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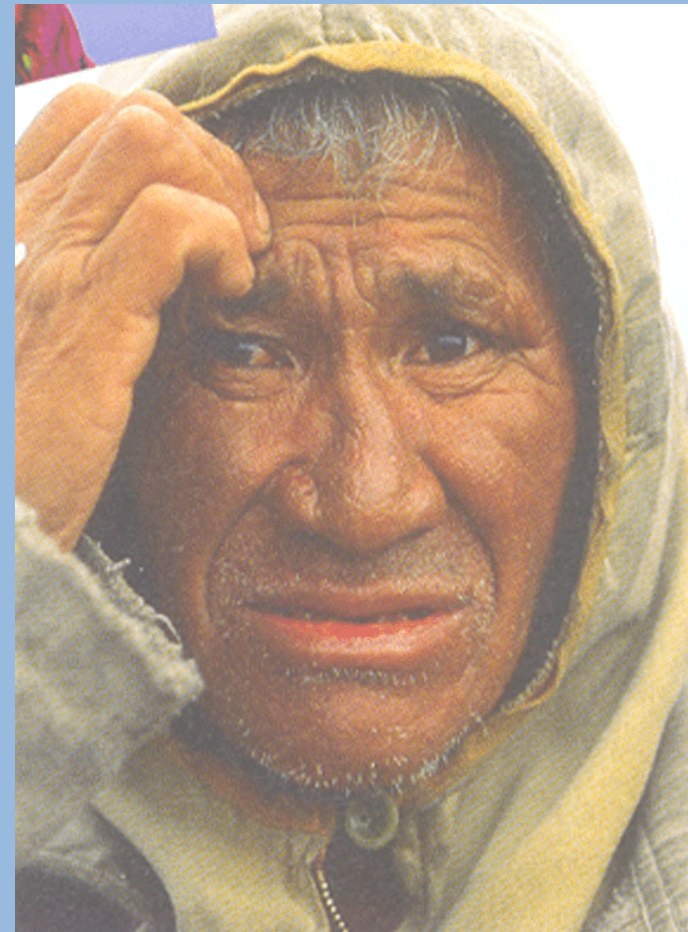
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Key results from the AC/AMAP report on Snow, Water, Ice & Permafrost in the Arctic (SWIPA)

Arctic A Messenger for Global Change
COP-17 side-event 06.12.2011.

Dr. Lars-Otto Reiersen
Prof. Terry Callaghan

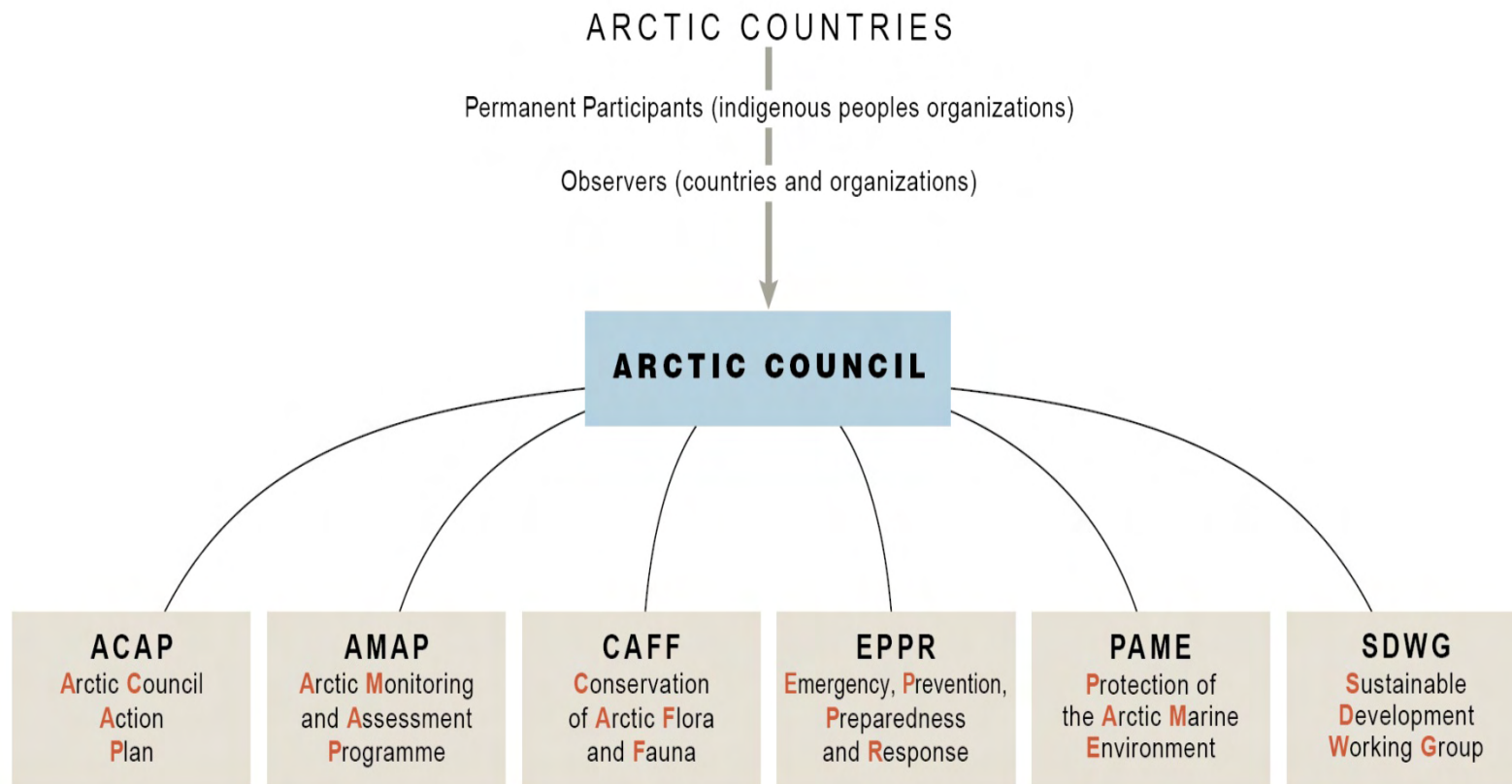




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Permanent Participants (6 Arctic Indigenous Orgs):

