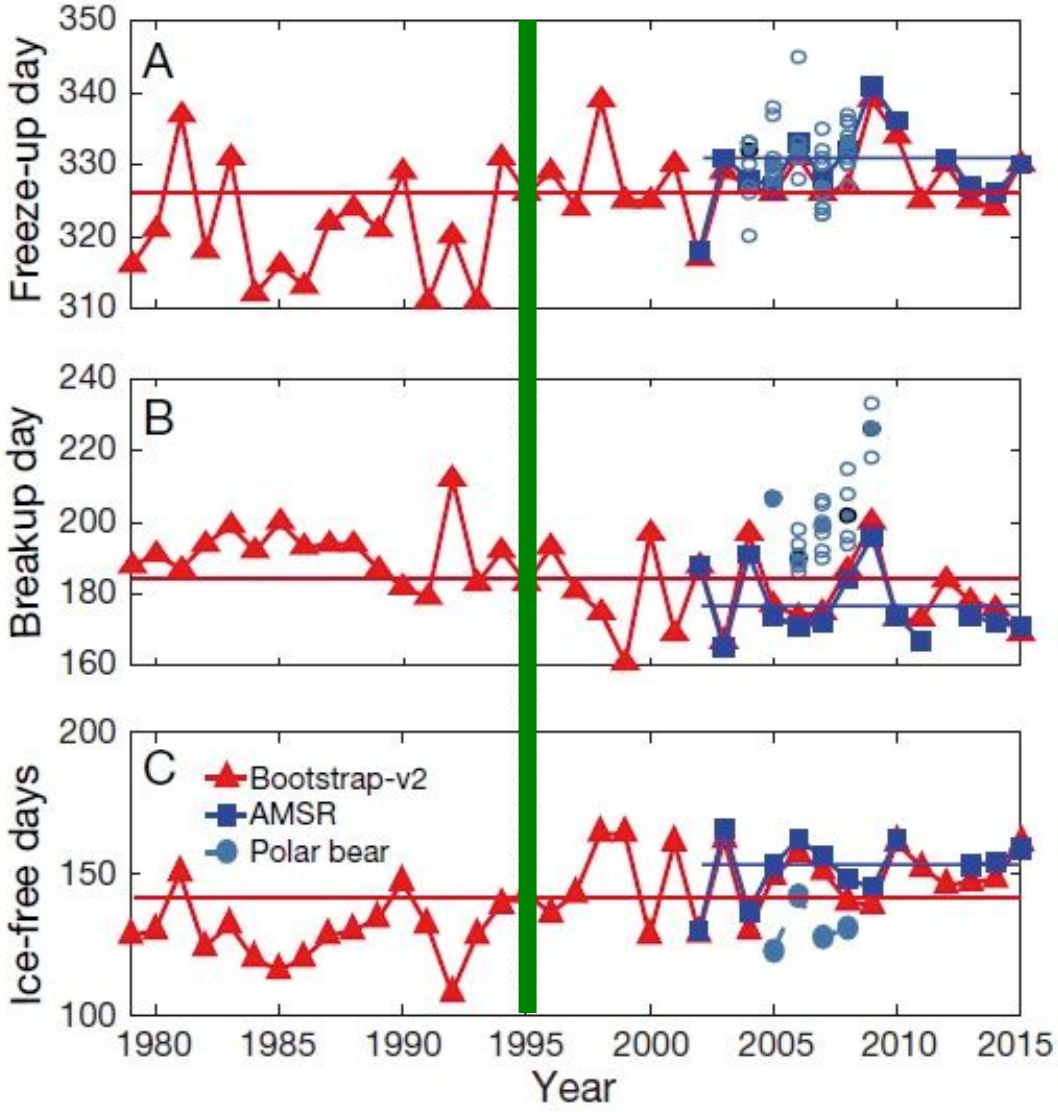
