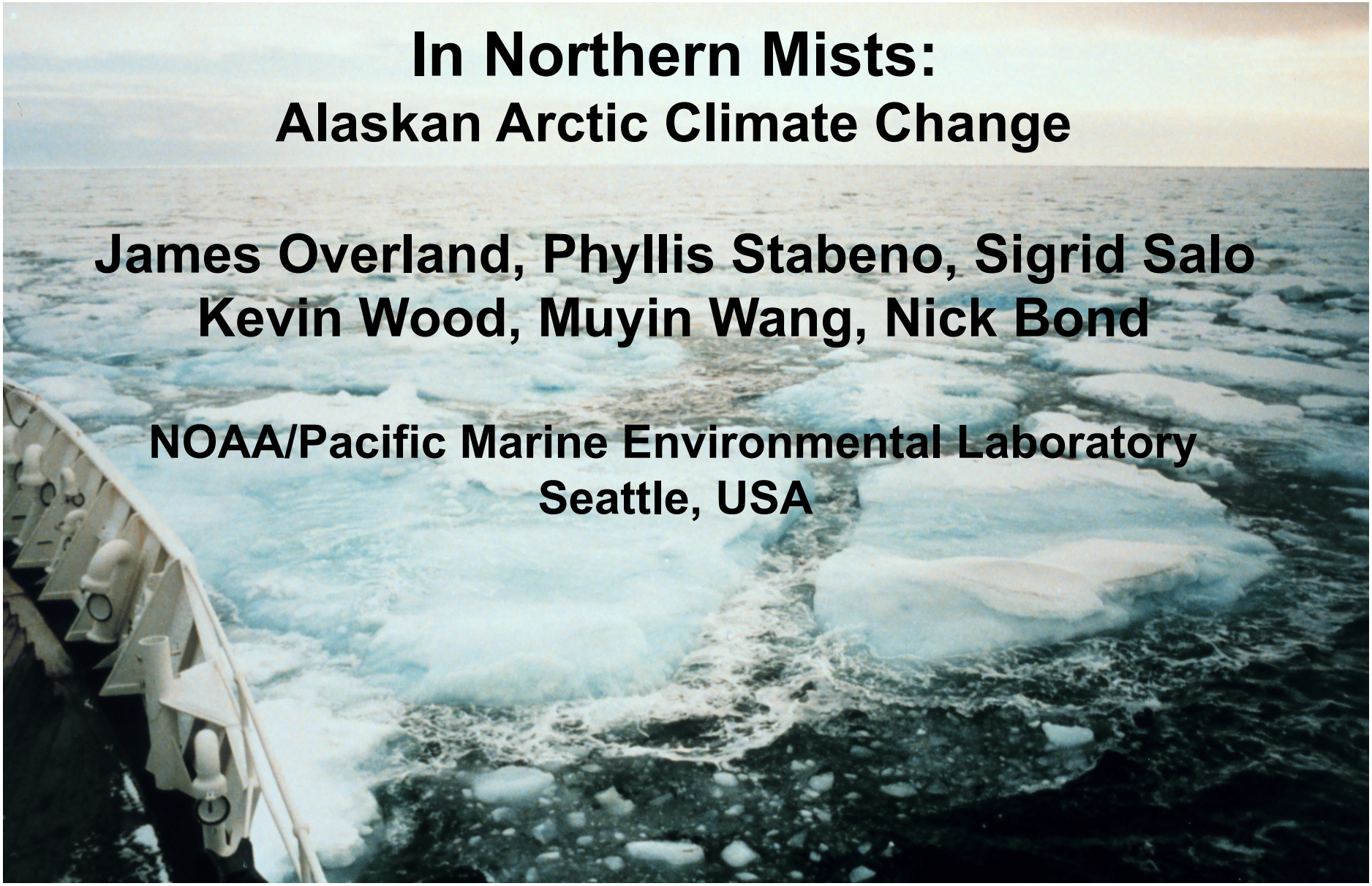


In Northern Mists:
Alaskan Arctic Climate Change

James Overland, Phyllis Stabeno, Sigrid Salo
Kevin Wood, Muyin Wang, Nick Bond

NOAA/Pacific Marine Environmental Laboratory
Seattle, USA

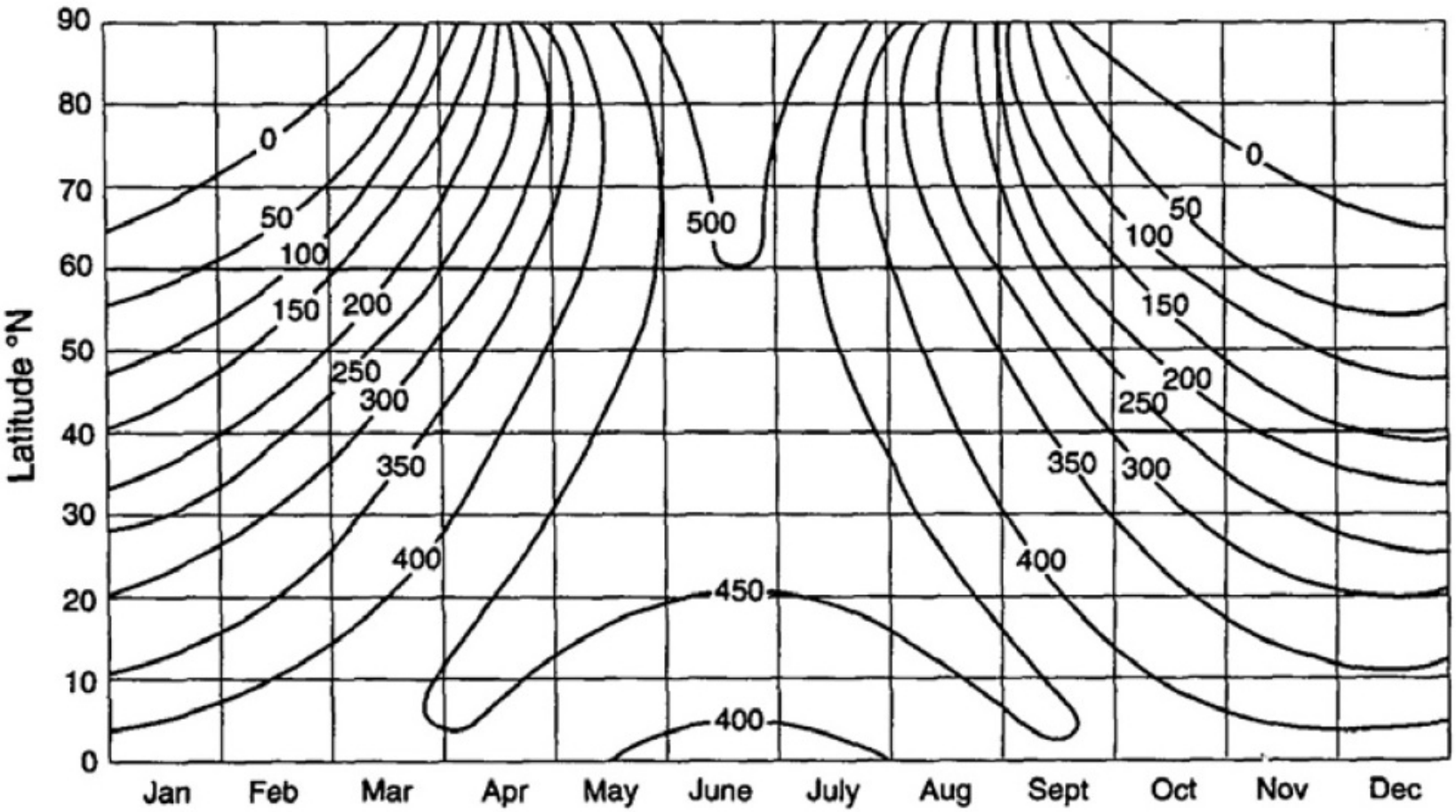
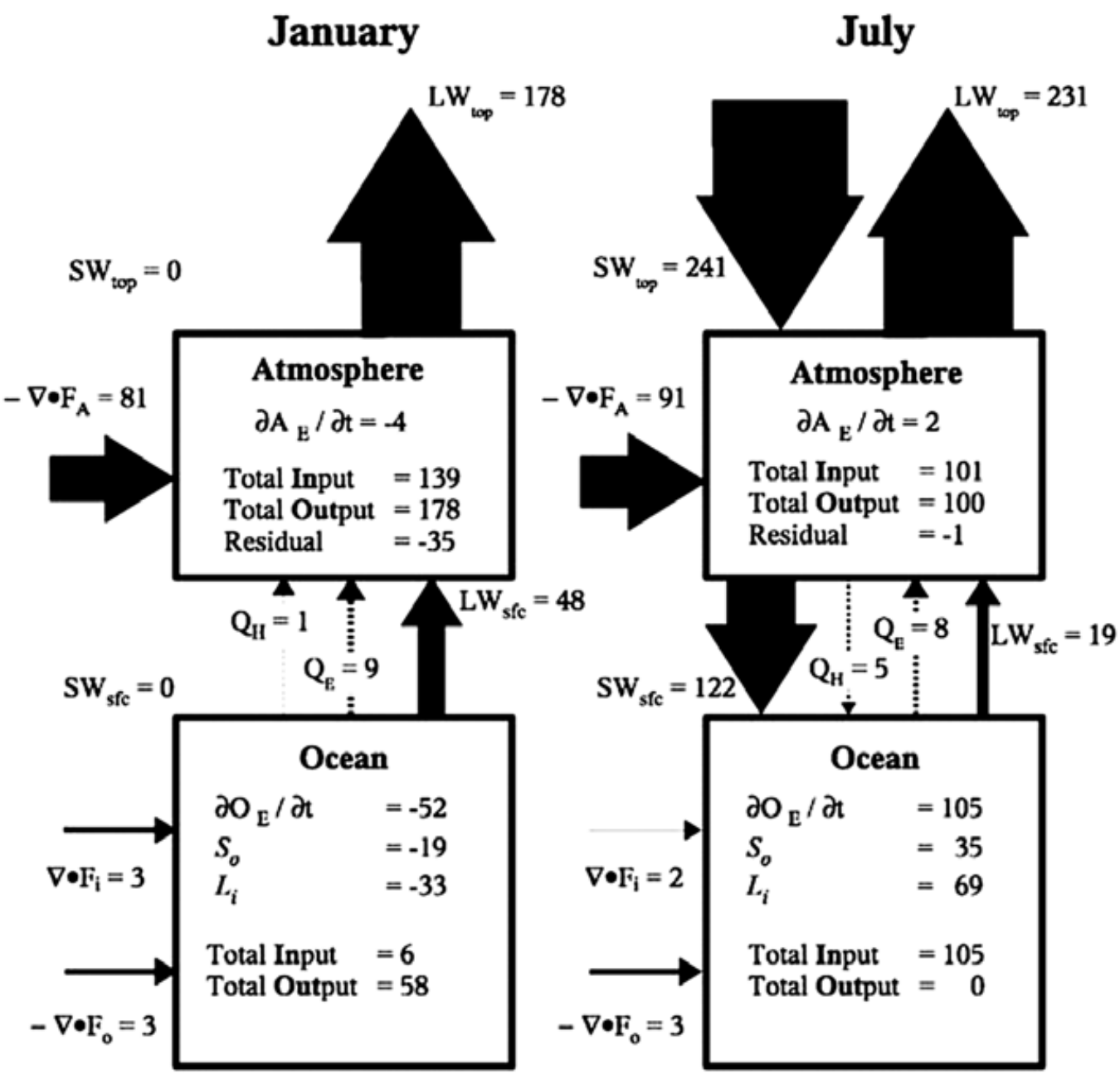