- Aleut International Association
- Arctic Athabaskan Council
- Gwich'in Council International
- Inuit Circumpolar Council
- Saami Council
- Russian Arctic Indigenous Peoples of the North (RAIPON)

AMAP Assessment 2009: **Human Health in the Arctic**



Arctic Monitoring and Assessment Programme (AMAP)

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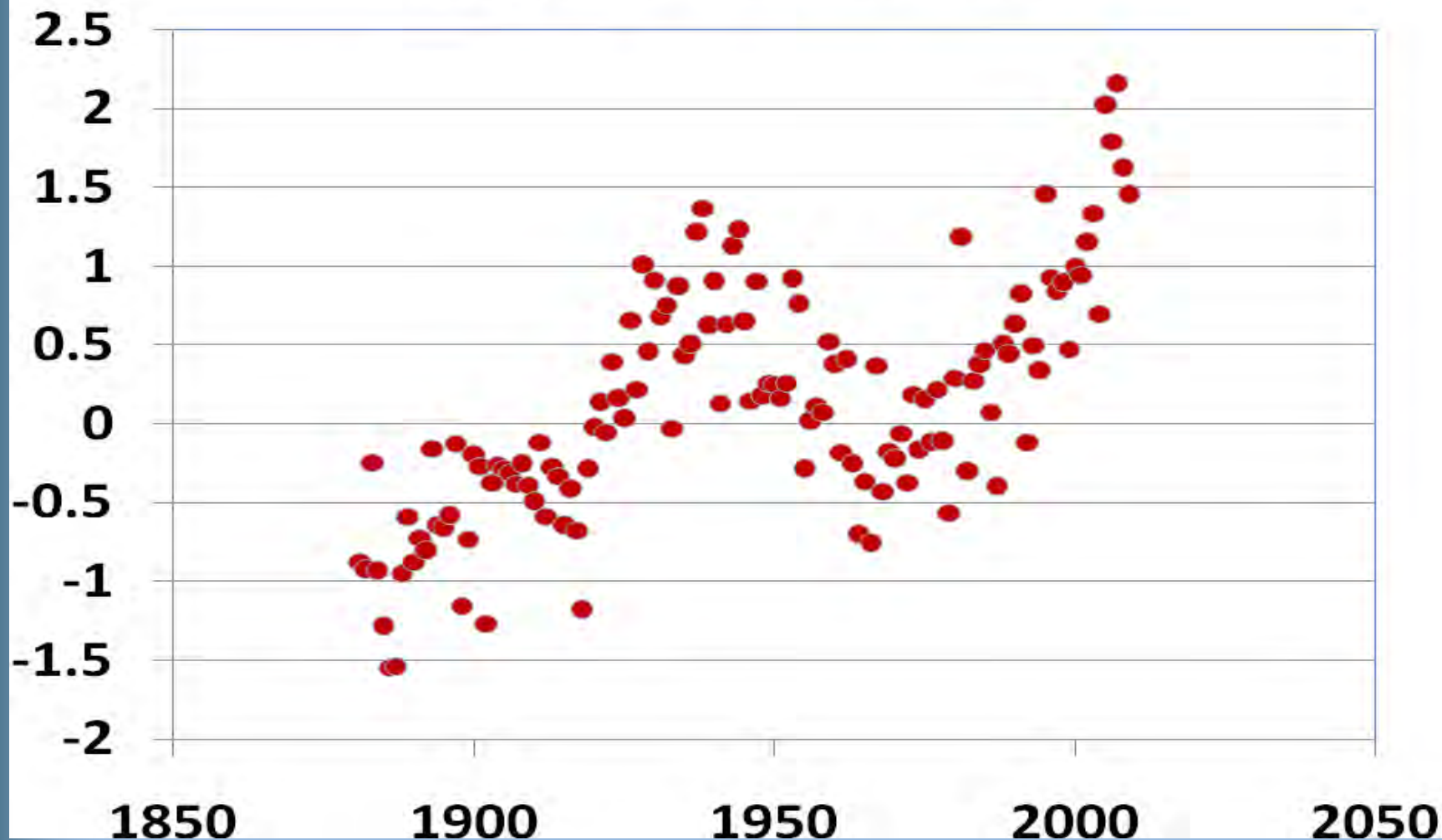
AMAP's geographical coverage