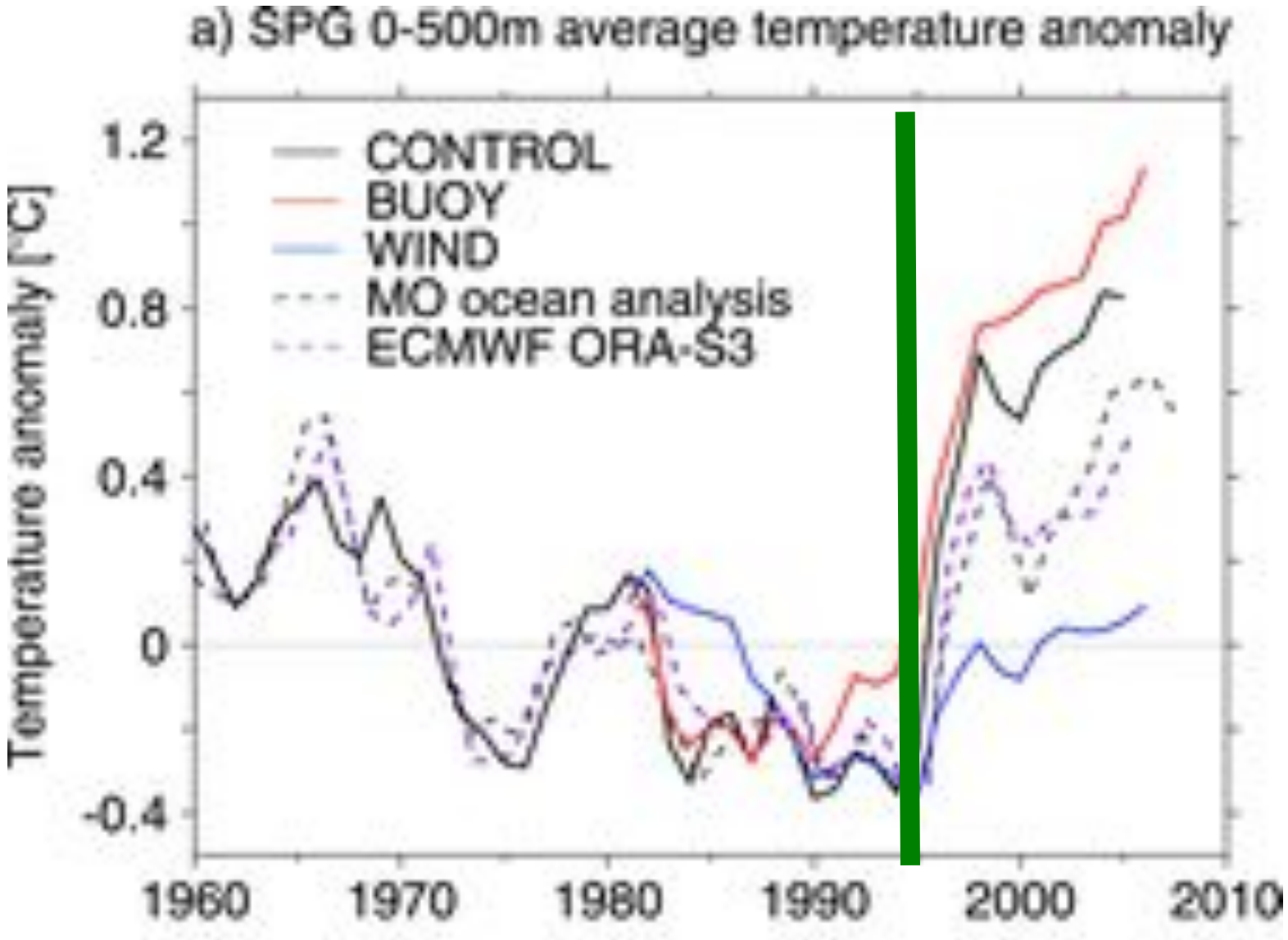