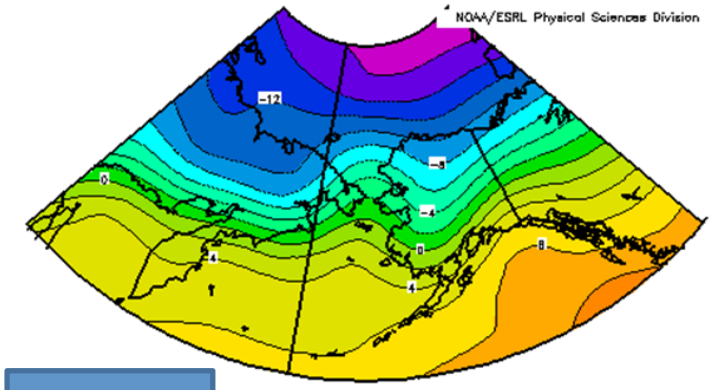
Figure 1. Latitudinal distribution of potential insolation for the Northern Hemisphere. Units are in W/m^2.



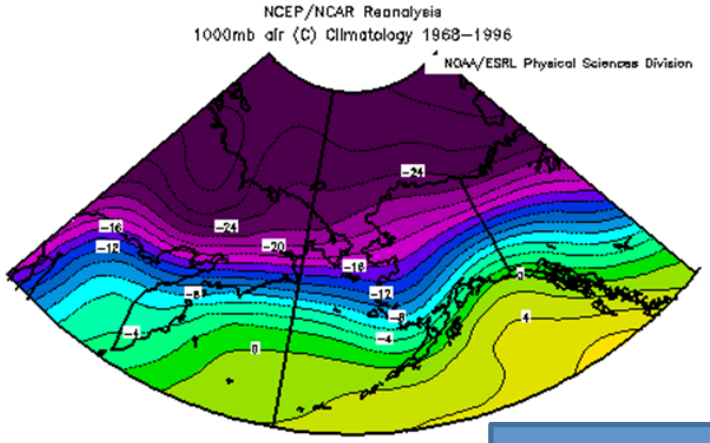
Heat Budget

Serreze

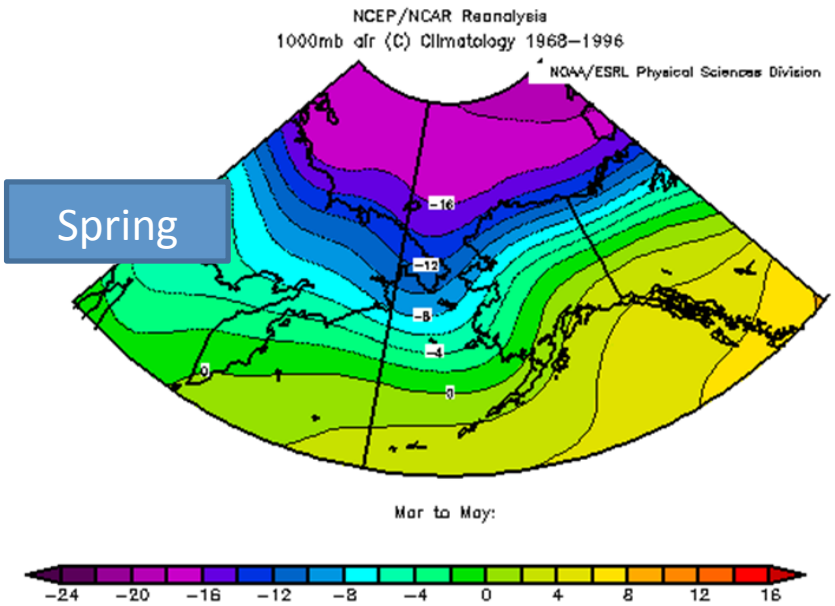
Seasonal Temperatures



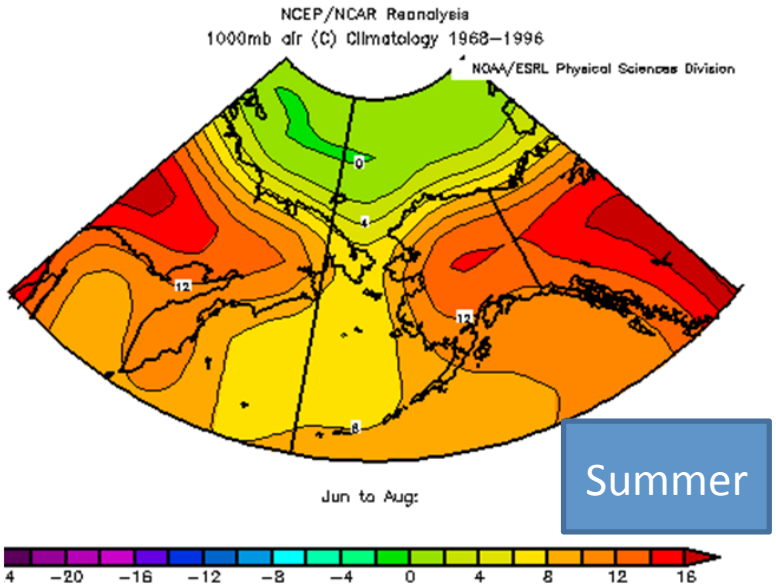
Fall



Winter

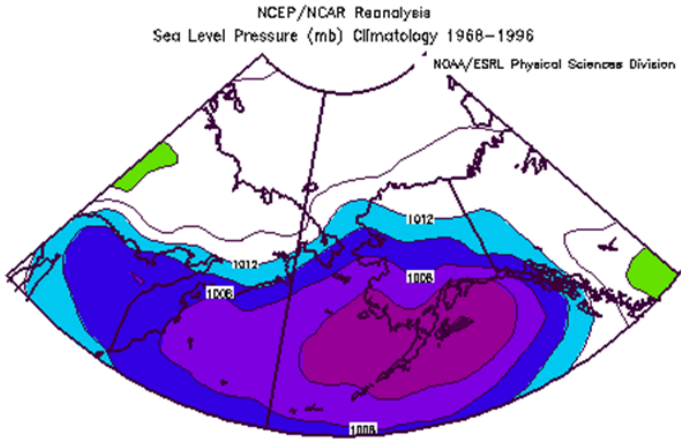


Spring

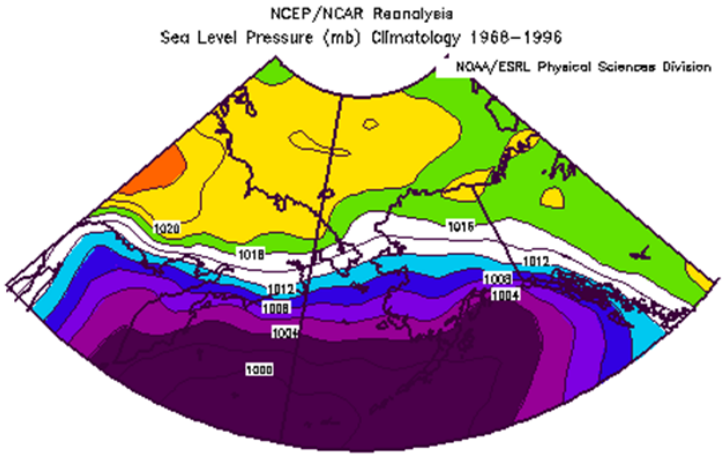


Summer

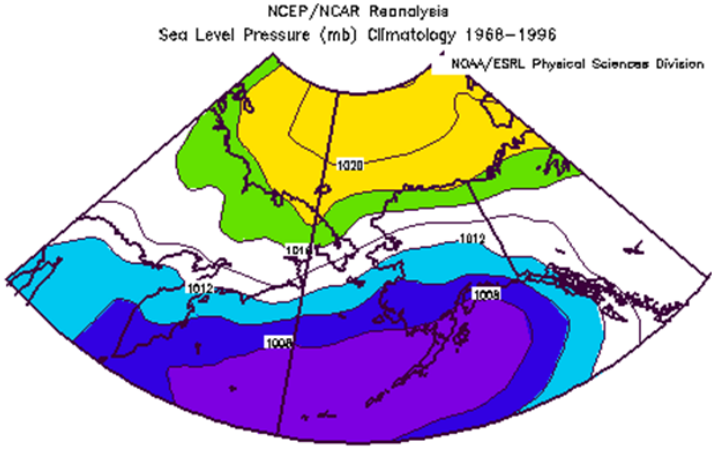
Sea Level Pressures



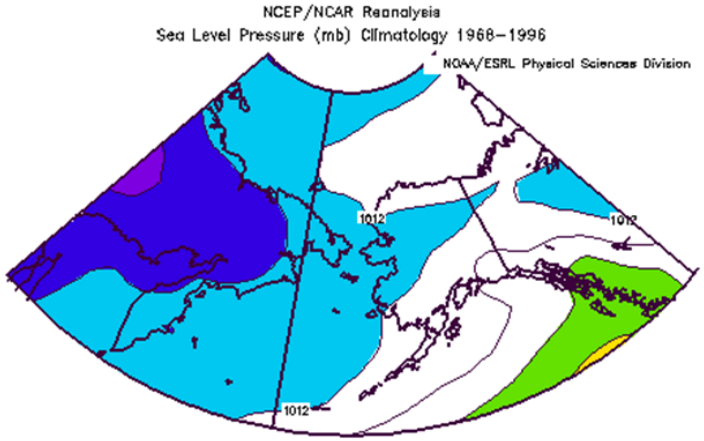
Sep to Nov:



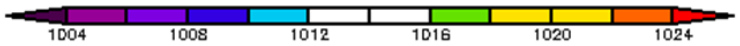
Dec to Feb:

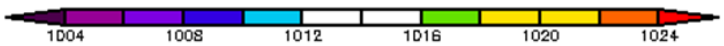


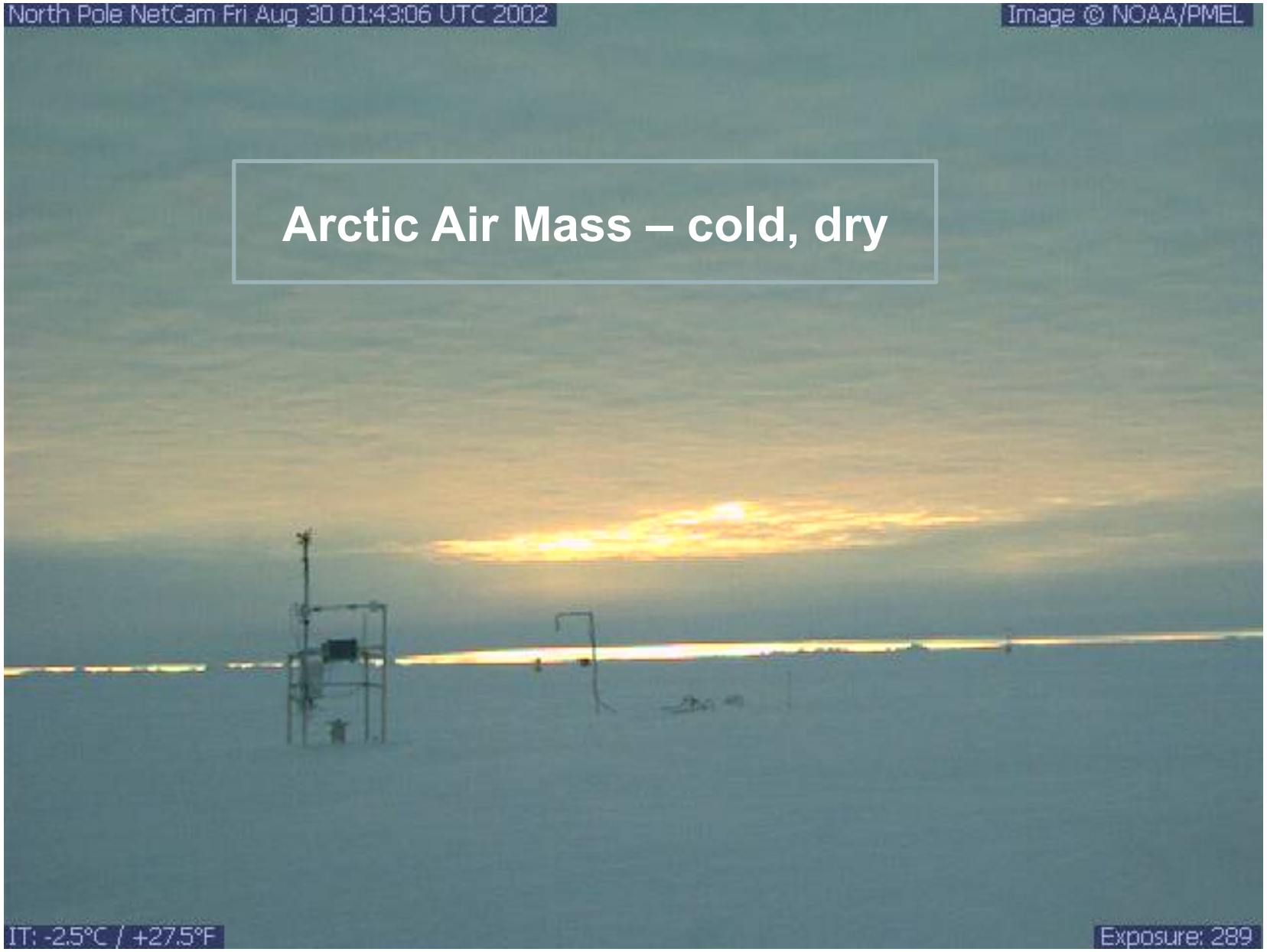
Mar to May:



Jun to Aug:



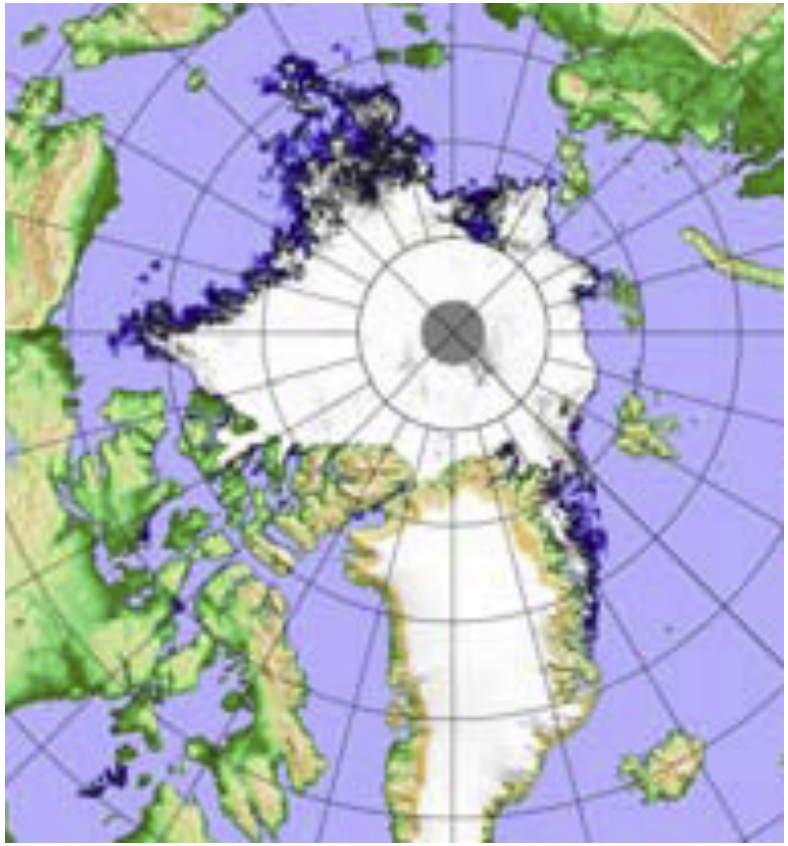




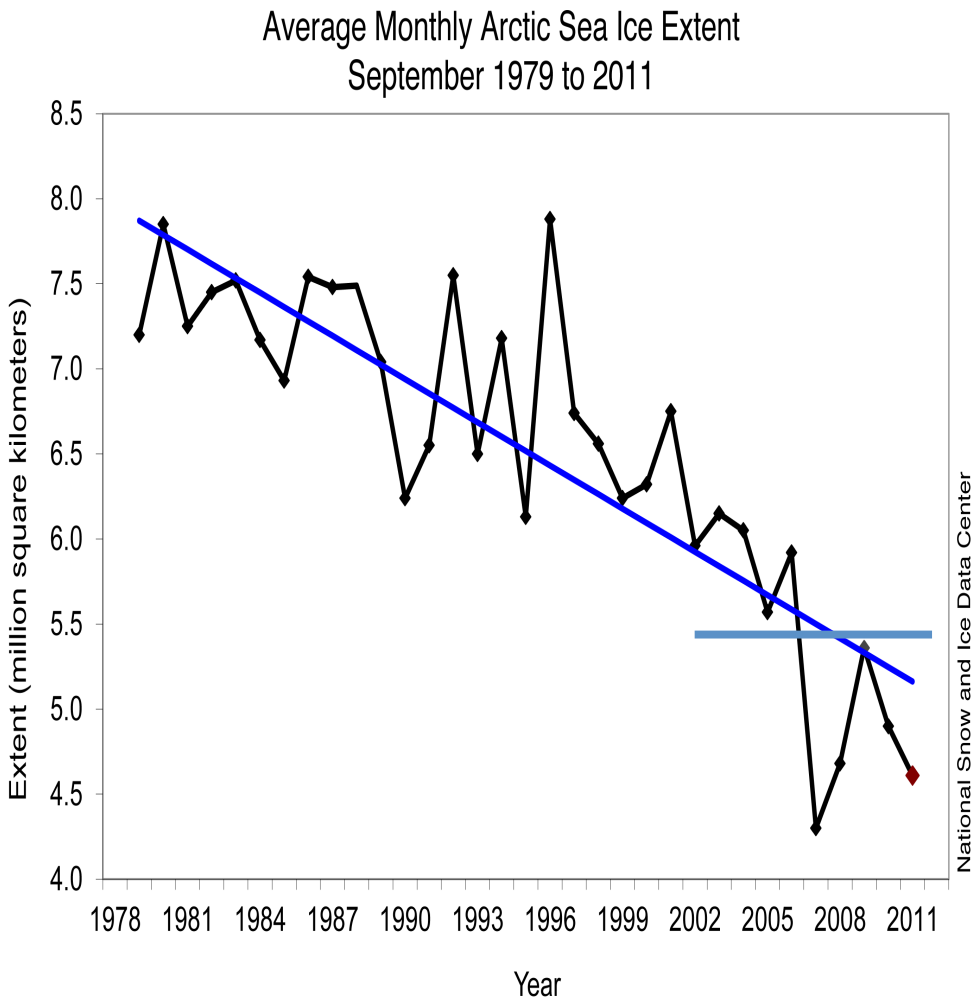
Arctic Air Mass – cold, dry

Maritime Air Mass- warm, moist

Sea Ice Loss- Declare a New Arctic Climate?

