The Current State of Arctic Sea Ice

Trends, Variability, and Implications for the Climate System

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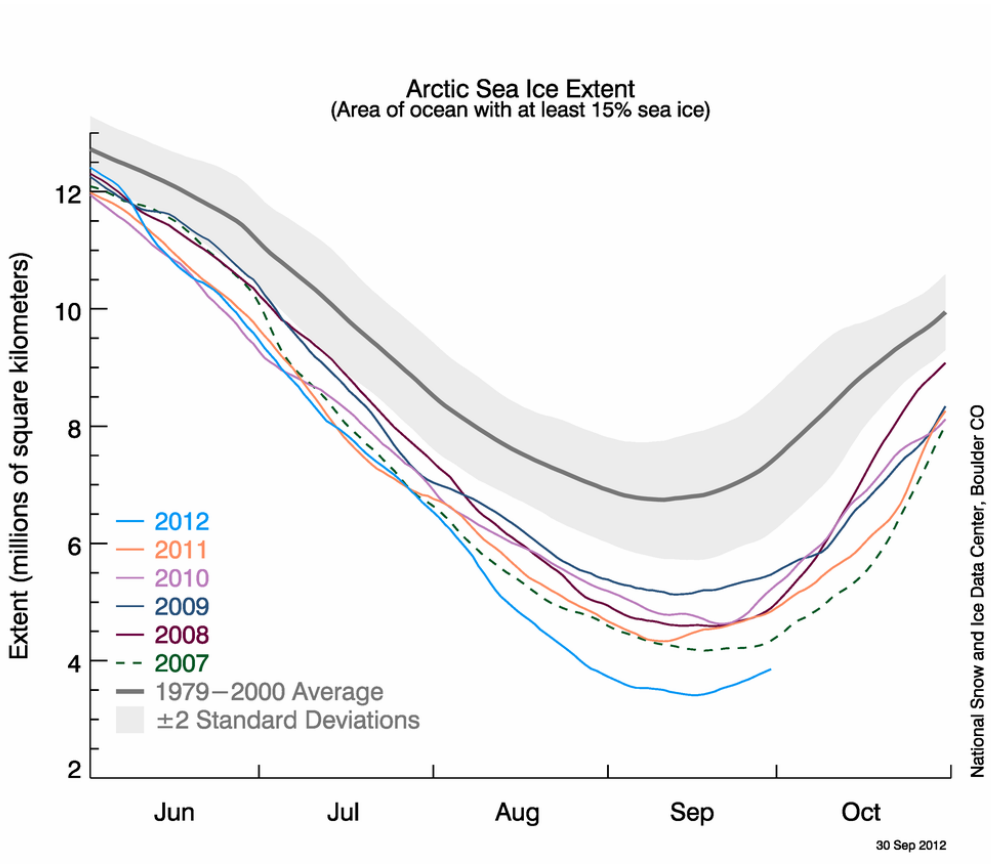
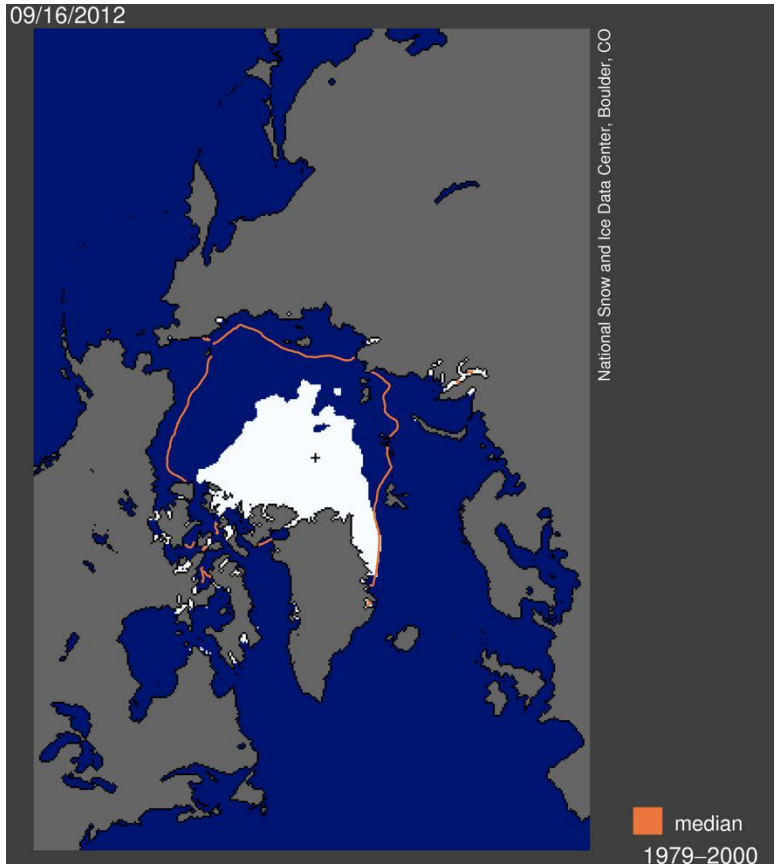
NOAA's 37th Climate Diagnostics and Prediction Workshop

