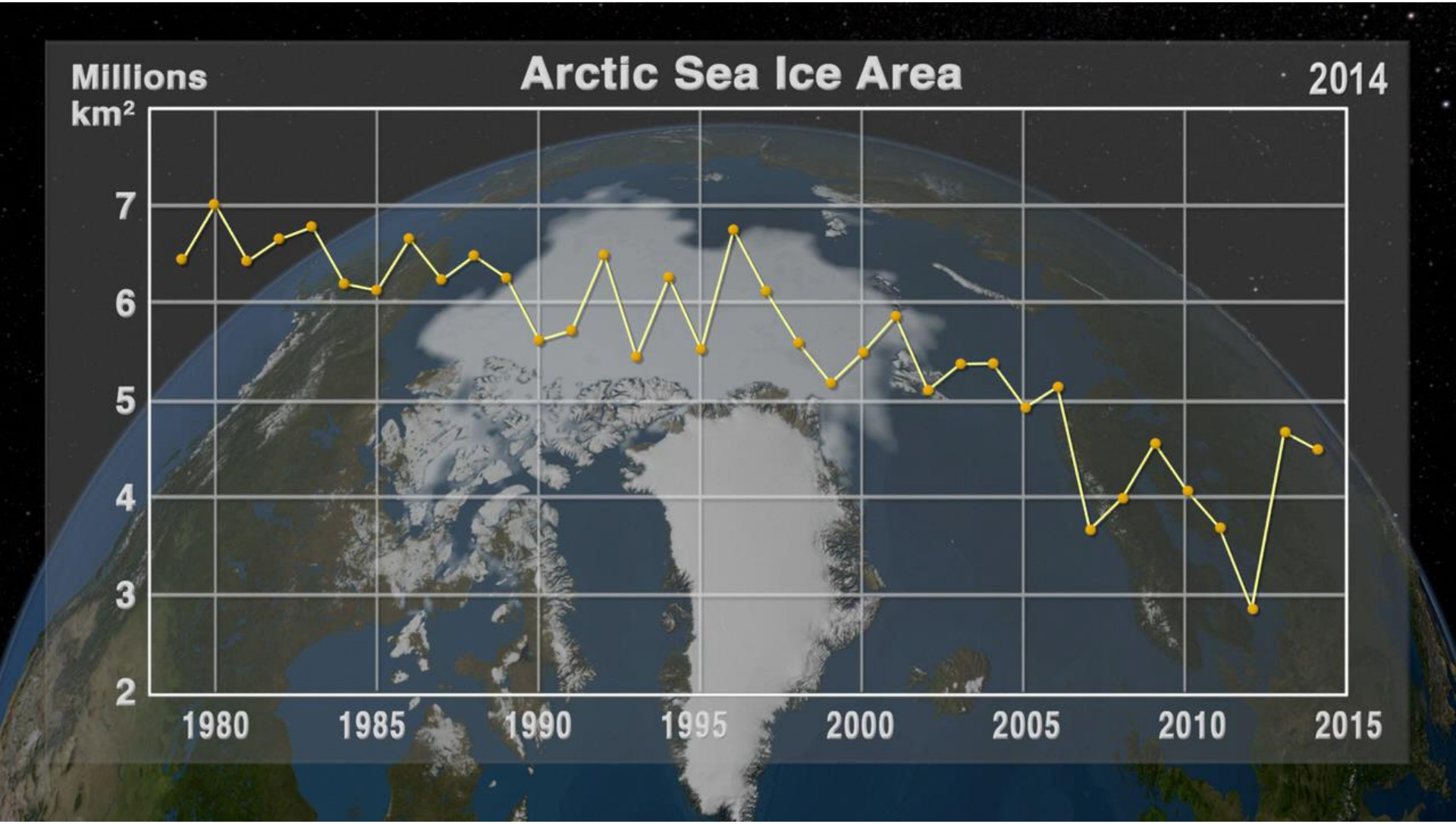
The changing Arctic sea ice cover: Regional and seasonal aspects