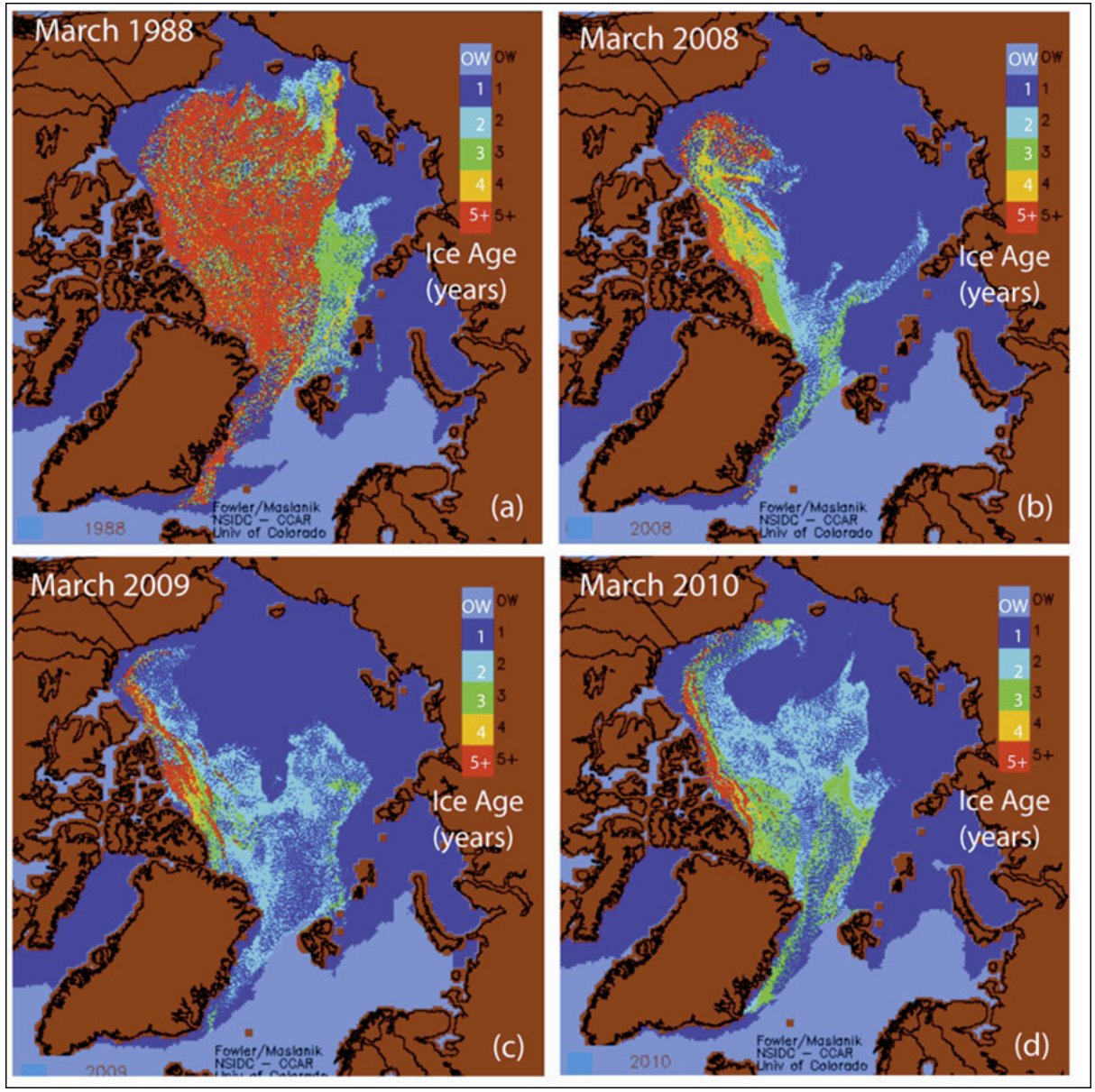


September 2011

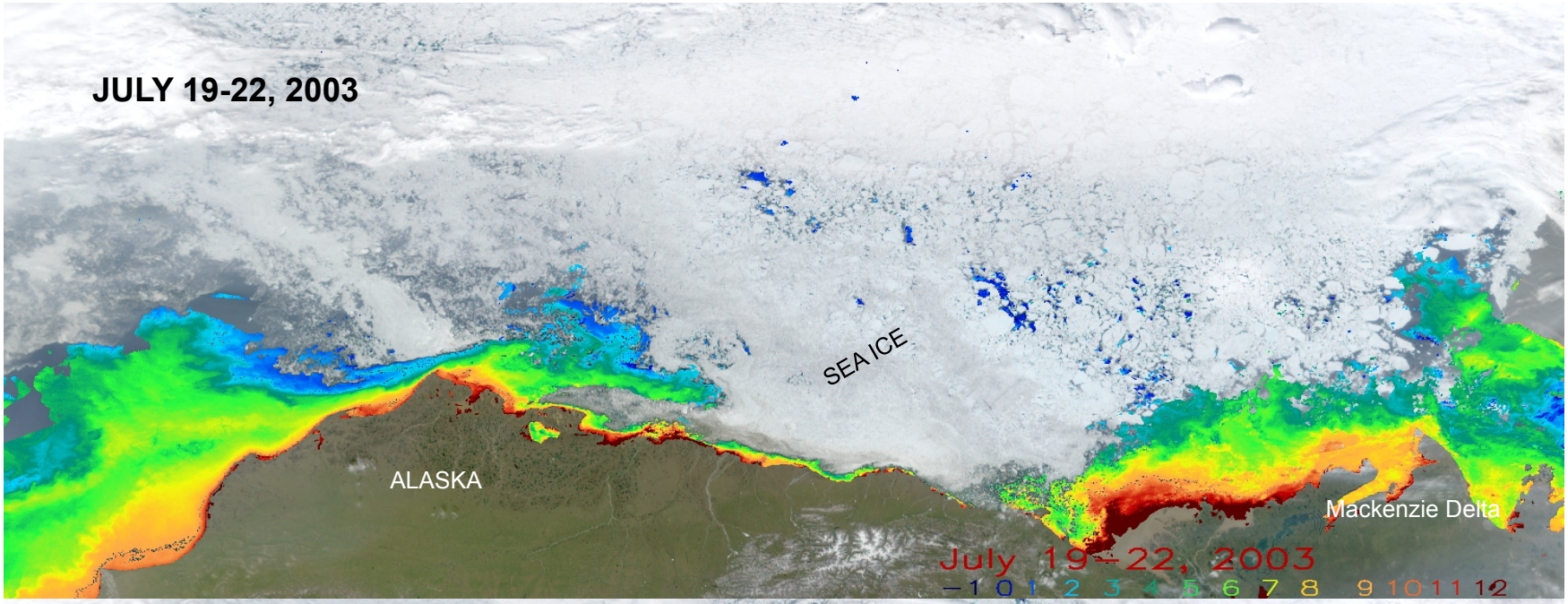


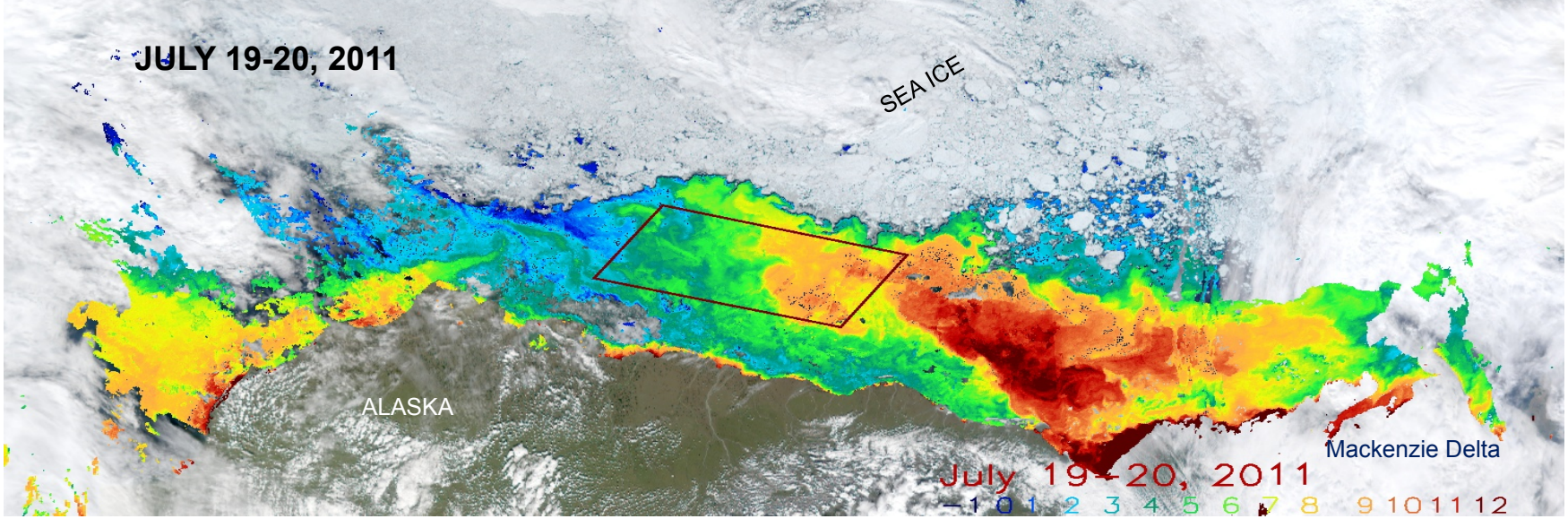
42 % Loss of Multi-year (thick) Sea Ice between January 2004 and 2008

Ron Kwok (JPL)