Record Retreat in 2012

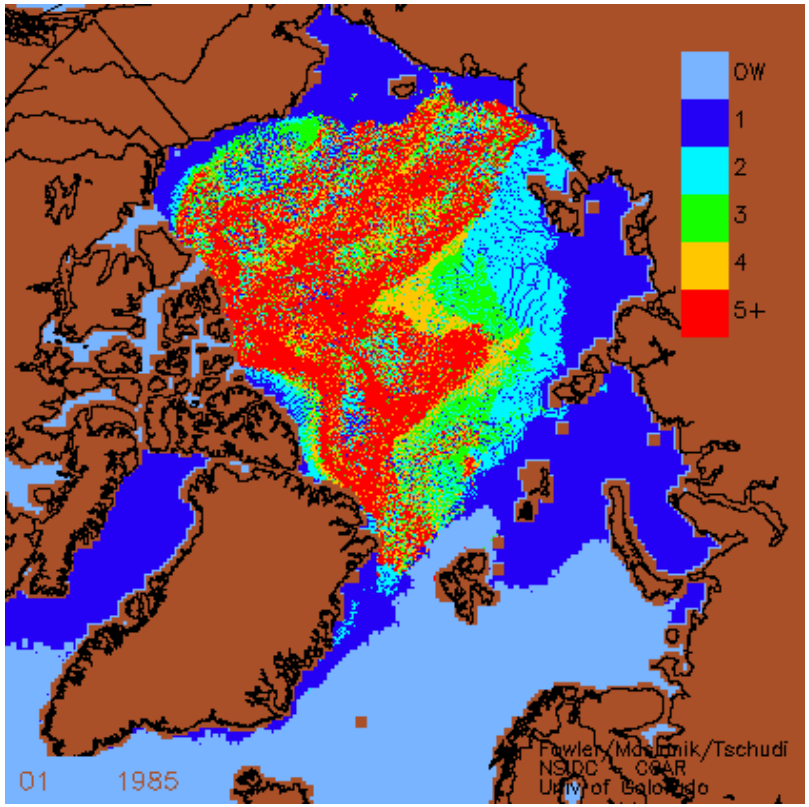


NSIDC News - Poles Apart: A Record Breaking Summer and Winter



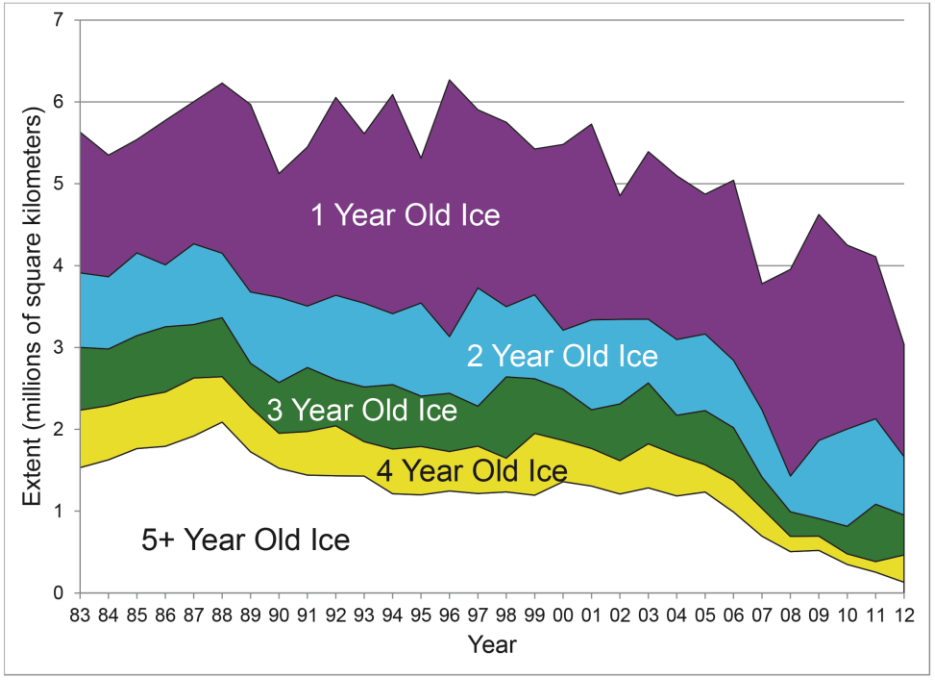
NSIDC News - Arctic Sea Ice Extent Settles at Record Seasonal Minimum