Ingrid H. Onarheim
Tor Eldevik and Lars H. Smedsrud

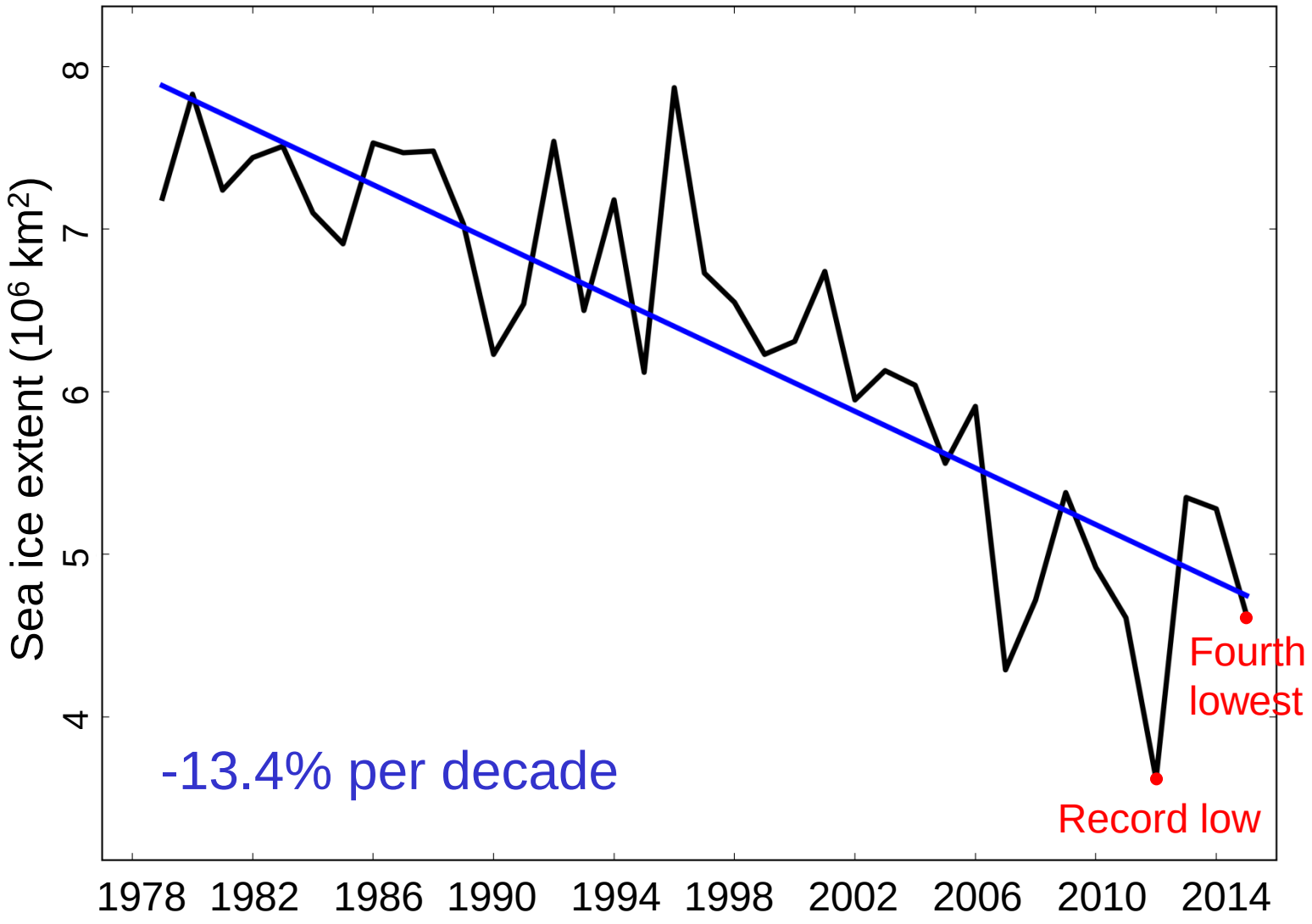
September Arctic sea ice area



Bjerknes Centre for Climate Research

http://svs.gsfc.nasa.gov/cgi-bin/details.cgi?aid=4301

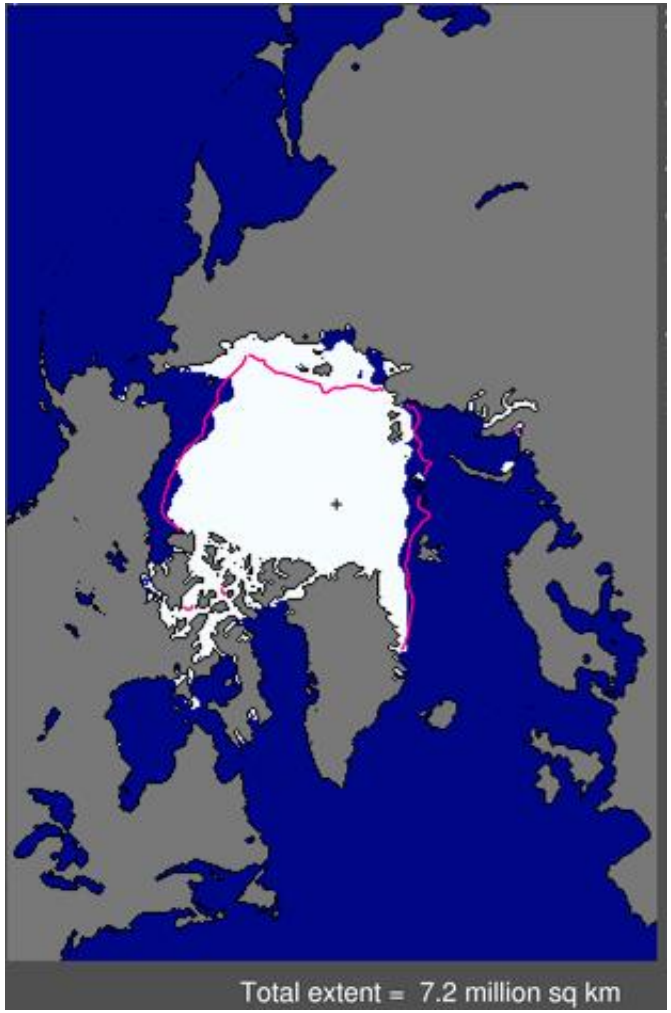
September Arctic sea ice extent



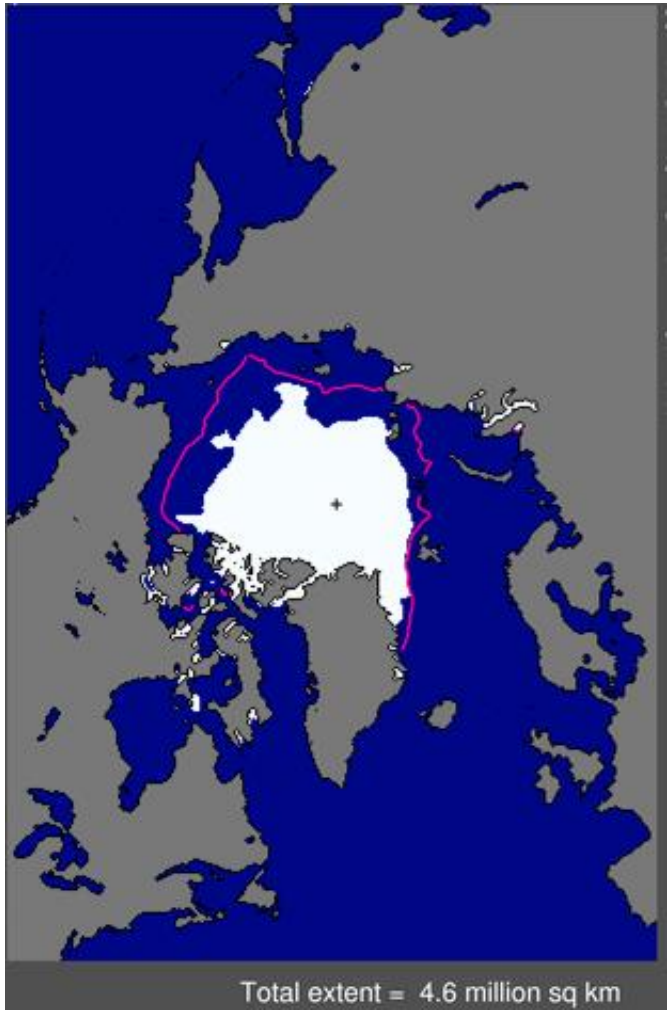
NSIDC

September sea ice extent

1979

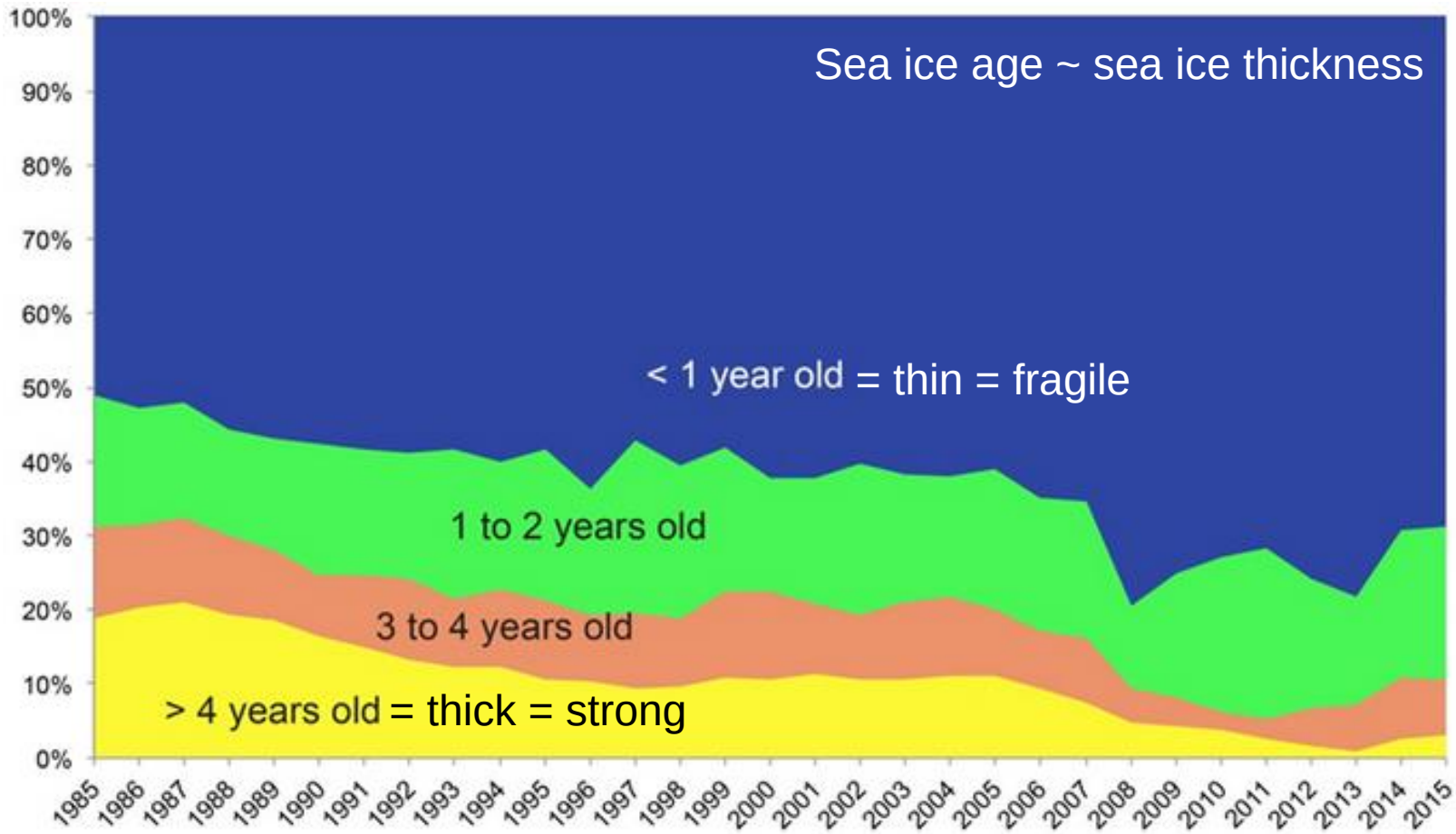


2015



Thinner sea ice cover

Old ice = thick ice = strong
Young ice = thin ice = fragile



Bjerknes Centre for Climate Research

http://www.arctic.noaa.gov/reportcard/sea_ice.html