Conditions have radically changed in the last five years and will continue

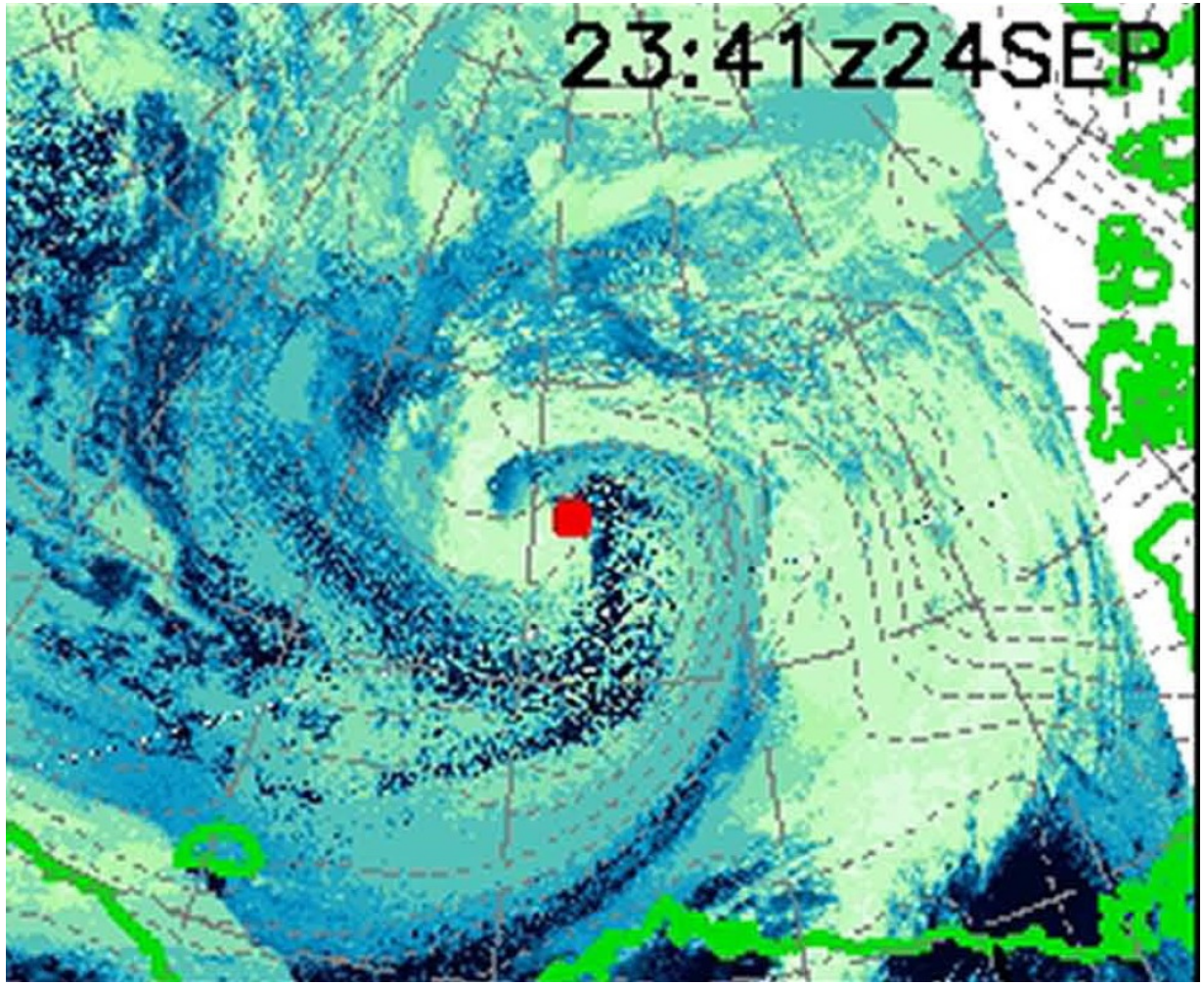




But we found the ocean was warm

Chukchi Sea
September 30, 2009

Atmospheric Storm in Pacific Arctic

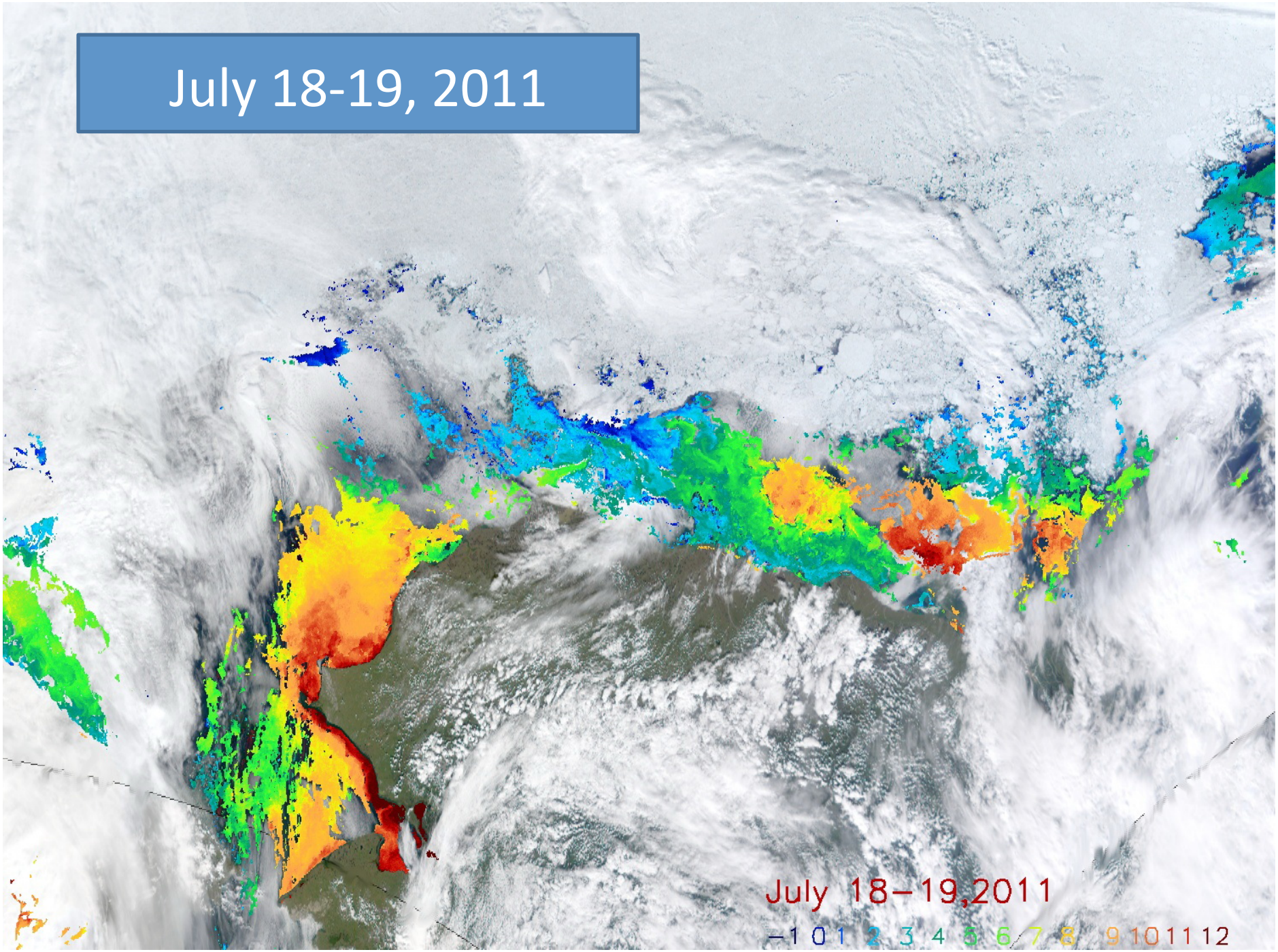


2010

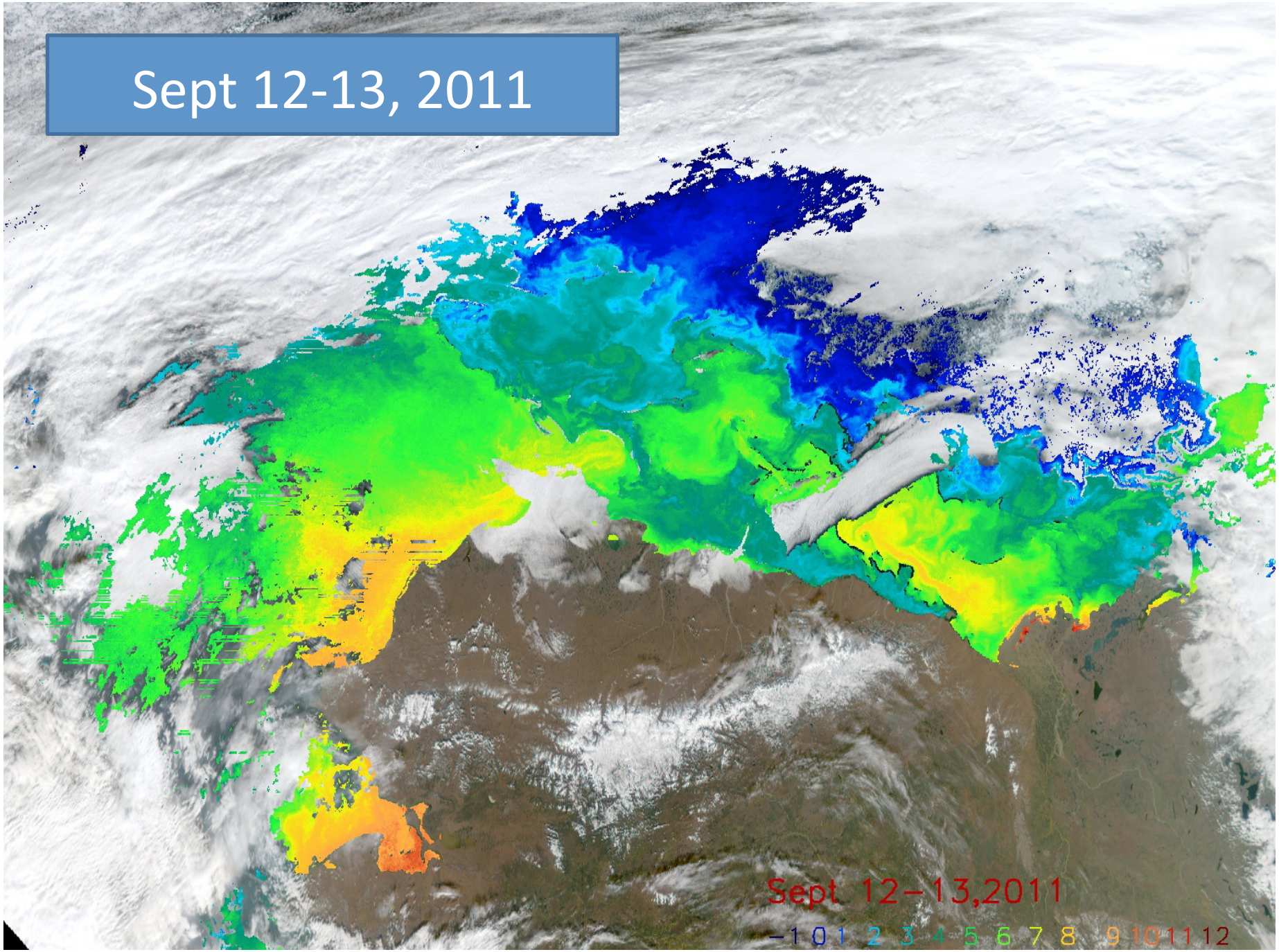