Evolution of Multiyear Ice Extent



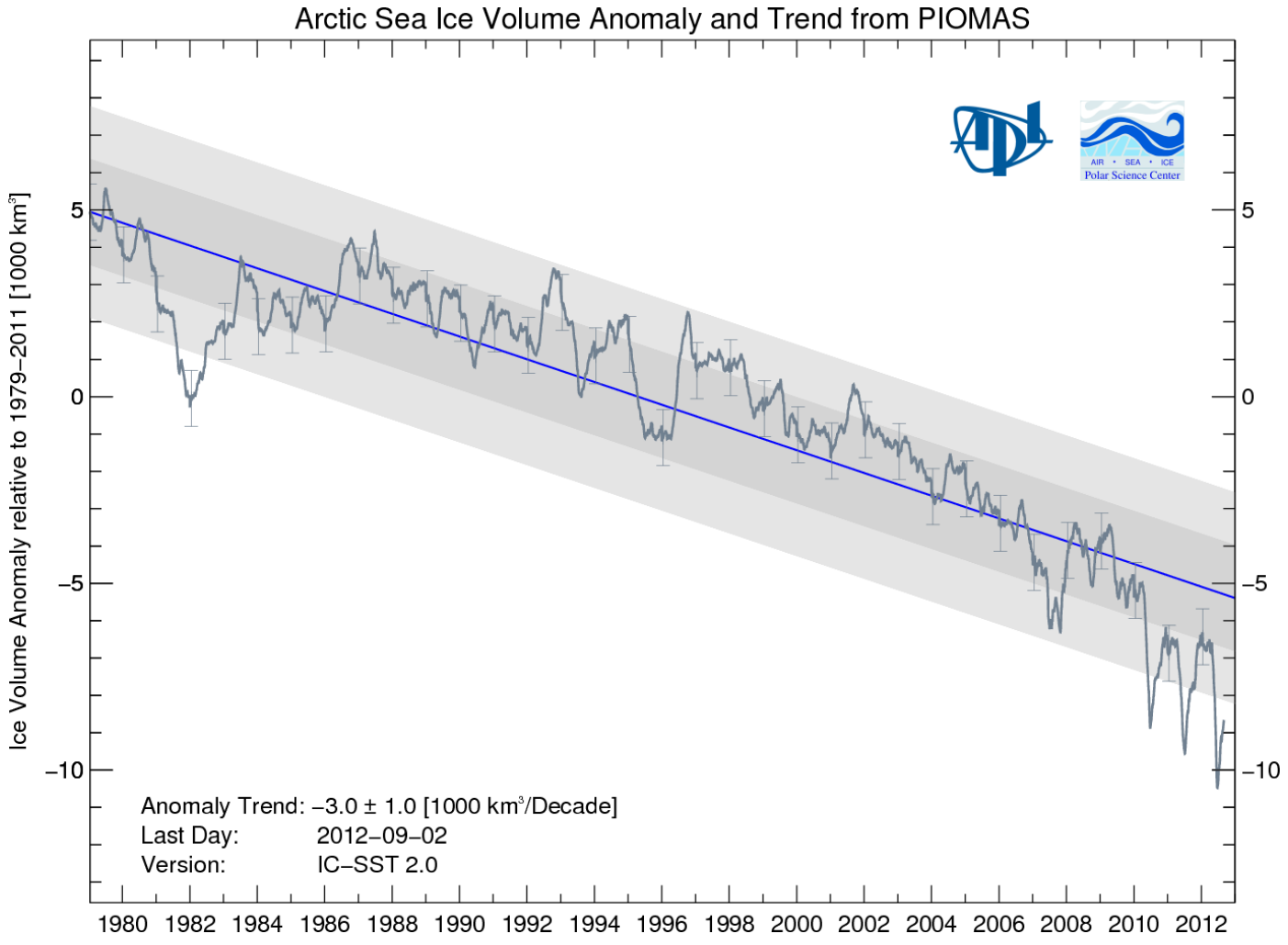
Ice age product courtesy of C. Fowler, J. Maslanik, and M. Tschudi, University of Colorado

- Precipitous loss of multiyear ice
- More seasonal ice cover
- Sea ice becoming more mobile



NSIDC Courtesy J. Maslanik and M. Tschudi, University of Colorado

Recent Ice Volume Repeatedly Surpassing Two Standard Deviations of the 30-Year Trend