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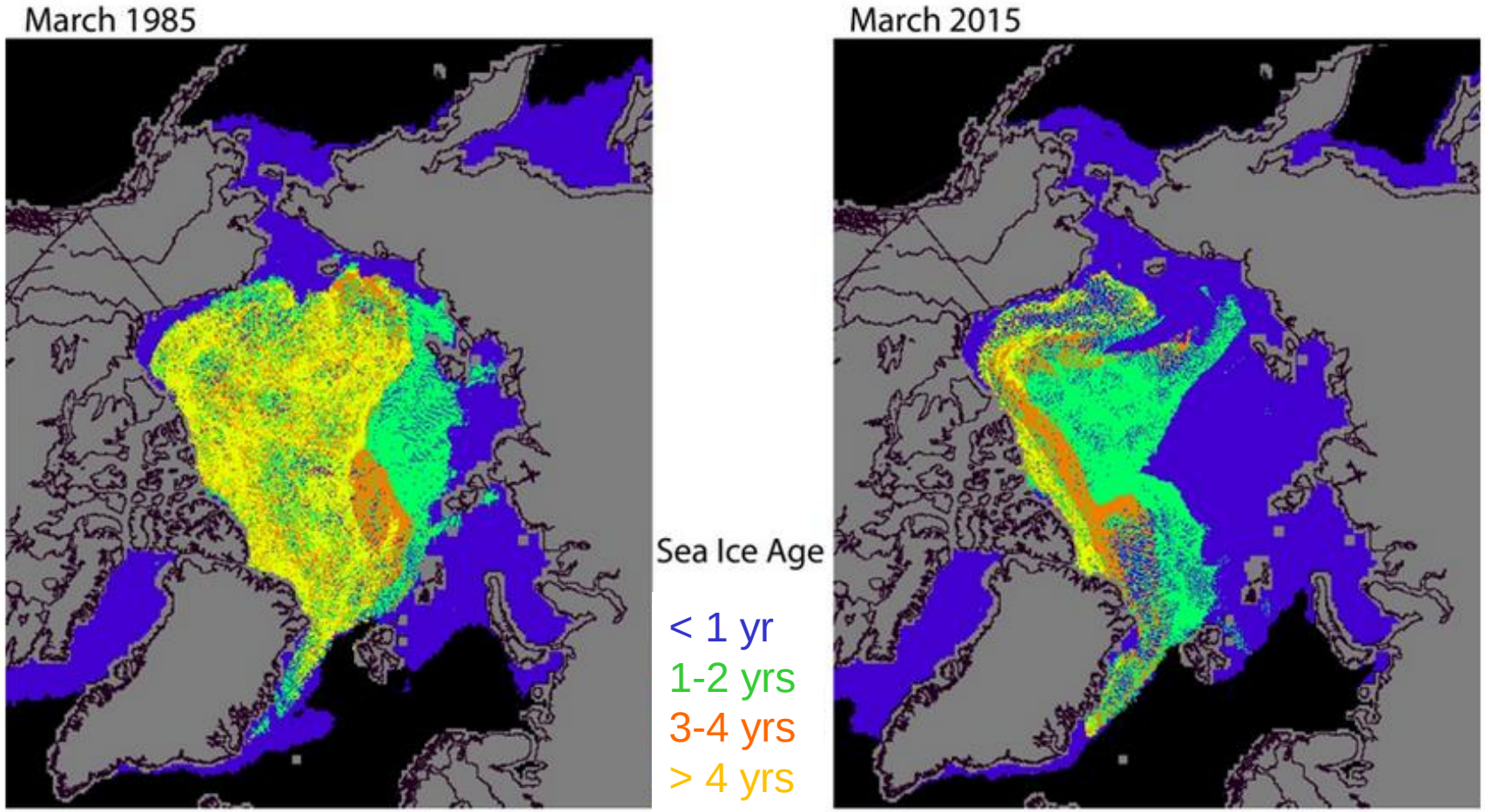

http://www.arctic.noaa.gov/reportcard/sea_ice.html

Barents Observer

2014

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Arctic by 2020

eport

THE DAILY CALLER NEWS FOUNDATION

2015

NOAA Says The Arctic Will Be 'Ice-Free' In 25 Years

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The End of the Arctic? Ocea

Free by 2015

SCIENCE ENERGY POLI

s could be nearly ice

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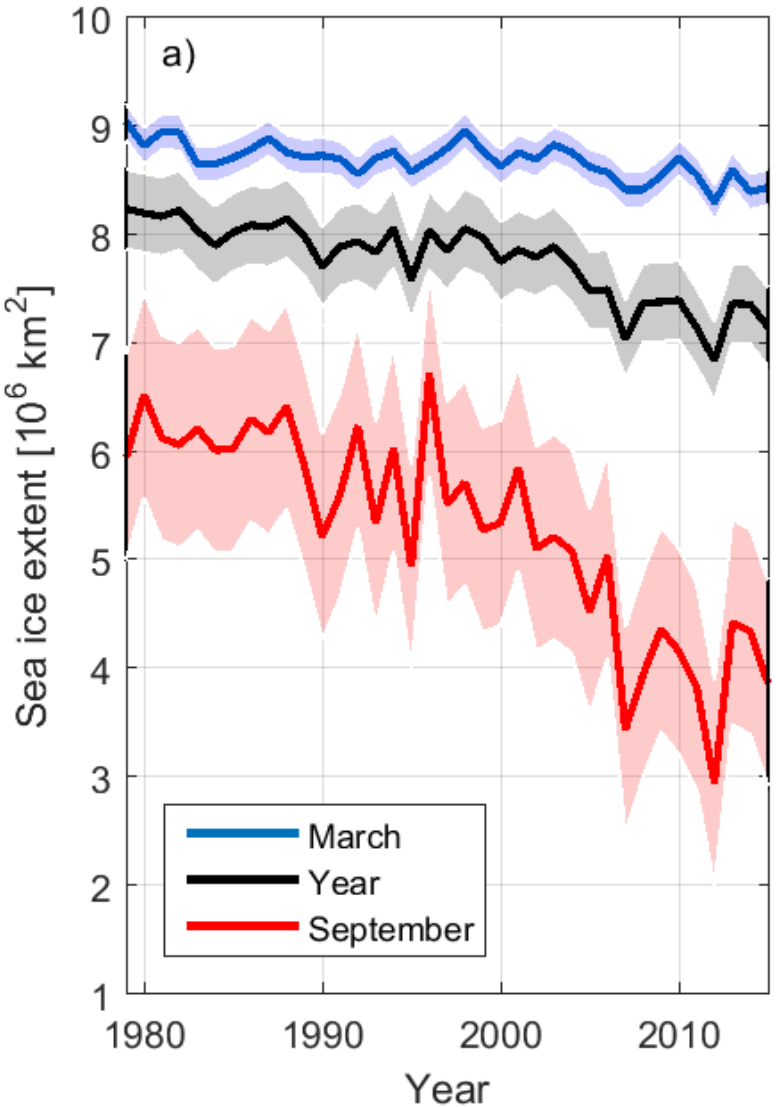
Arctic Sea Ice May Completely Disappear in Our Lifetime