Decreasing cloud cover drives the recent mass loss on the Greenland Ice Sheet
Stefan Hofer1,*, Andrew J. Tedstone1, Xavier Fettweis2 and Jonathan L. Bamber1
Science Advances 28 Jun 2017: Vol. 3, no. 6, e1700584 DOI: 10.1126/sciadv.1700584

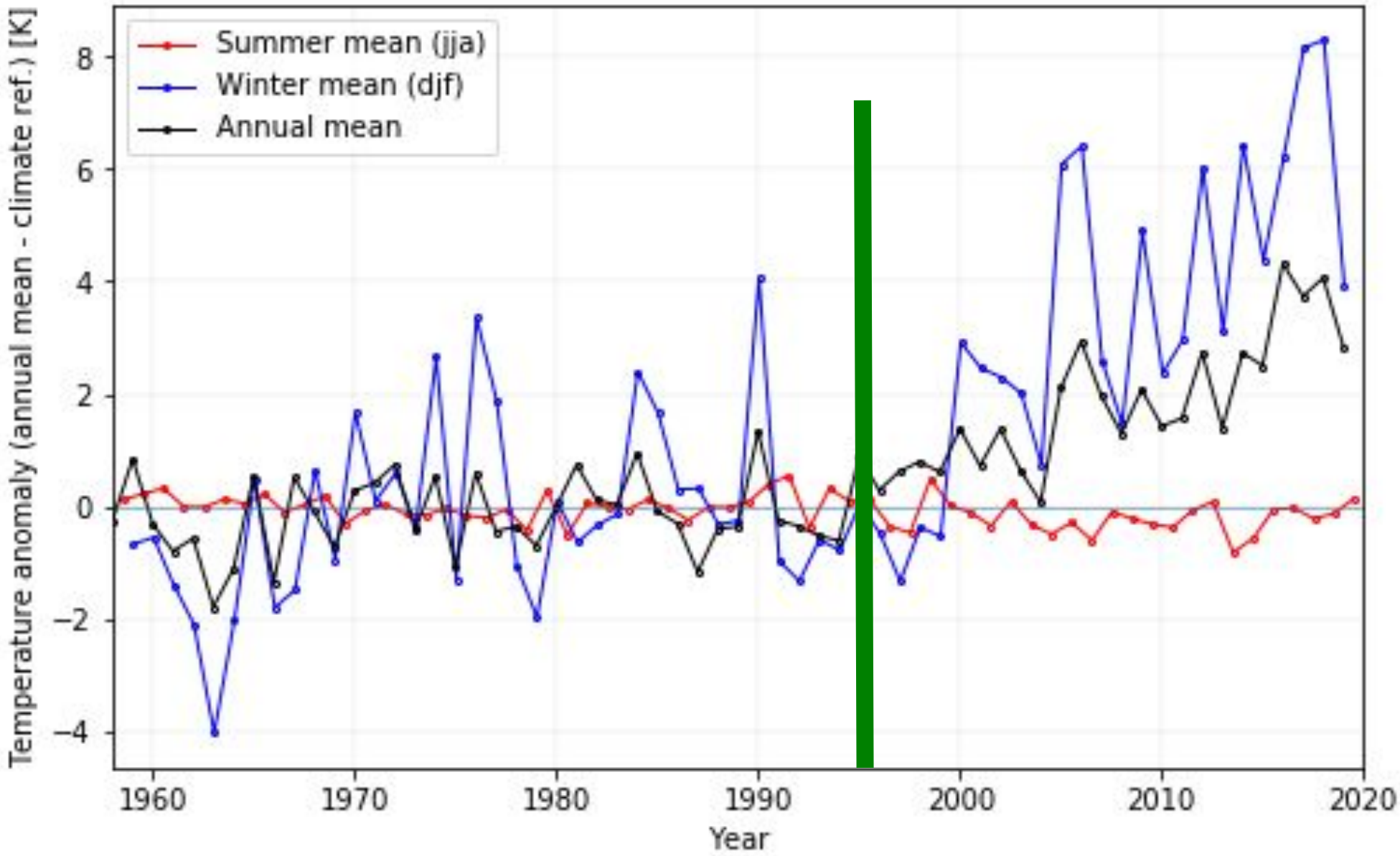
Figure 3 from Castro de la Guardia (2017) showing freeze-up and breakup dates and ice-free days 1979–2015 for Western Hudson Bay, showing that the earliest freeze-up dates since 1979 (top panel) came on 6 November, Day 310 (in 1991 and 1993).