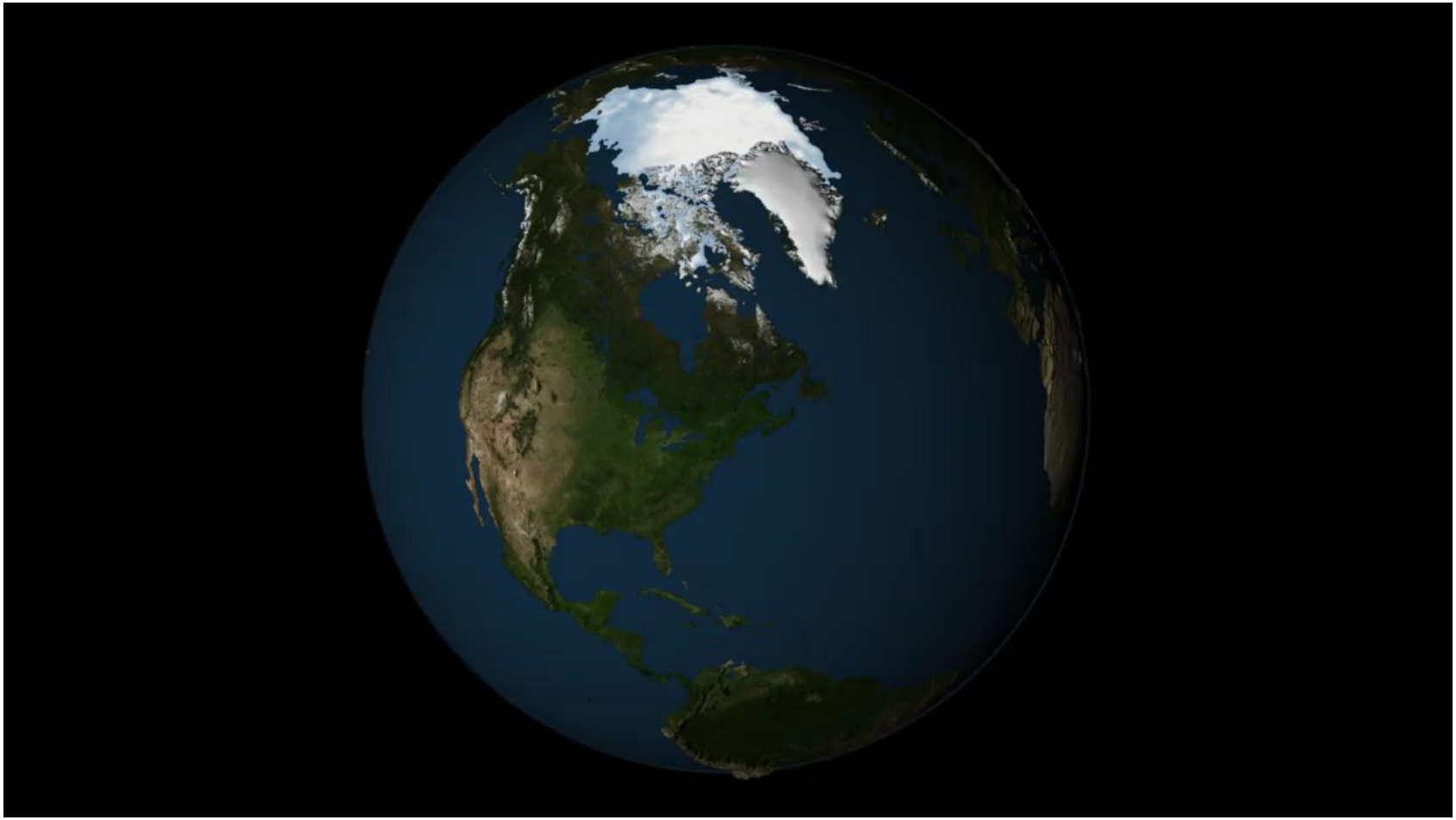


University of Washington, Polar Science Center, PIOMAS Model

A View from the Beaufort Sea

Photo courtesy of Alice Orlich, IARC