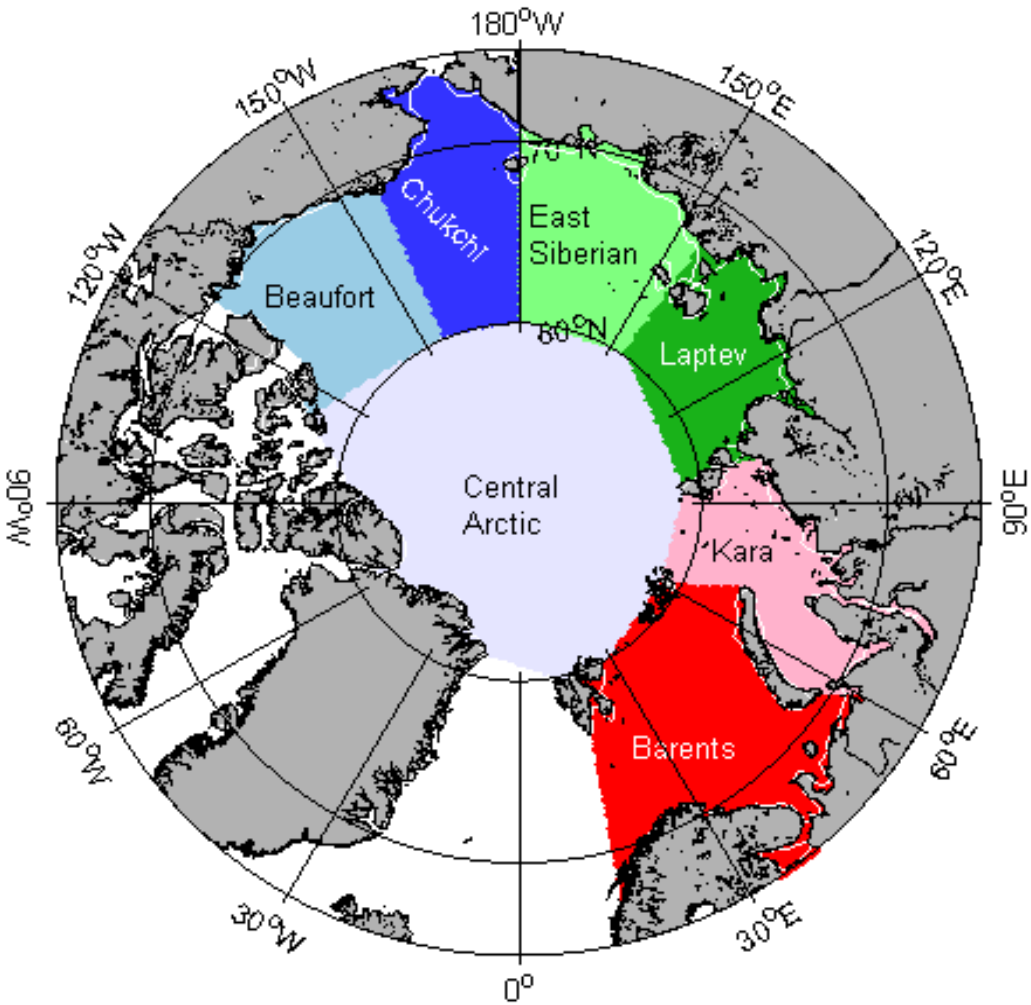
SCIENCE ENERGY POLICY

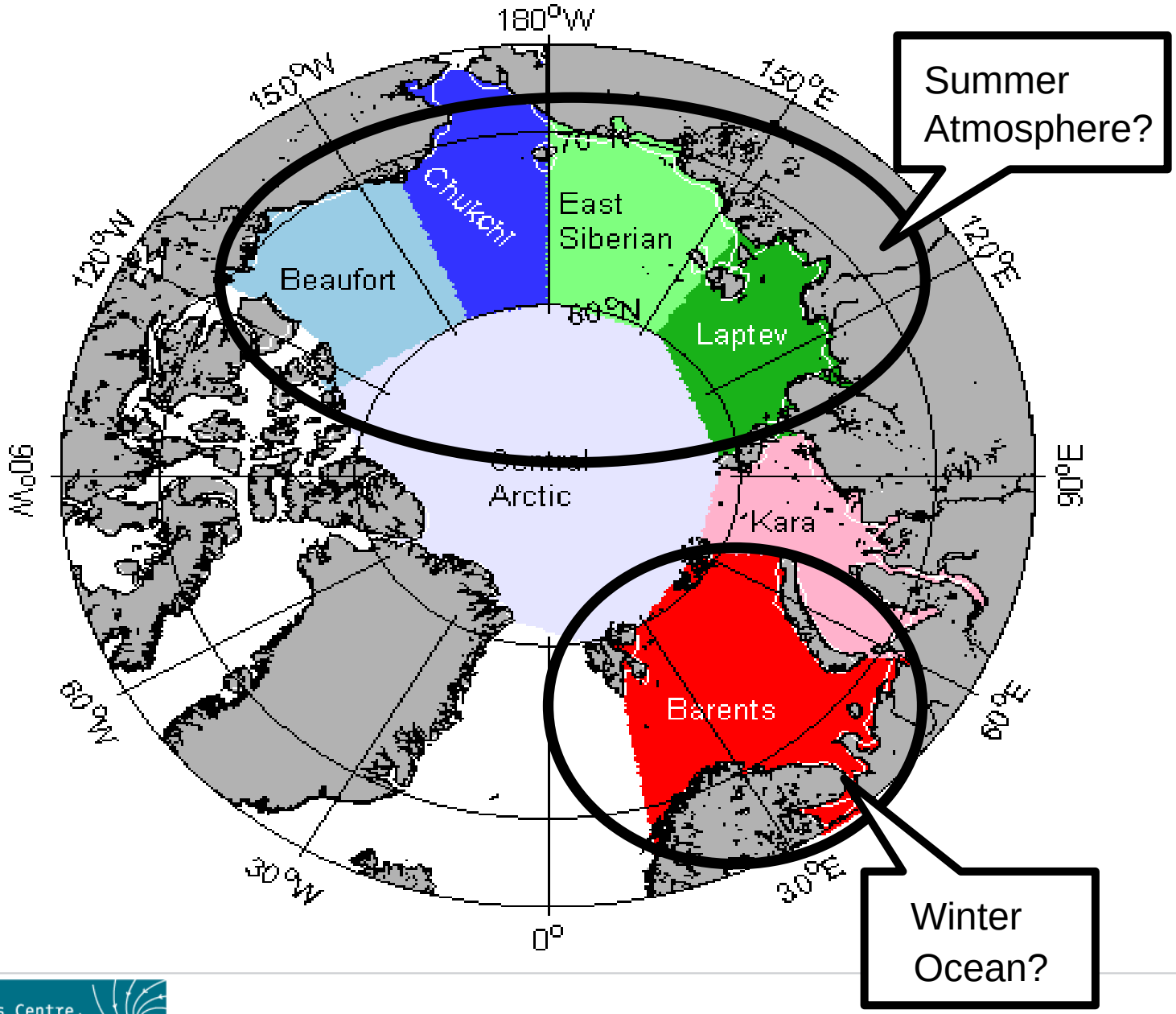
mmers be sea ice-free

in three years time?