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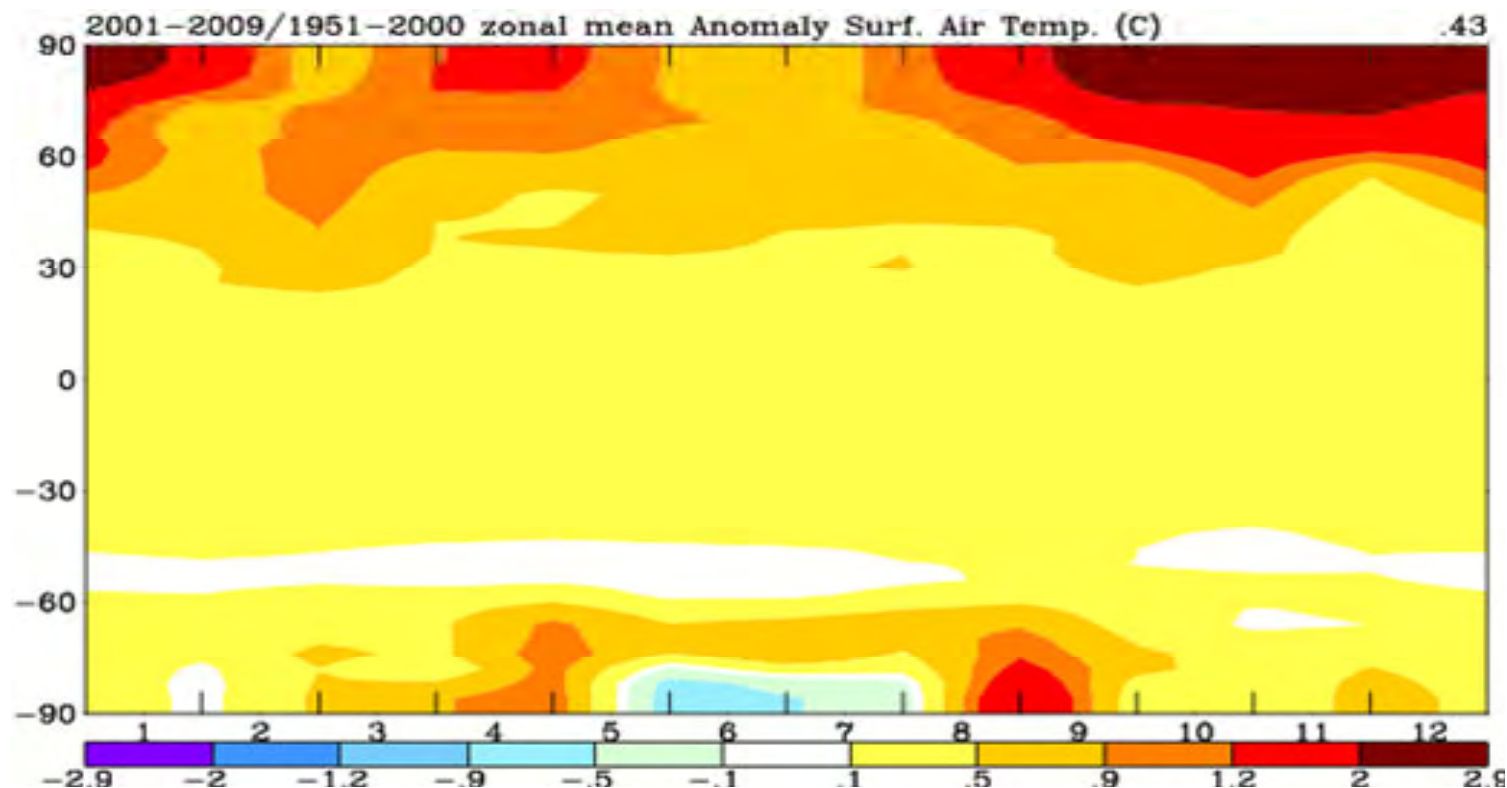
**Annual surface air temperature
averaged over 60°N - 90°N**



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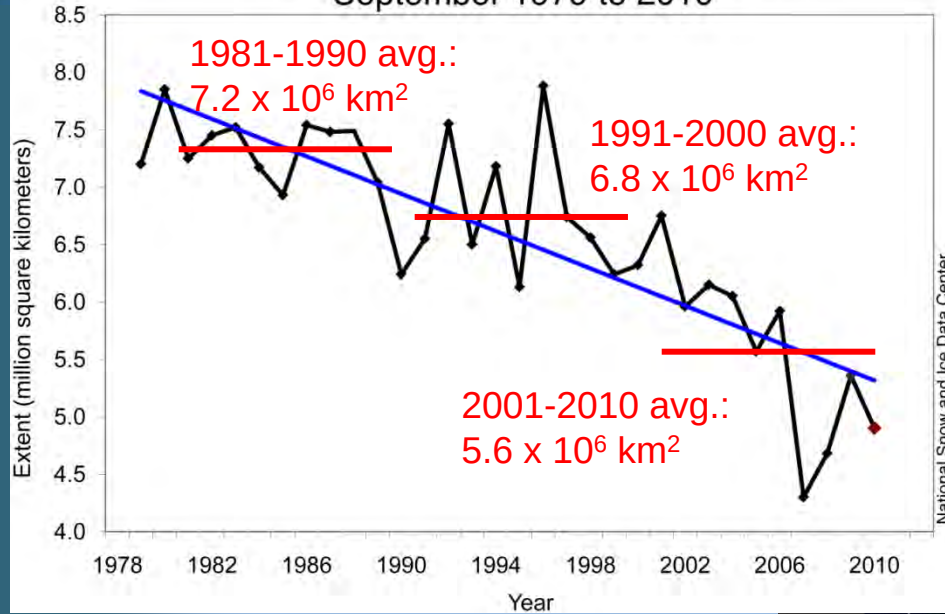
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Latitude-month dependence of temperature anomalies, 2001-2009