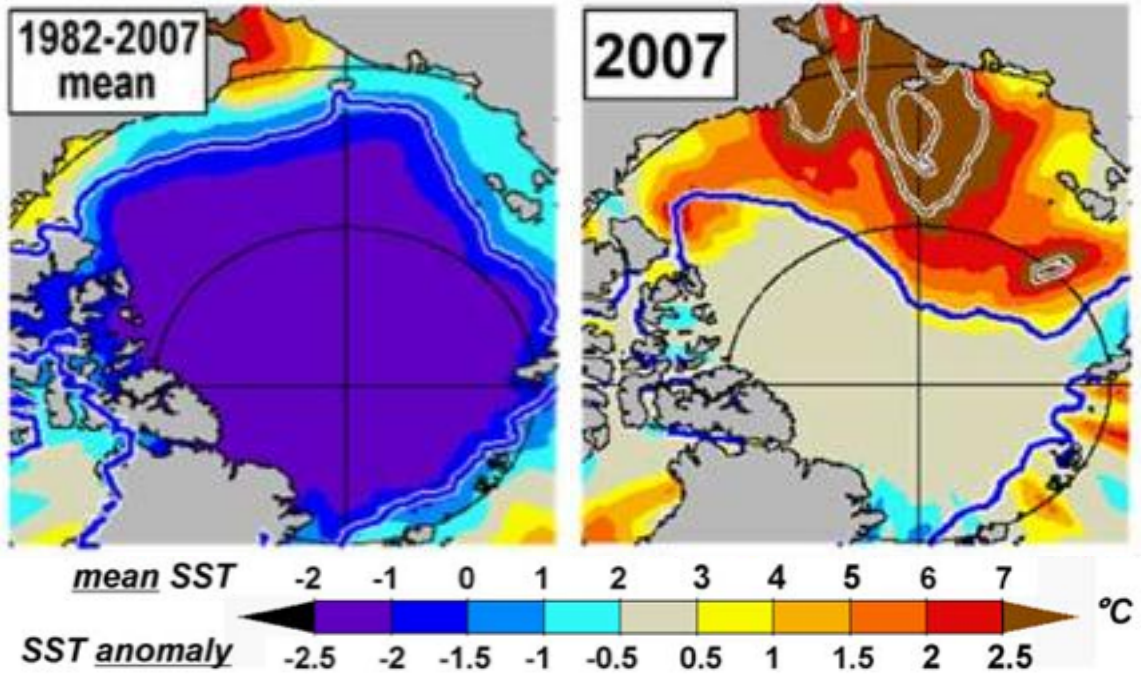
What's taking the blame?



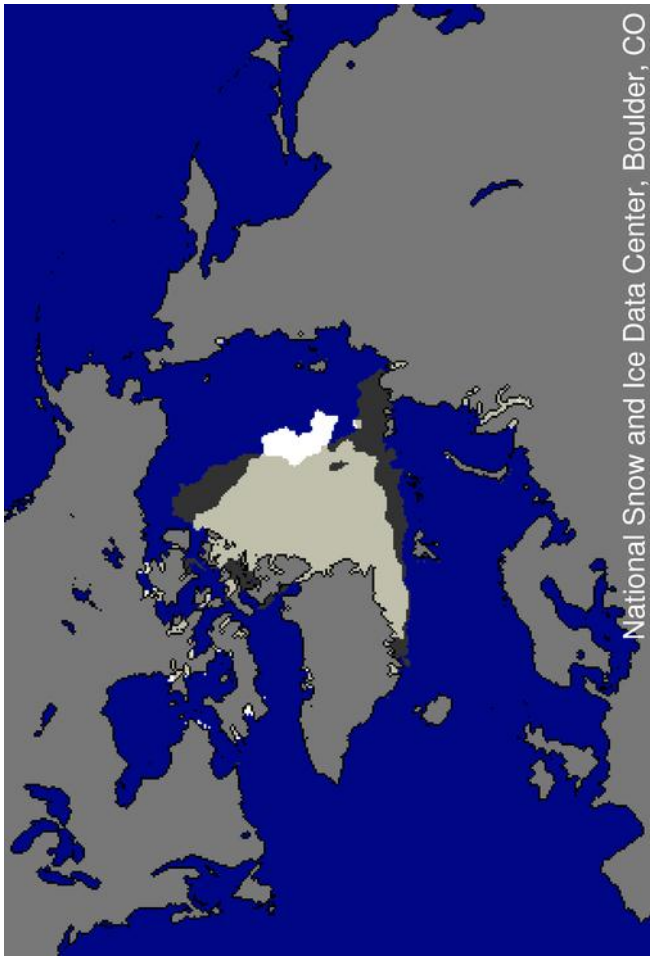
NASA - Arctic Sea Ice Hits Smallest Extent in Satellite Era

What happened in 2007?