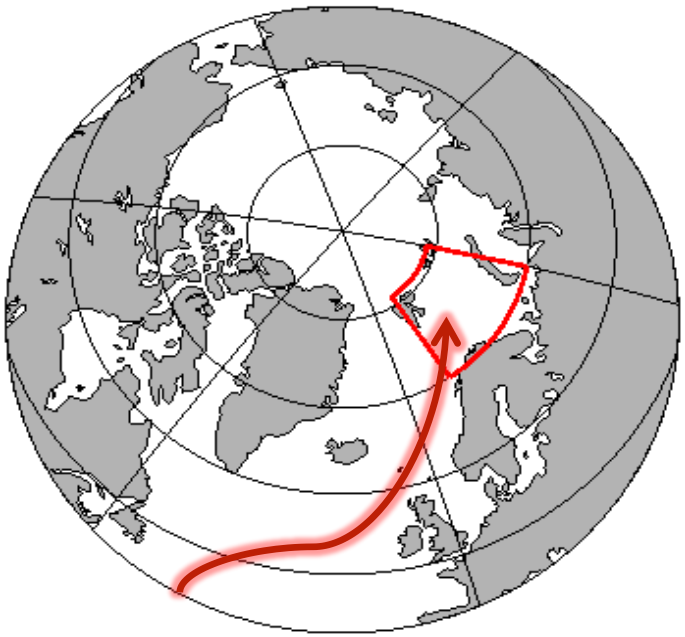
Arctic Ocean sea ice extent

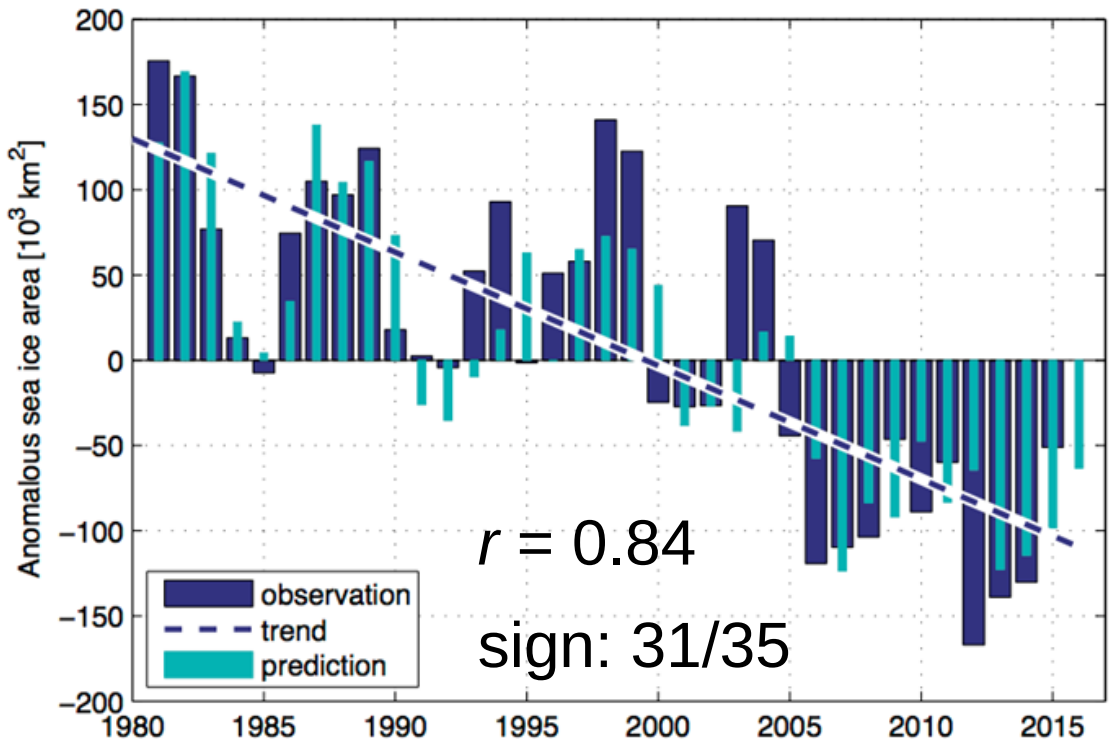





180°W
150°W
150°E
120°W
120°E
90°W
90°E
60°W
60°E
30°W
30°E
0°
70°N
80°N
Chukchi
East Siberian
Beaufort
Laptev
Central Arctic
Kara
Barents
Summer Atmosphere?
Winter Ocean?

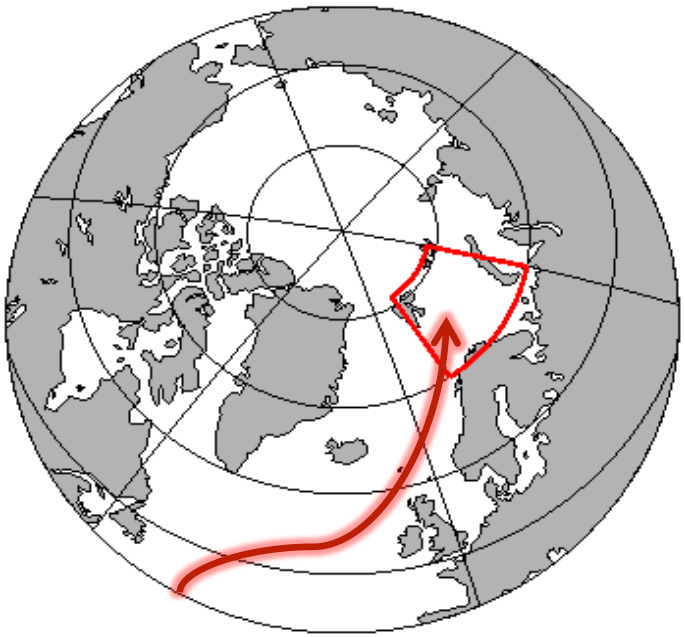
ASOF Meeting **2015**:
Skillful prediction of Barents Sea ice cover