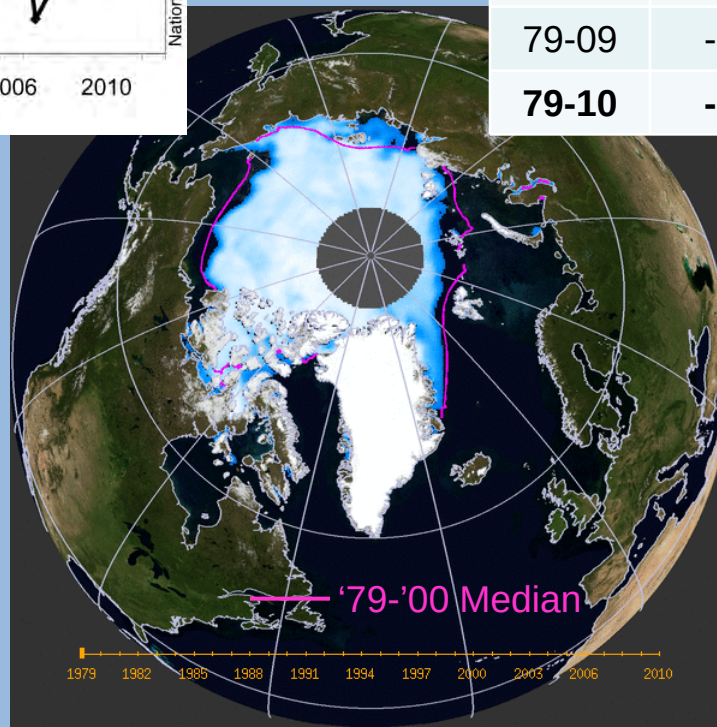


Accelerating September trend

Average Monthly Arctic Sea Ice Extent
September 1979 to 2010



Year Range	Trend (km ² /yr)	%/dec. rel. 79-00 avg.
79-01	-45900	-6.5
79-02	-51000	-7.3
79-03	-52800	-7.5
79-04	-54600	-7.8
79-05	-59400	-8.4
79-06	-60200	-8.6
79-07	-71600	-10.2
79-08	-78100	-11.1
79-09	-78700	-11.2
79-10	-81400	-11.6



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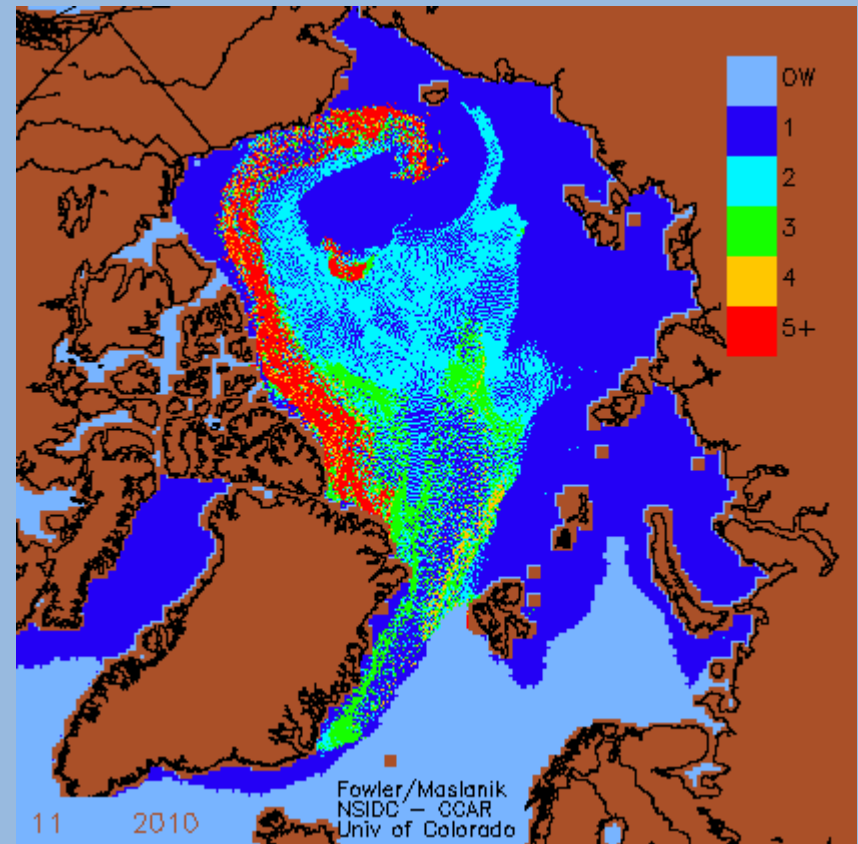
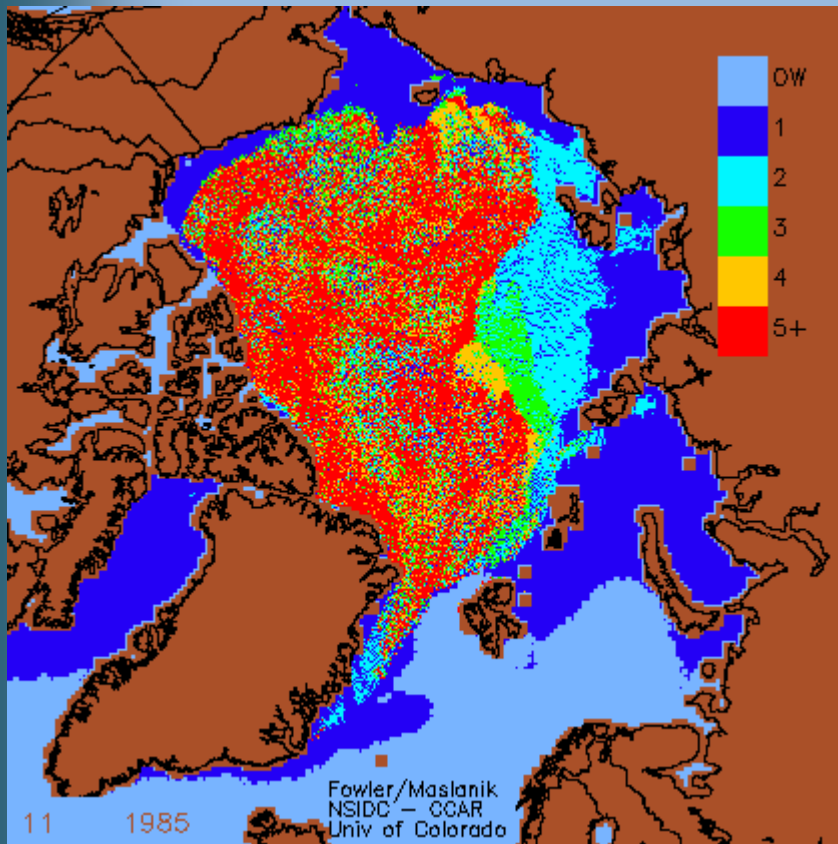
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Ice is getting younger and thinner