- Persistent ridge in late summer
- In-situ melting dominated
- Increased advective export



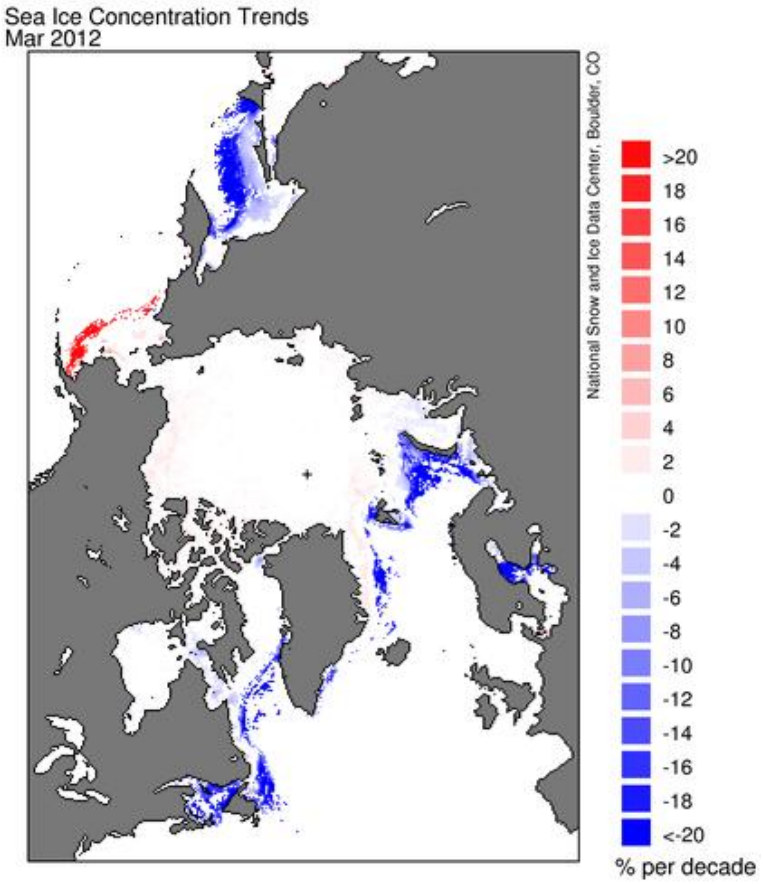
Steele et al., 2008



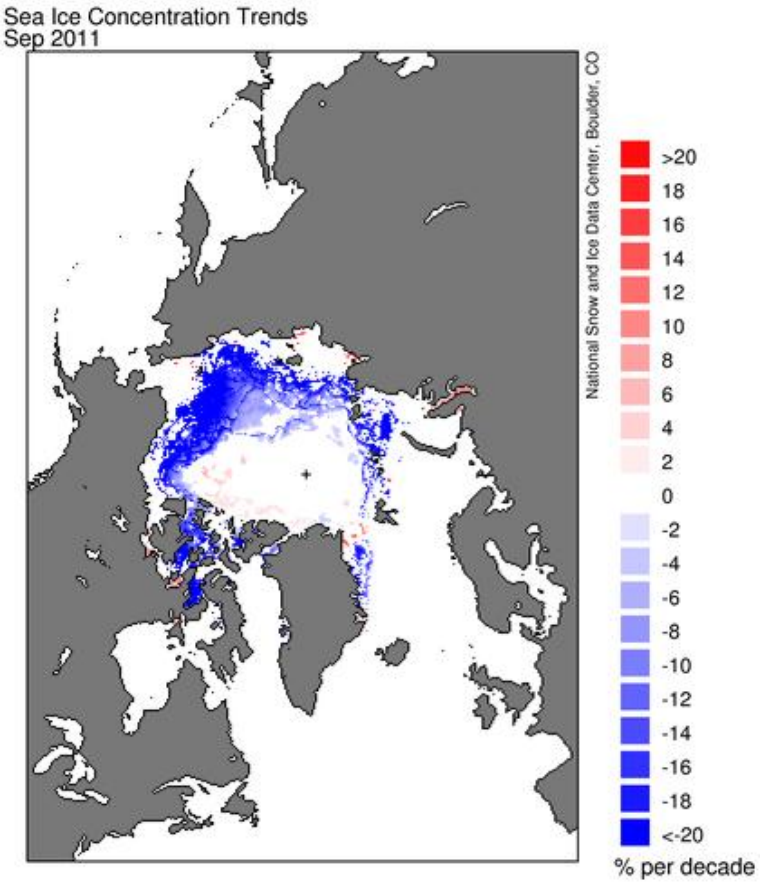
NSIDC News - Arctic Sea Ice Extent Settles at Record Seasonal Minimum