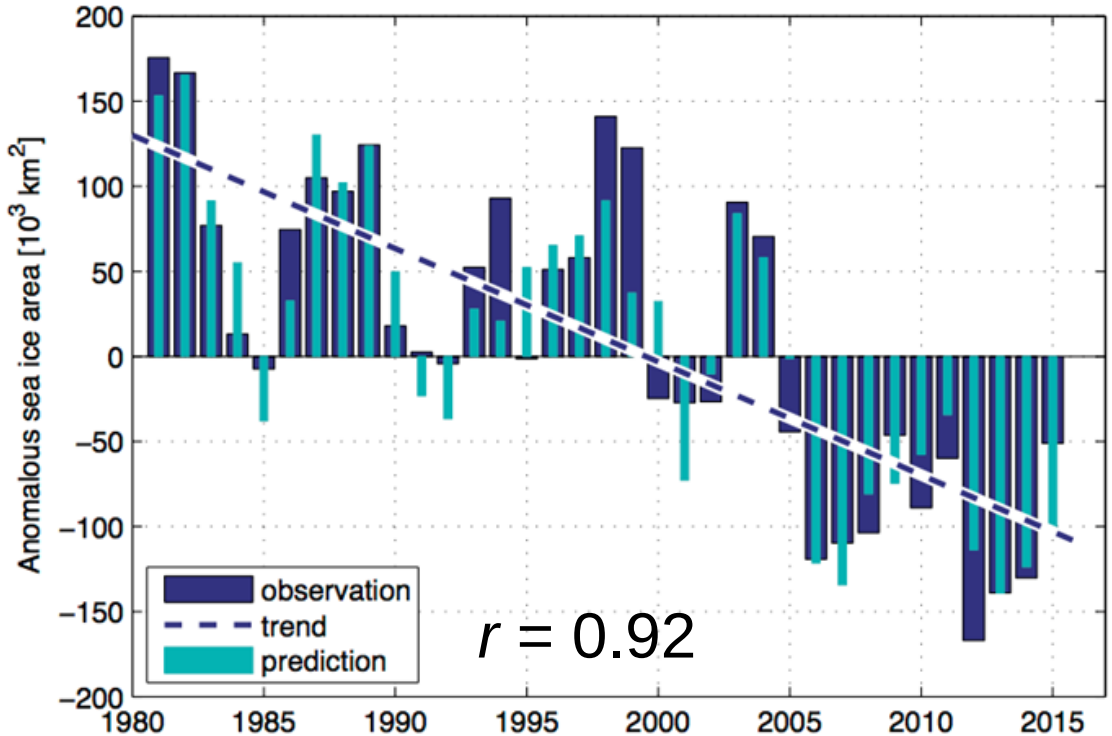




$$A_{ice}^{n+1} = \alpha A_{ice}^{n} + \beta HT^{n}$$

ASOF Meeting **2015**: Skillful prediction of Barents Sea ice cover

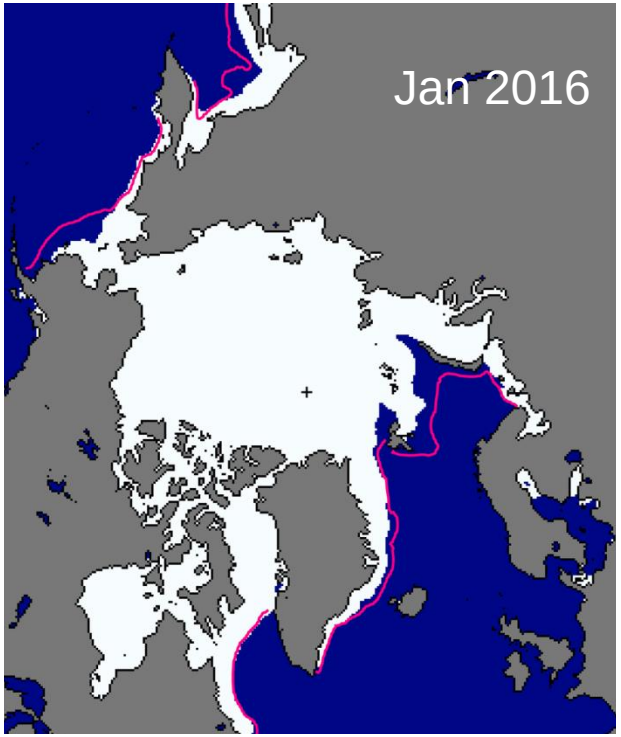


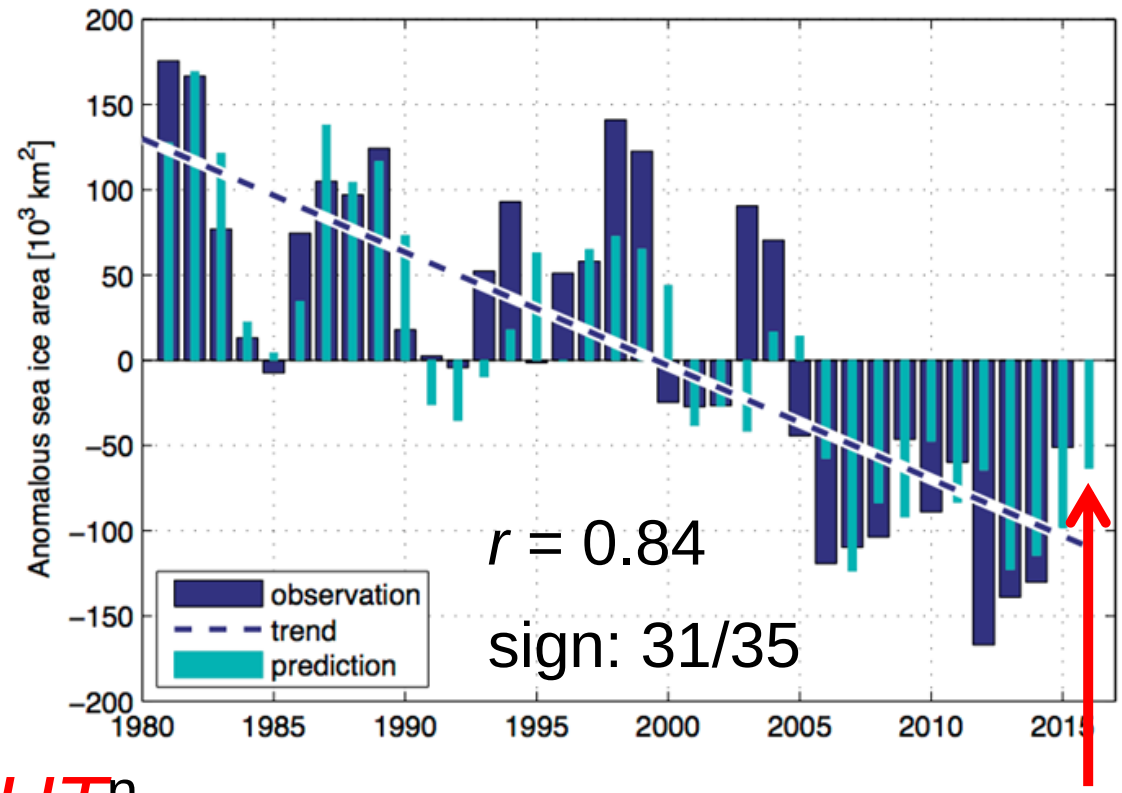


+ Meridional wind

$$A_{ice}^{n} = \alpha A_{ice}^{n-1} + \beta HT^{n-1} + \gamma V^{n}$$