Much of older, thicker ice north of Alaska now melting away during

summer
Mar 1985 – Mar 1986

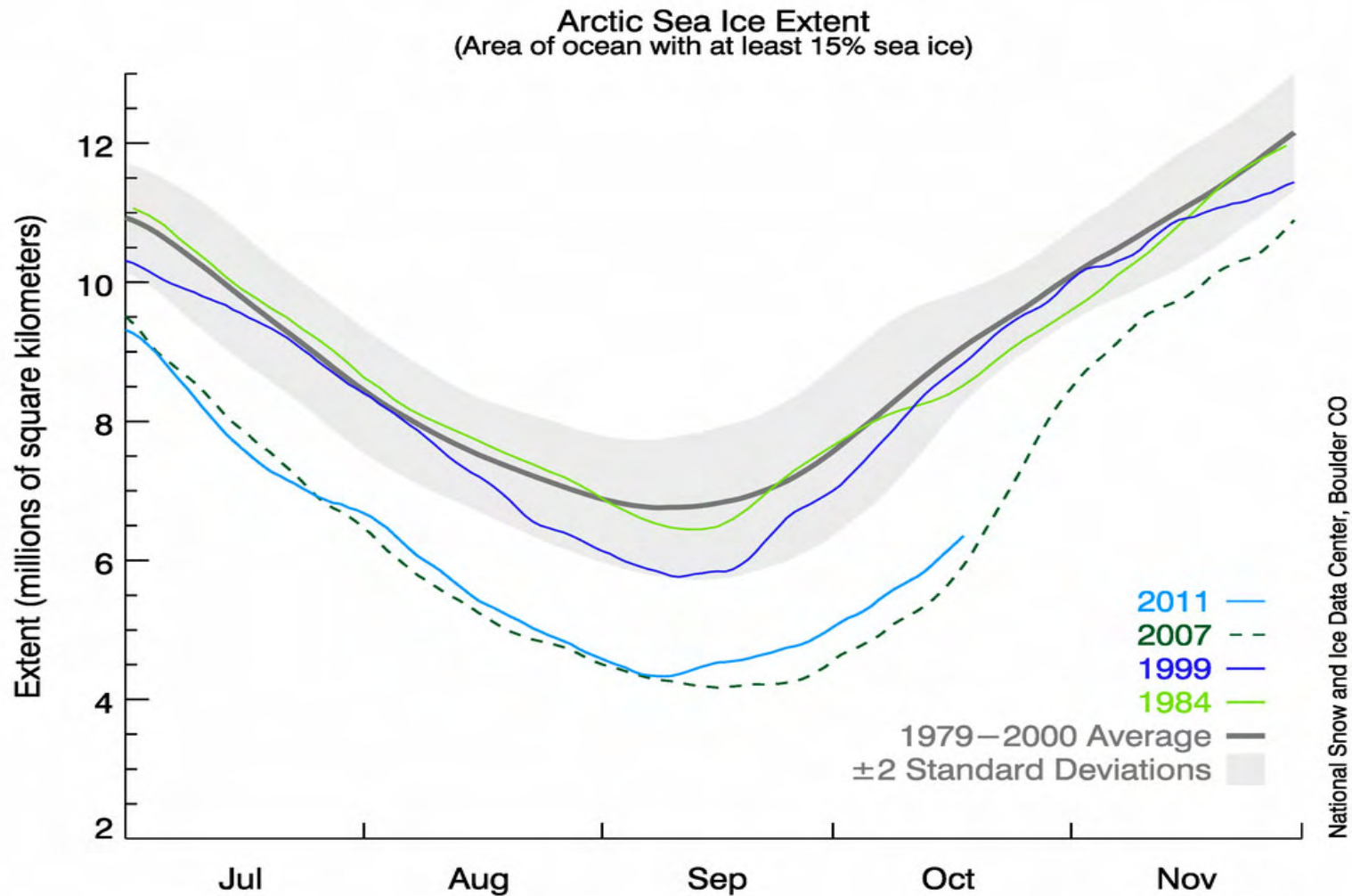
Mar 2010 – Mar 2011



Based on satellite observations; from J. Maslanik, C. Fowler, Univ. Colorado

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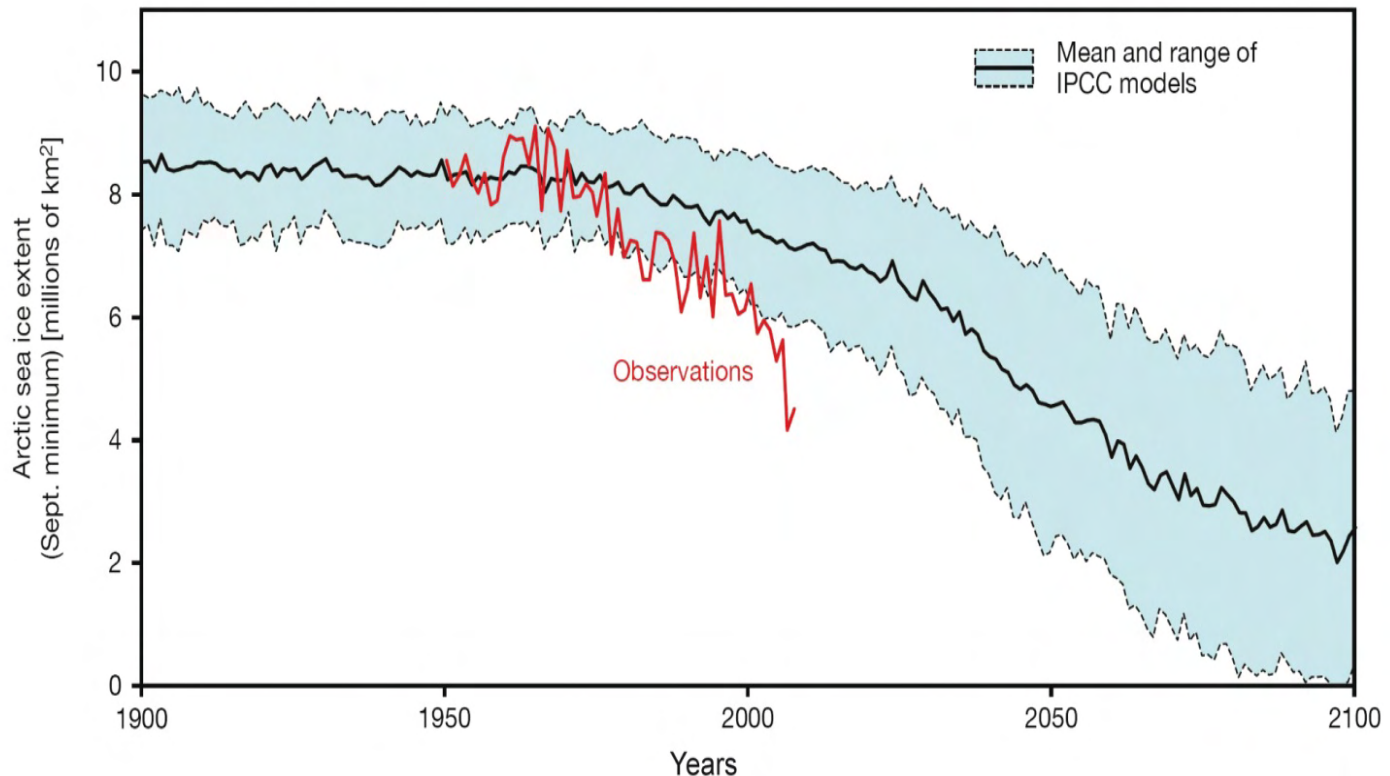