Alaska

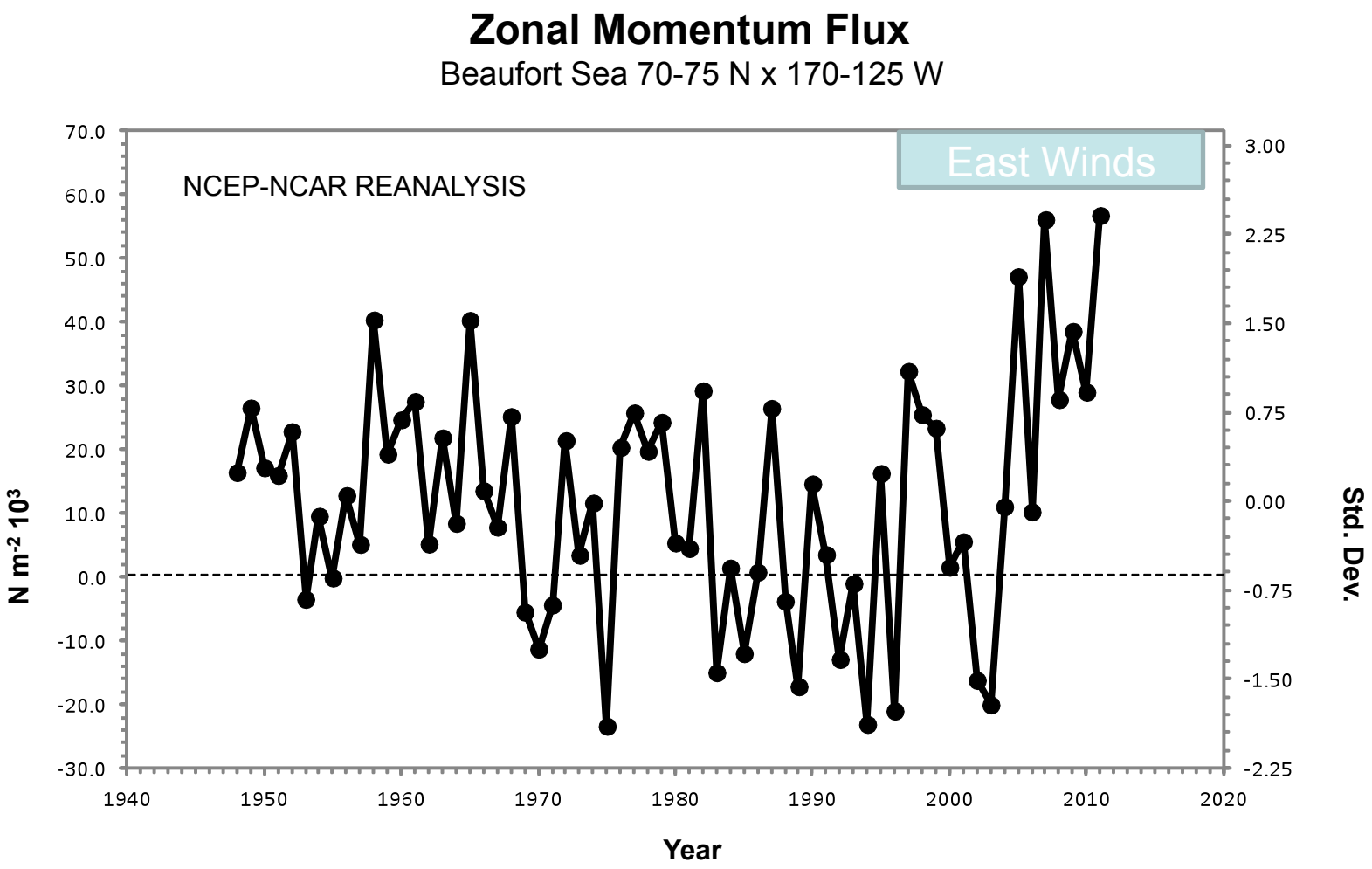
September Storm Genesis in Chukchi Sea

July 18-19, 2011



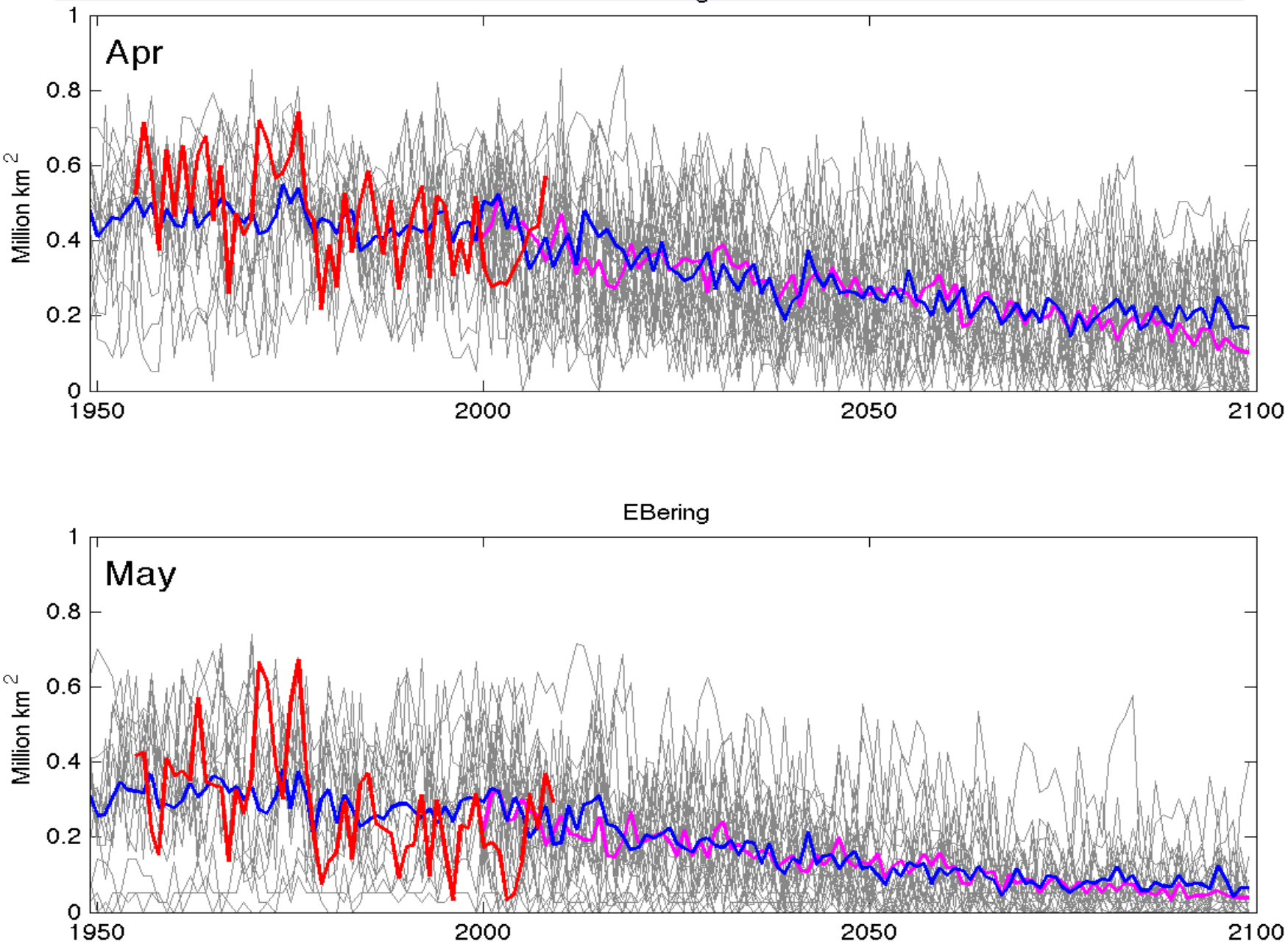
Sept 12-13, 2011



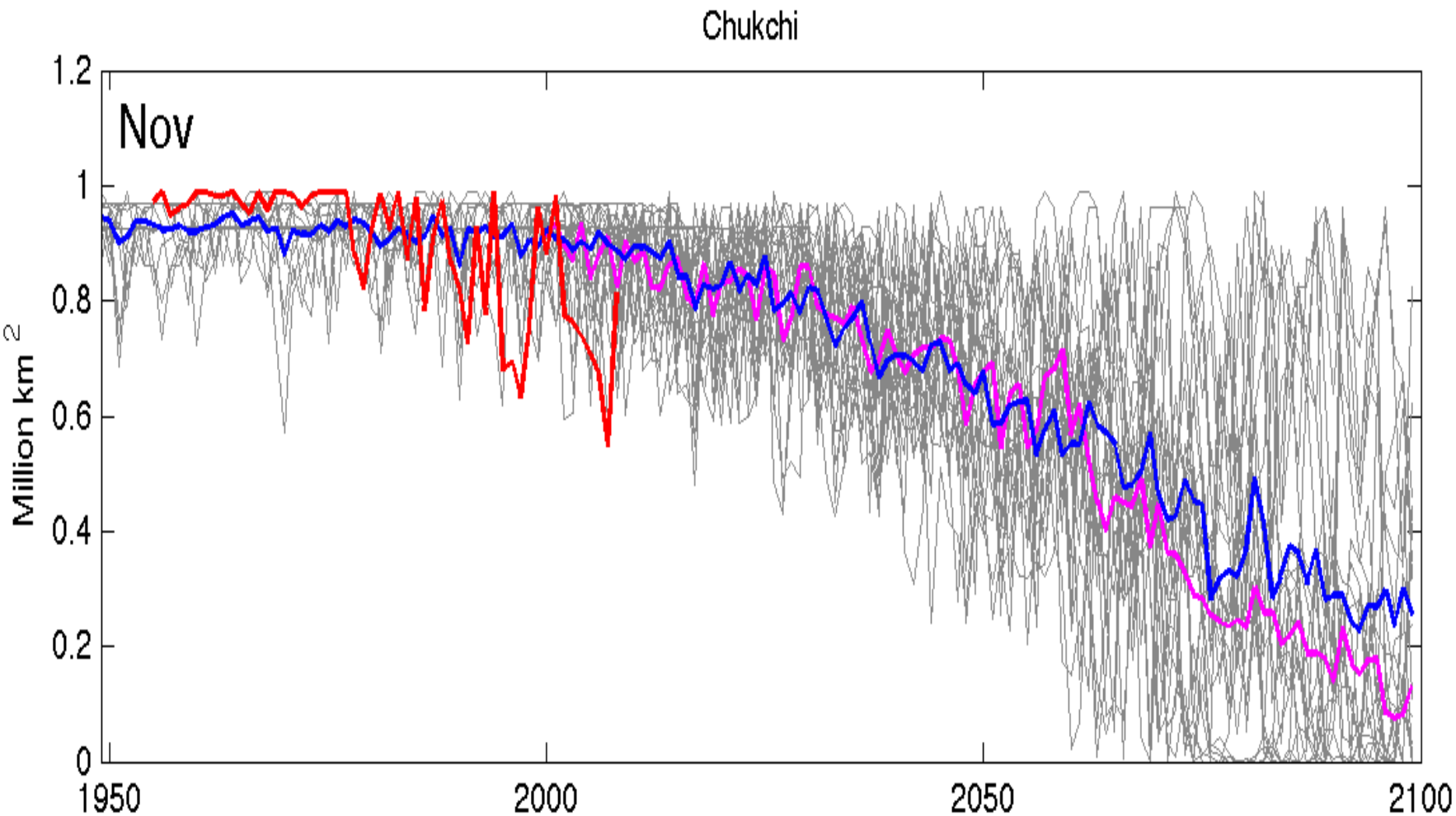


Combined Impact of new Summer Wind Pattern, Ocean Currents, and Ice Albedo Feedback