Regional Variability in Sea-Ice Extent

Maximum extent in March



Minimum extent in September



NSIDC BIST Data Portal

Atmospheric Response to Diminishing Sea-Ice Cover

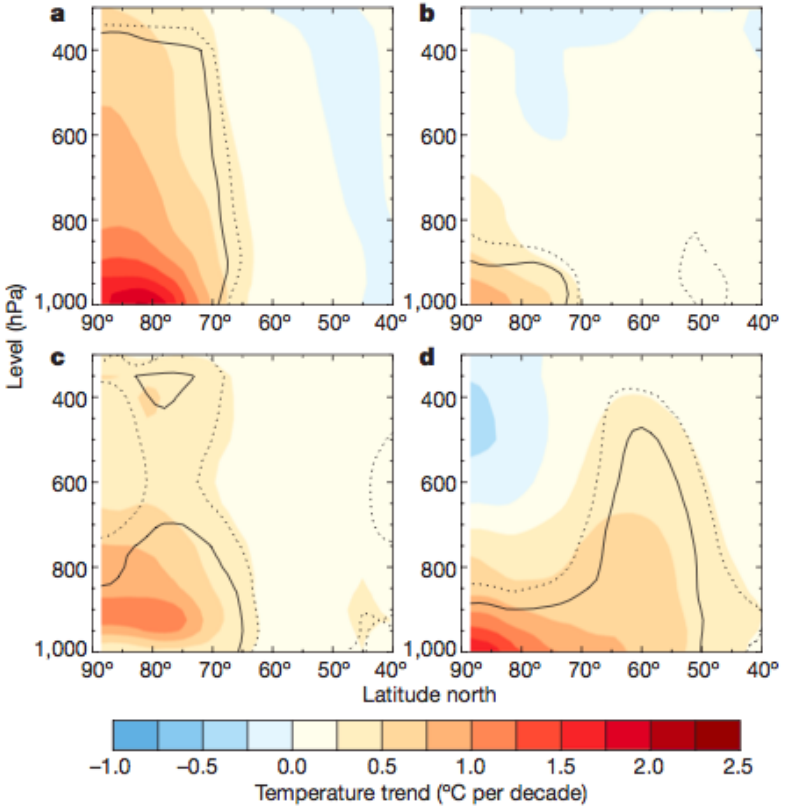
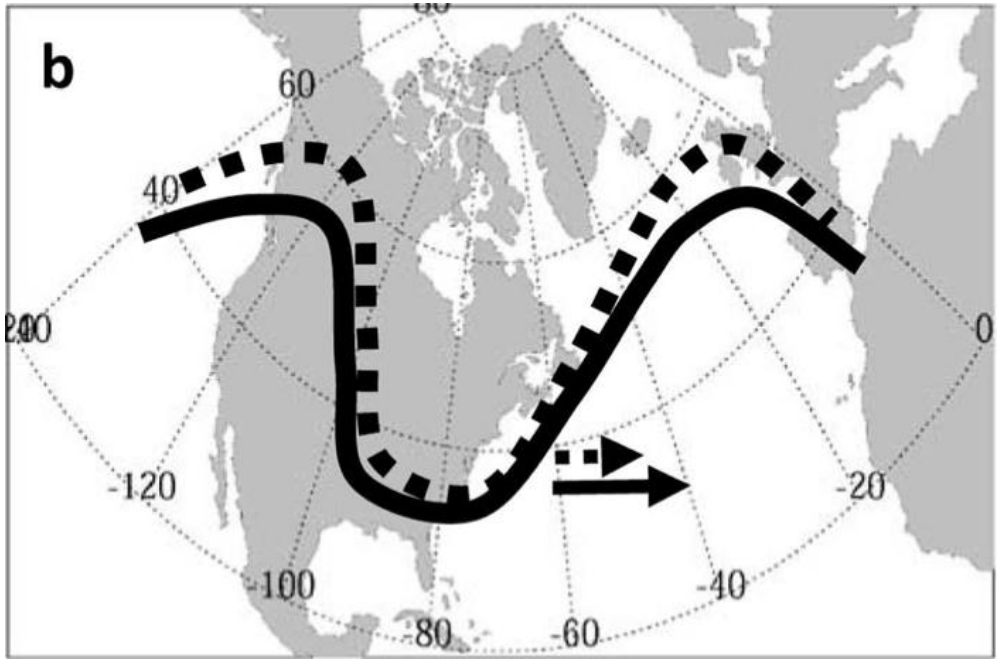


Figure 2 | Temperature trends linked to changes in sea ice. Temperature trends over the 1989–2008 period averaged around circles of latitude for winter (**a**), spring (**b**), summer (**c**) and autumn (**d**). The trends are derived from projections of the temperature field on the sea ice time series (Methods Summary). The black contours indicate where the ice–temperature regressions differ significantly from zero at the 99% (solid lines) and 95% (dotted lines) uncertainty levels.