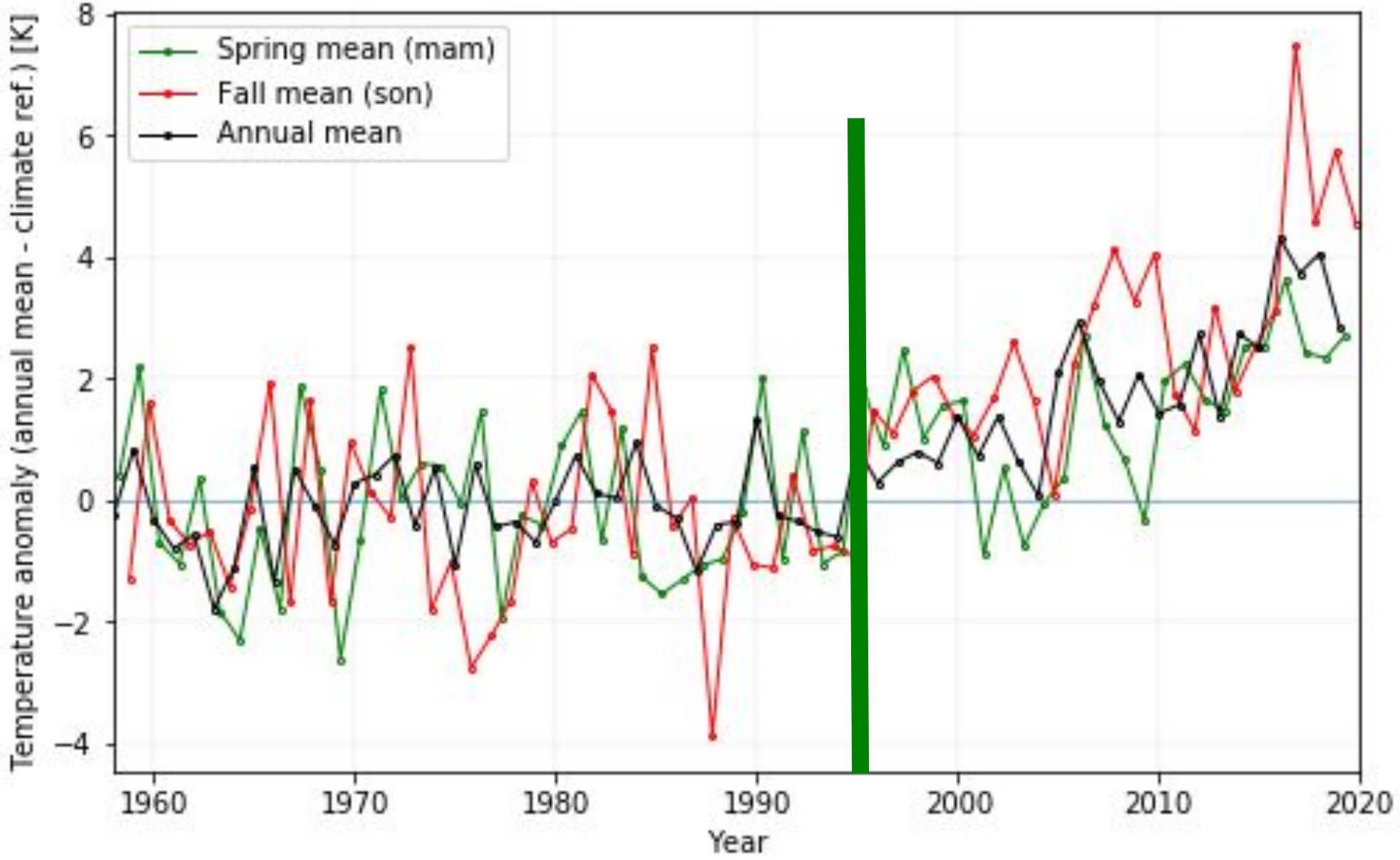
https://climatechangedispatch.com/wh-freeze-up-earlier-1980-average/