Future Sea Ice Loss from Climate Models

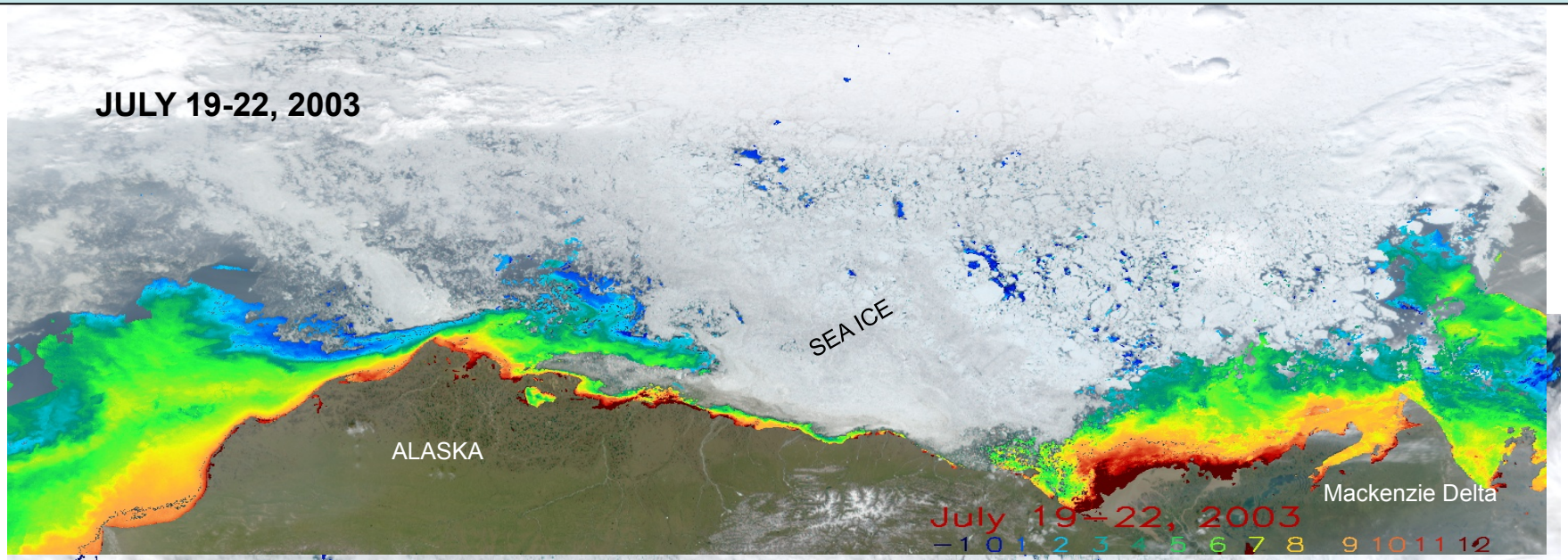


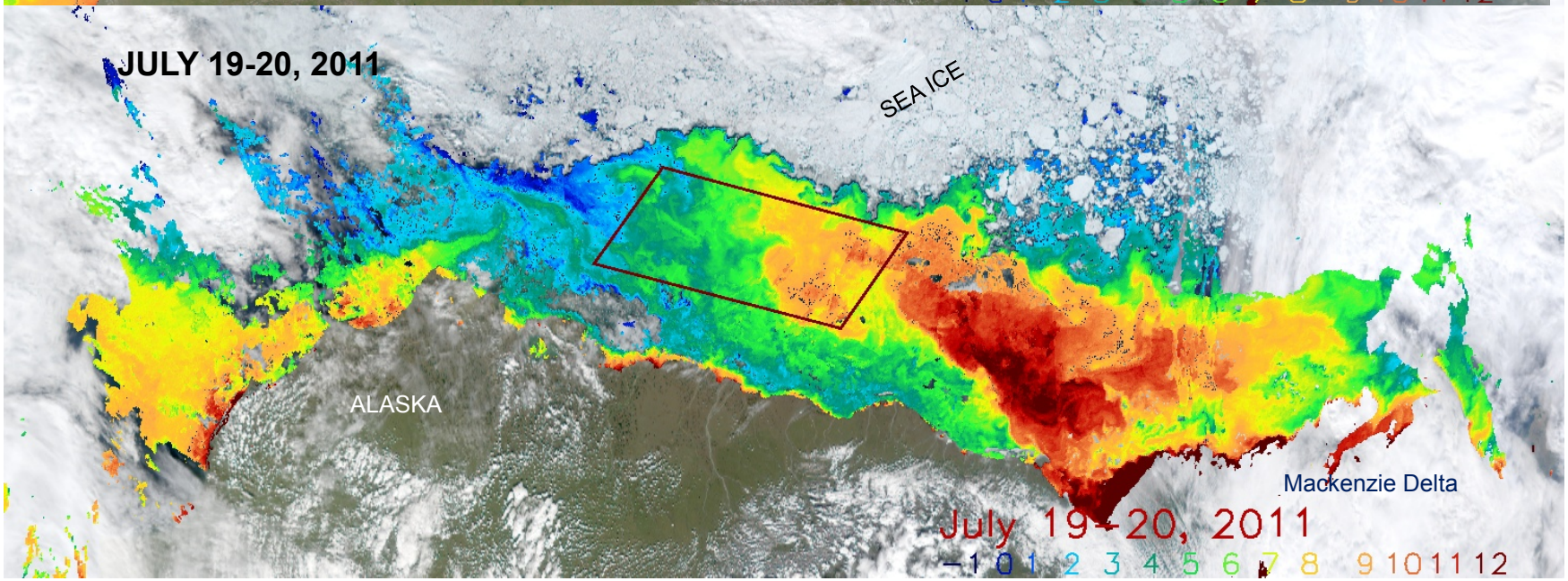
Future Sea Ice Loss



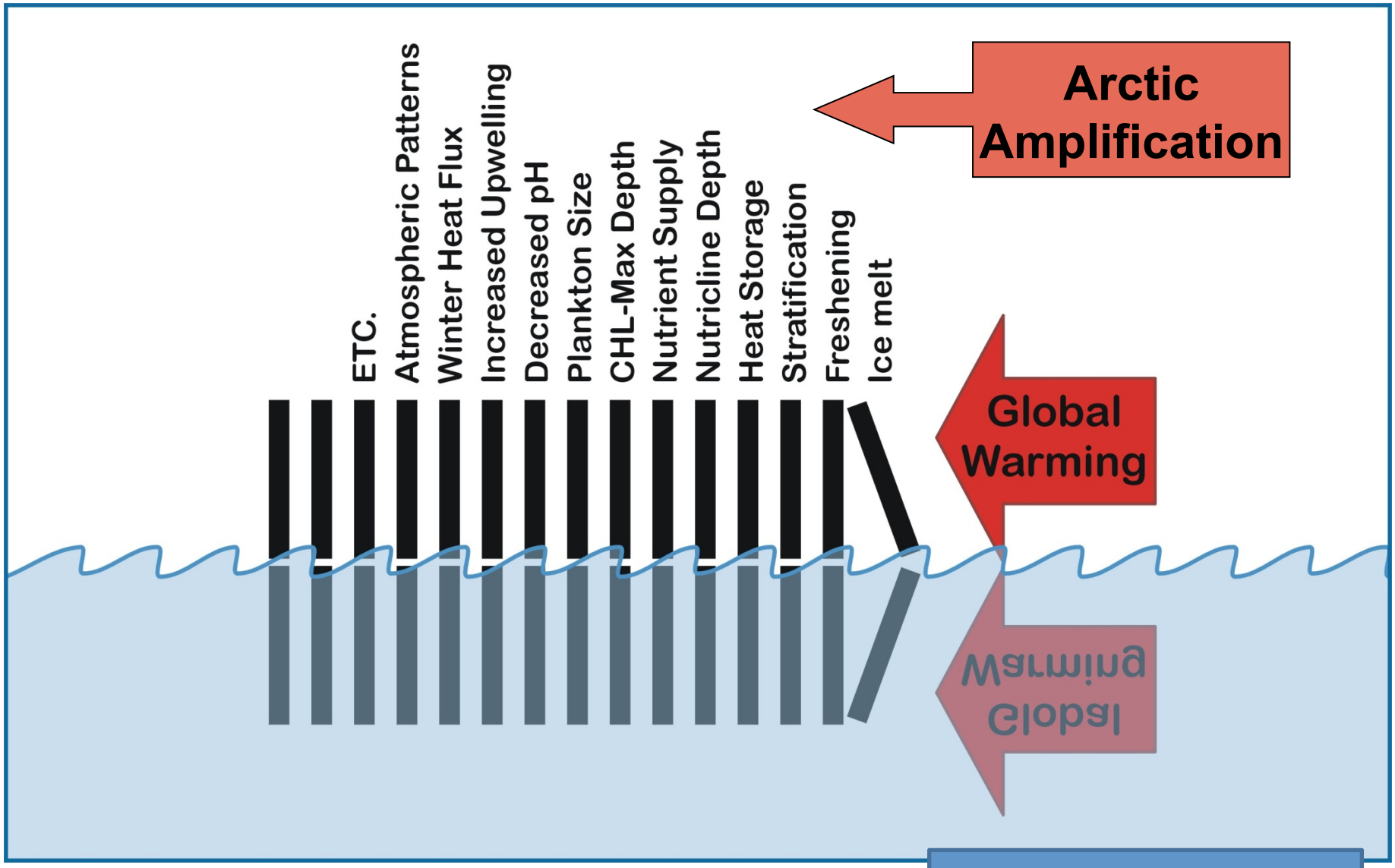
Observed Sea Ice loss at a rate faster than Model Projections

Why have Conditions radically changed in the last five years? How they will continue?





Cascading Climate Impacts to Ocean and Biology



From E Carmack