18 Oct 2011

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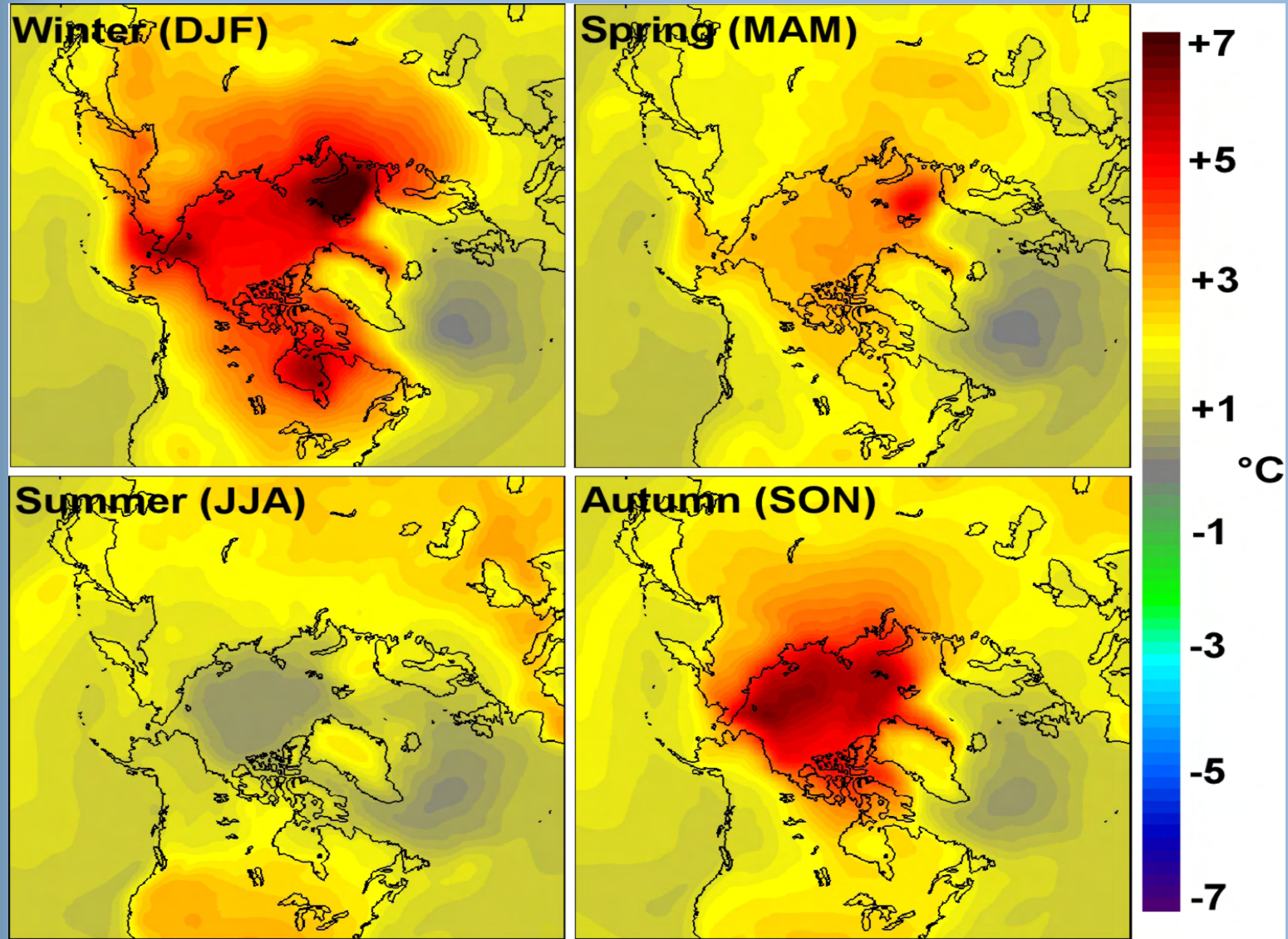
Sea ice projections reported by ACIA 2005 and the Intergovernmental Panel on Climate Change (IPCC) in 2007 underestimated the rates of change now observed