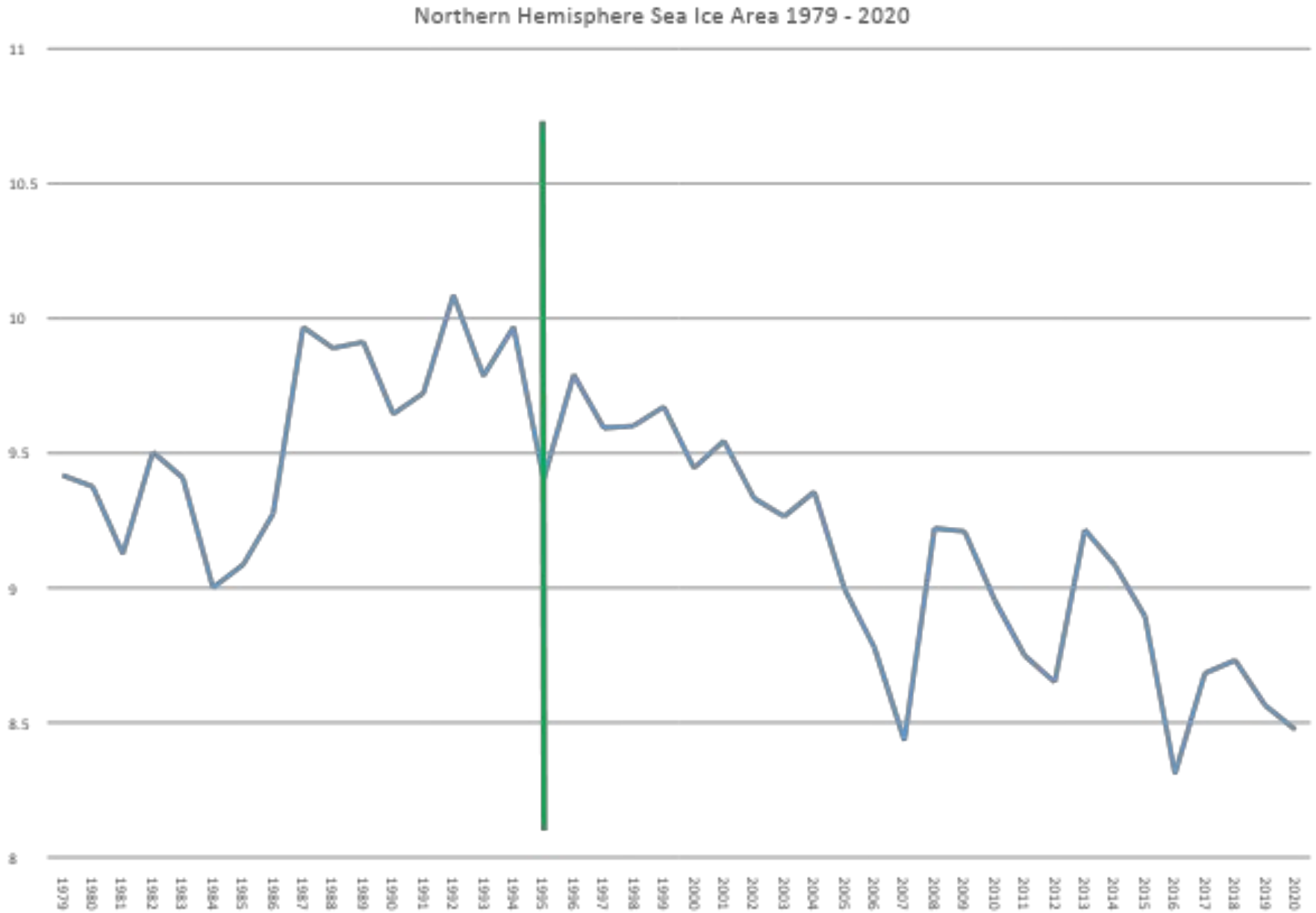

a) SPG 0-500m average temperature anomaly
Temperature anomaly [°C]
1.2
0.8
0.4
0
-0.4
1960
1970
1980
1990
2000
2010
CONTROL
BUOY
WIND
MO ocean analysis
ECMWF ORA-S3

Arctic Temperatures



Arctic Temperatures




Northern Hemisphere Sea Ice Area 1979 - 2020
11
10.5
10
9.5
9
8.5
8
1979
1980
1981
1982
1983
1984
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1986
1987
1988
1989
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2014
2015
2016
2017
2018
2019
2020

We must

- Continue to verify the linkages between mid ocean seismic activity and global temps
- Build more data on ocean temps at depth (ARGO)
- Begin to establish numericalrelationships between mid ocean activity and
  - Thermohaline strength
  - Snow and ice dynamics
  - Monsoon and El Nino dynamics
  - Hurricane frequencies and strengths
  - Cloud cover, particularly in the Arctic\

  Continue to monitor CO@ levels and do head to head comparisons between all of these drivers.