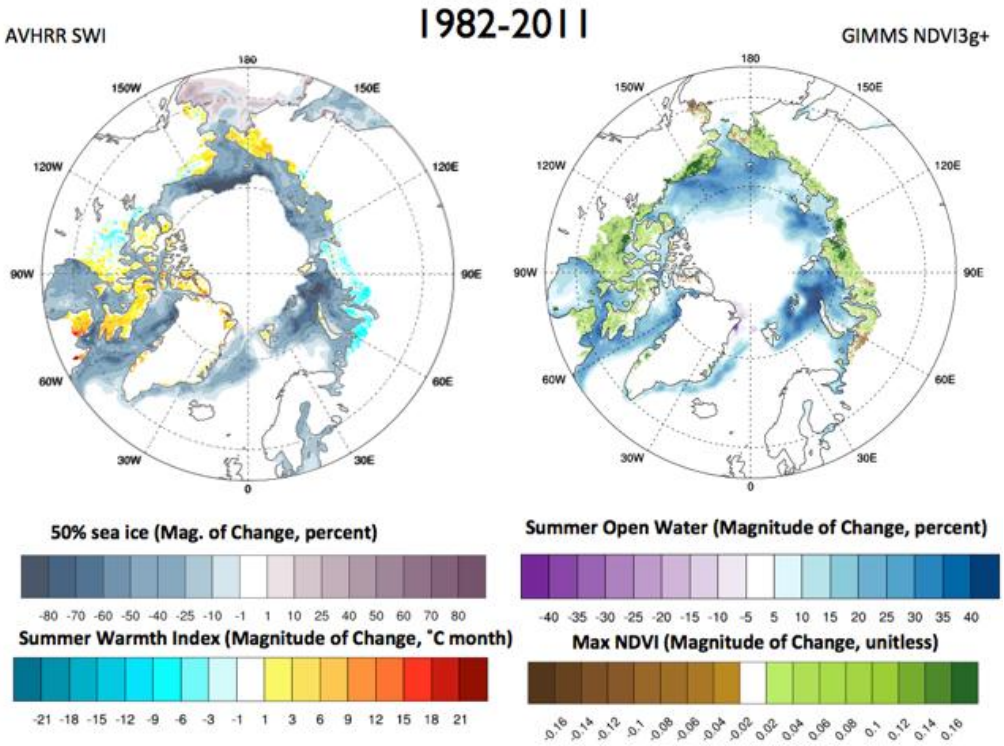
Screen and Simmonds, 2010

- Reinforced Arctic amplification
- Changing phase speed of hemispheric disturbances



Francis and Vavrus, 2012

A Shifting Biosphere and Coastal Impacts

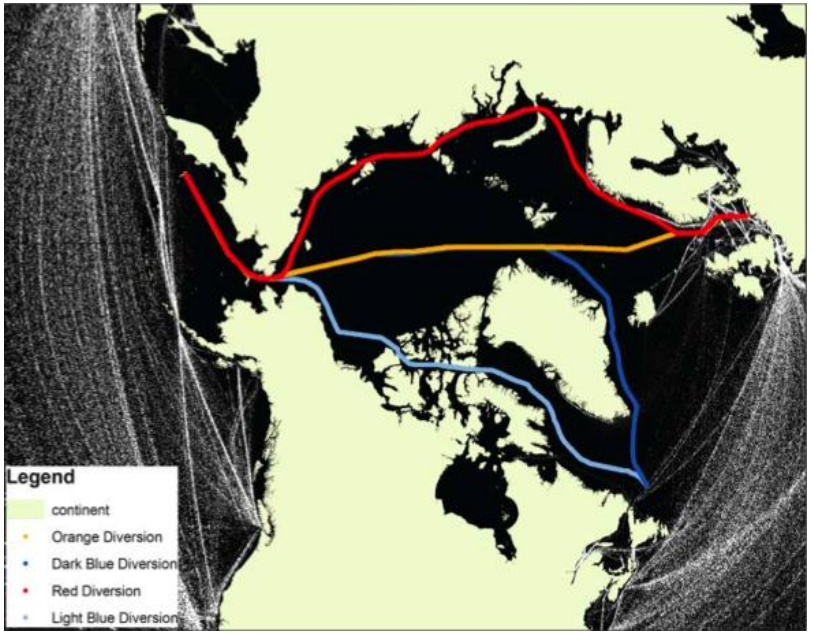


Walker et al., 2012 – modified from Bhatt et al., 2010

NSIDC - Sea Ice and the Arctic Coast

Surging Industry and Marine Traffic in the Arctic

Alaska Journal of Commerce



Corbett et al., 2010

Key Points

- Multiyear sea-ice loss has resulted in a larger seasonal component of sea-ice cover
- Due to long-term thinning, Arctic sea ice is now more susceptible to large-scale retreat
- Impacts of reduced summertime ice extent and a longer ice-free season are numerous and far reaching
- Another record year in 2012 increases interests in the Arctic

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