Update **2016**:
Skillful prediction of Barents Sea ice cover

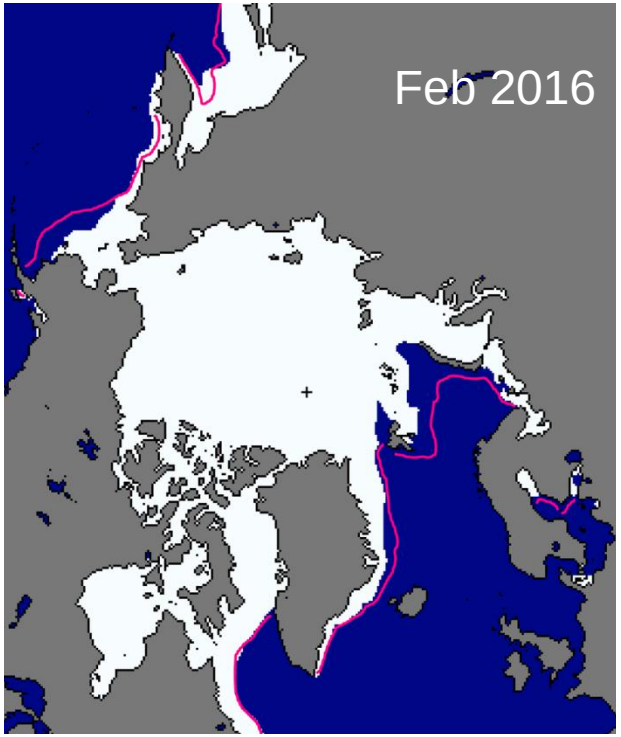


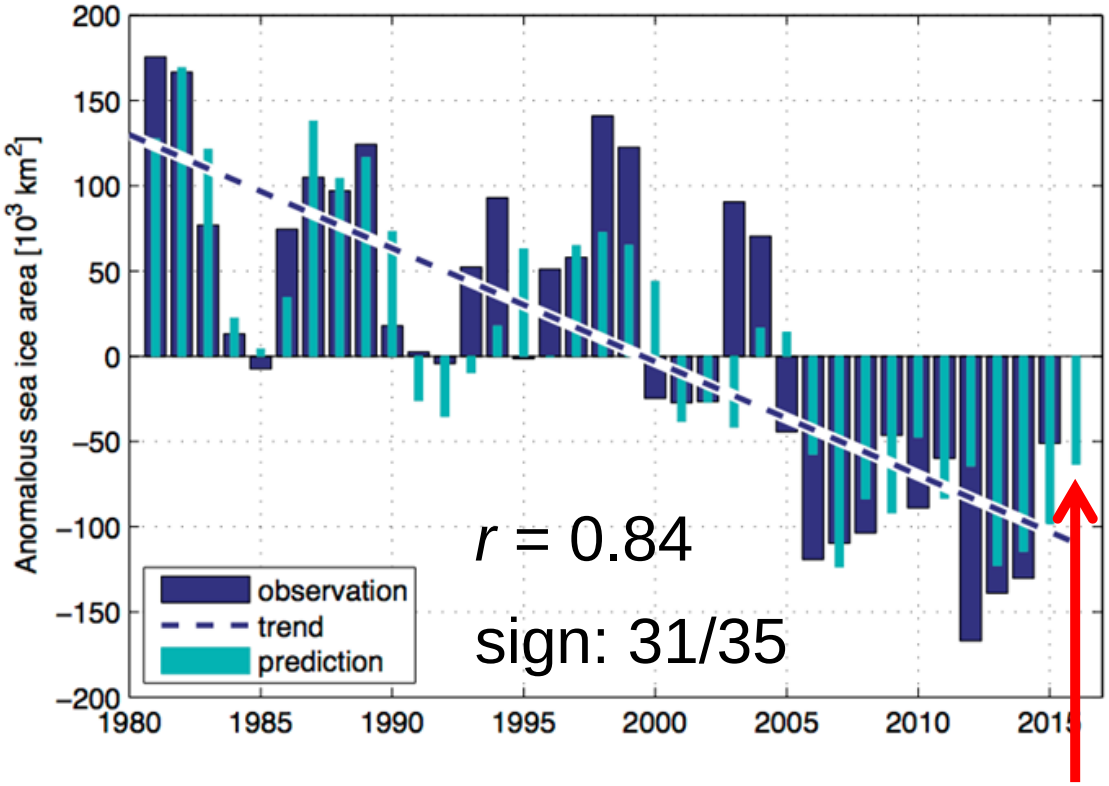


$$A_{ice}^{n+1} = \alpha A_{ice}^{n} + \beta HT^{n}$$

Prediction for winter 2015-2016

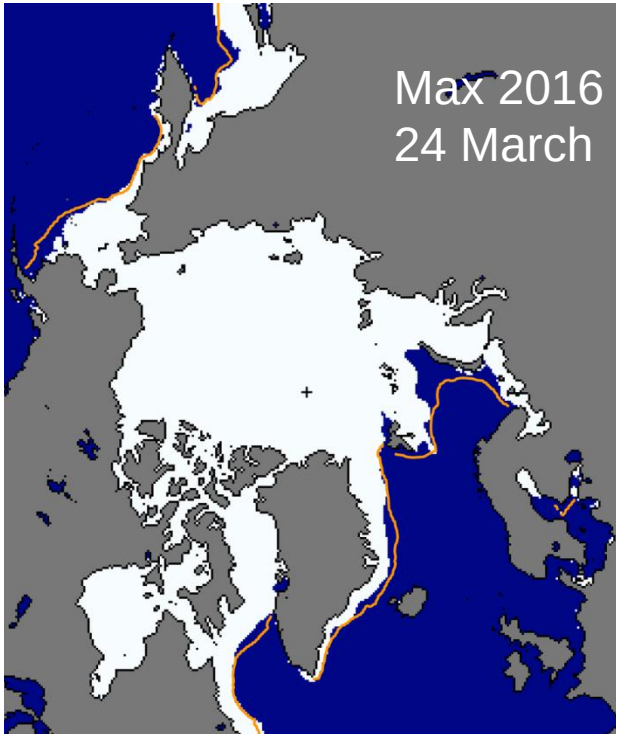
Update **2016**:
Skillful prediction of Barents Sea ice cover