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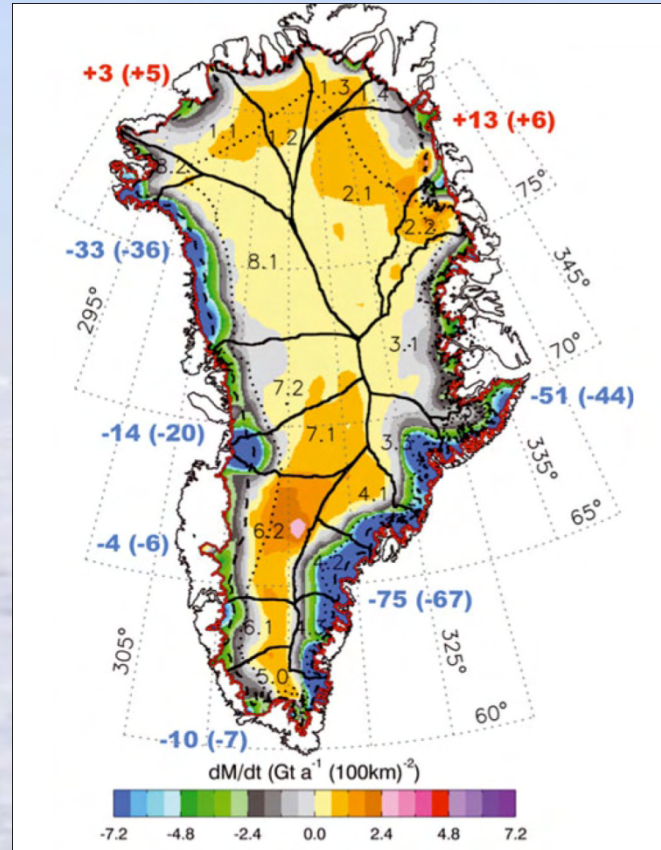
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Projected changes of temperature: 2070-2090



Surface Mass Balance			Sea Level Rise		
Snow fall (acc.)	Run off (melt)	Ice Discharge	Tot. Mass Bal.	Greenland	Global Eust.
550  570 Gt/yr					