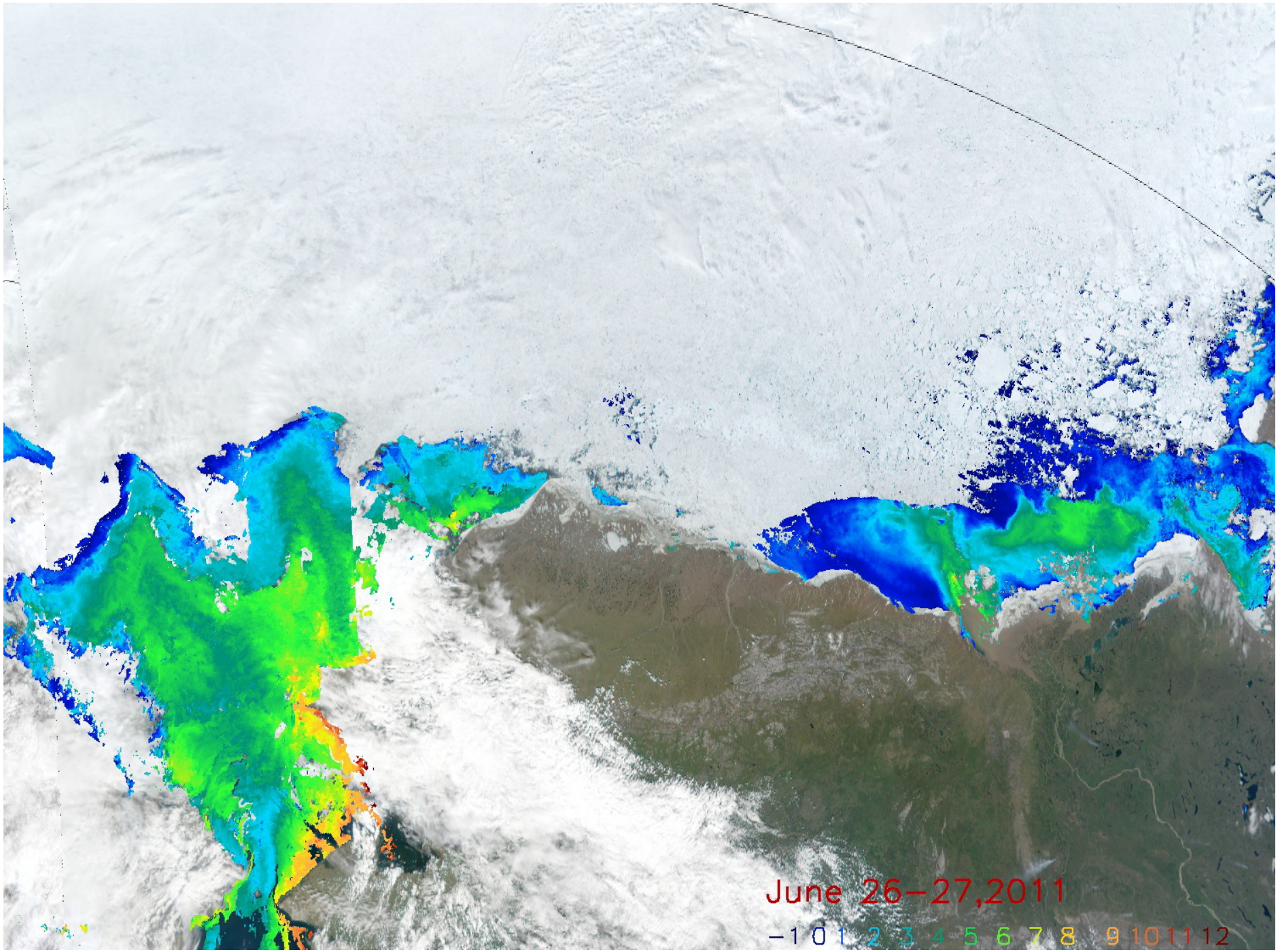
Summary and Questions

New Arctic/Same Bering Sea

Western Arctic North: What is the rate of Arctic Amplification and new Coupled Feedbacks?

How do cascading impacts modify the Ocean and Biology? Develop Present & Future Scenarios.

Western Arctic South: Still dominated by Aleutian Low. Modest spring sea ice changes in SE Bering Sea.


June 26–27,2011
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