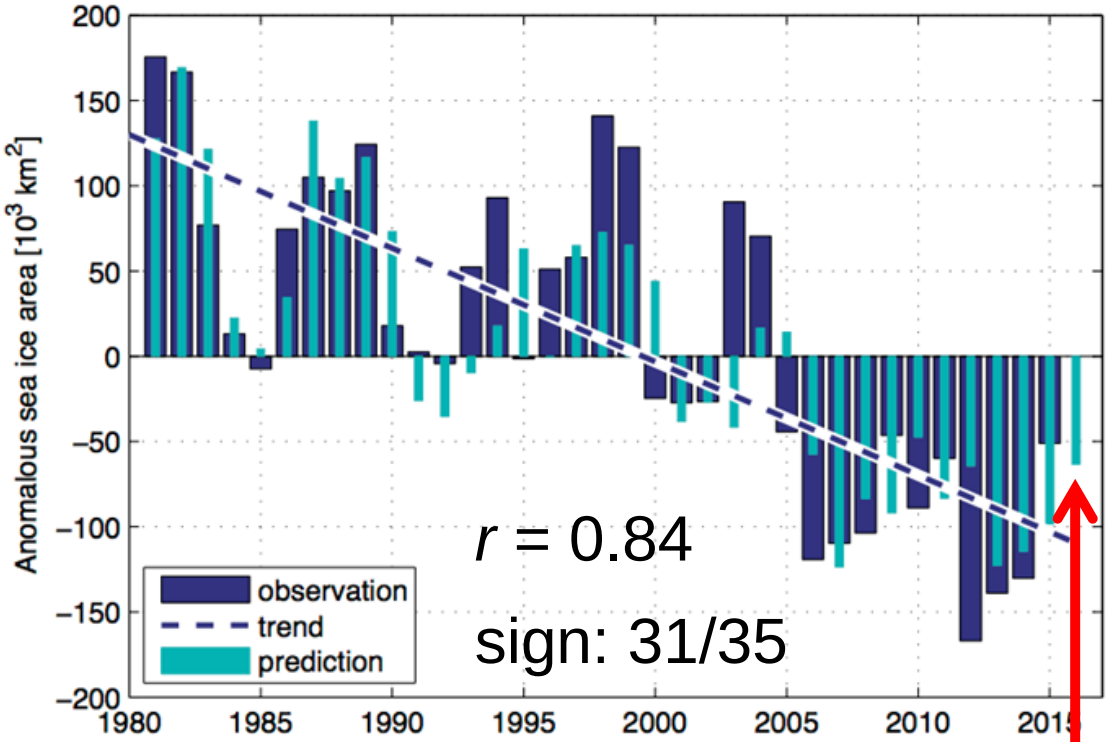




Prediction for winter 2015-2016

Update **2016**:
Skillful prediction of Barents Sea ice cover





Prediction for winter 2015-2016

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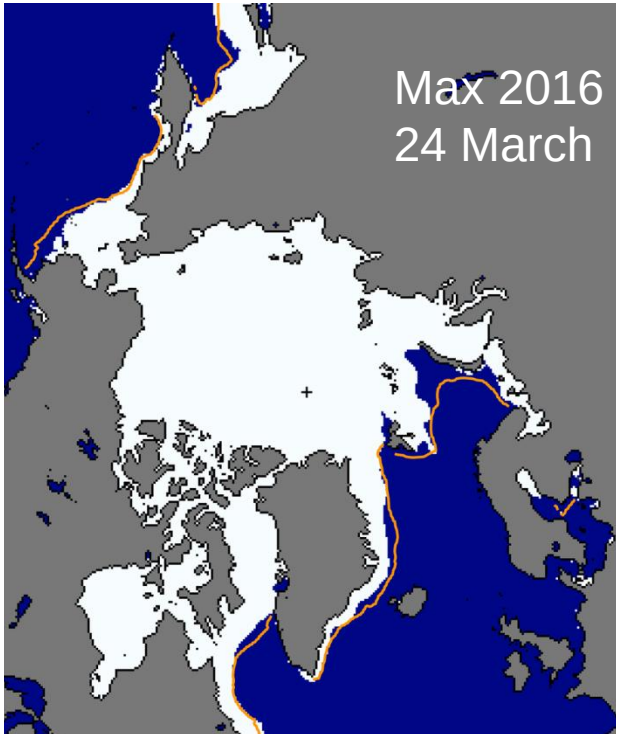
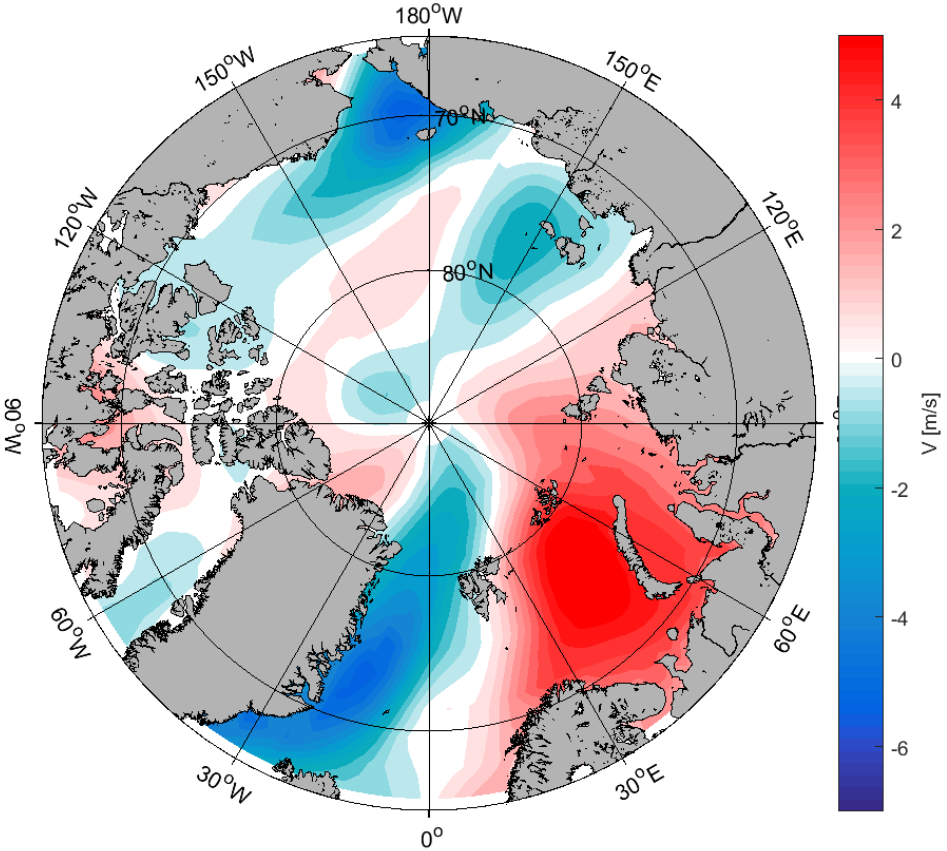
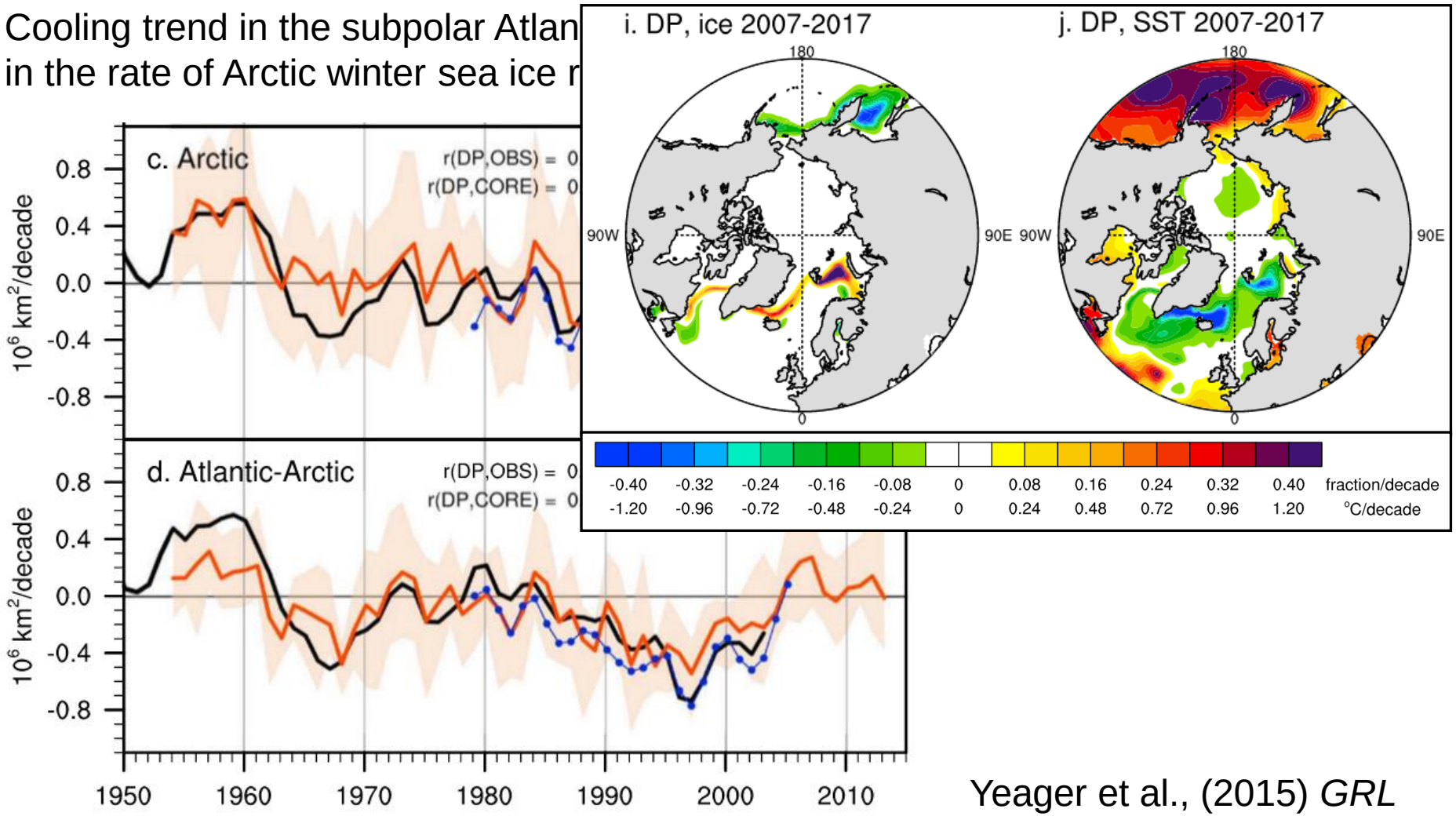


Anomalous meridional wind
November 2015



Decadal trends in winter sea ice extent

Cooling trend in the subpolar Atlan
in the rate of Arctic winter sea ice r



Yeager et al., (2015) *GRL*

Summary

- Barents Sea dominates **winter** Arctic sea ice trends
- Canadian/Russian Arctic dominates **summer** Arctic sea ice trends
- New record low for Arctic sea ice this winter, dominated by a small sea ice cover in the Barents Sea

Thank you!

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