Grey1990's
Black: 2005-2006



IceSat observations

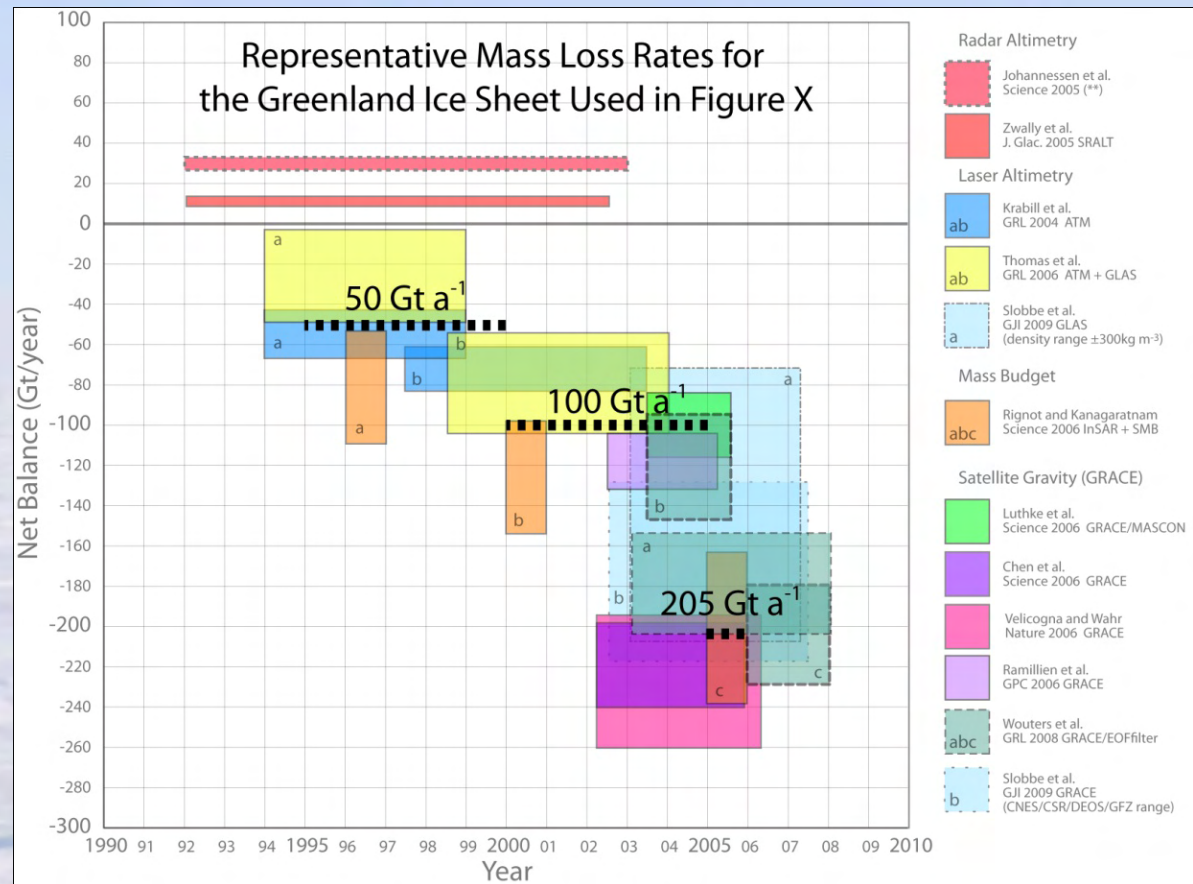
Zwally et al, 2011

The Greenland Ice Sheet in a Changing Climate

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Surface Mass Balance				Sea Level Rise	
Snow fall (acc.)	Run off (melt)	Ice Discharge	Tot. Mass Bal.	Greenland	Global Eust.
550  570 Gt/yr	250  350 Gt/yr	300  400 Gt/yr	-30  -205 Gt/yr	0.1  0.6 mm/yr	

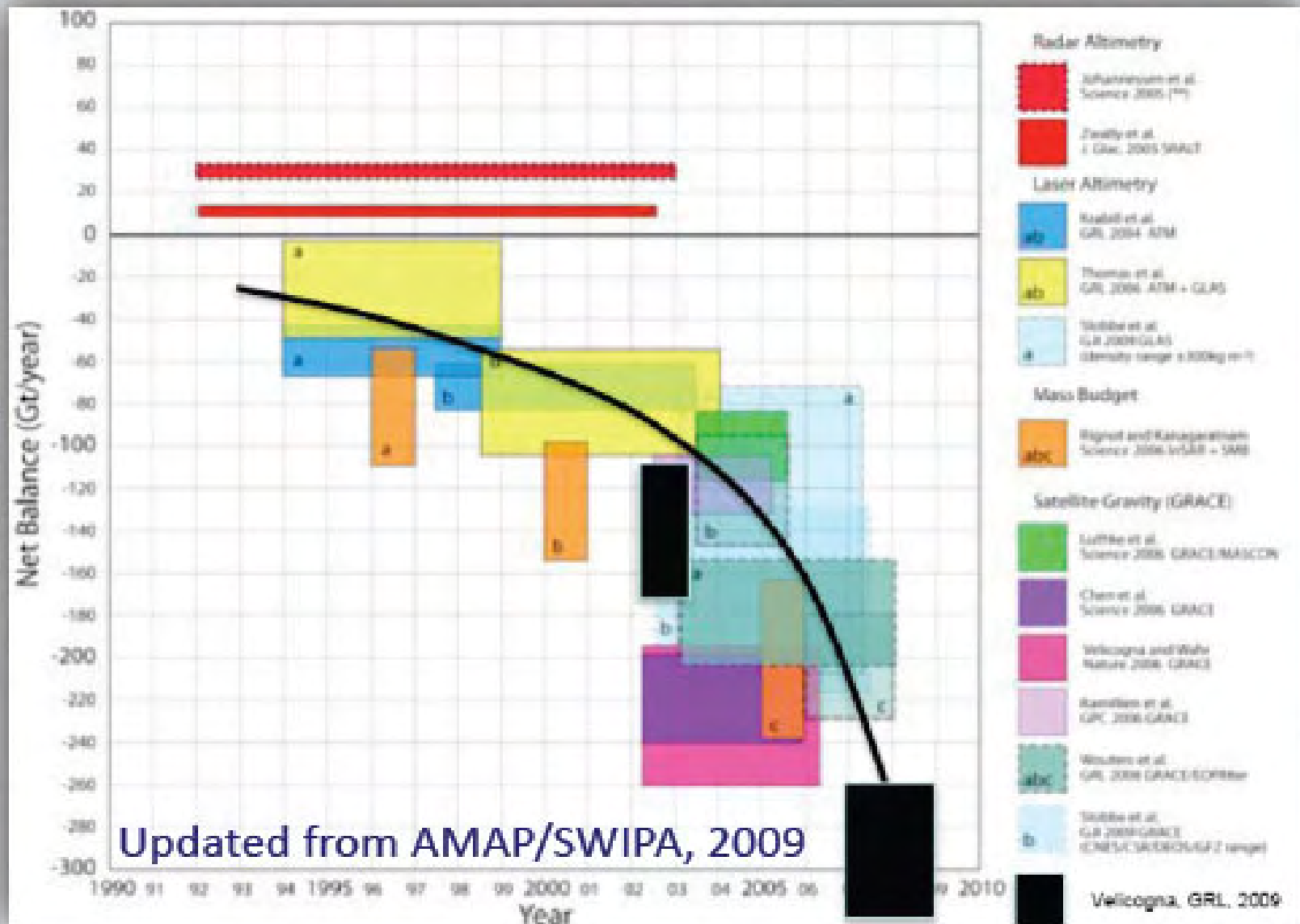
Grey1990's
Black: 2005-2006



The Greenland Ice Sheet in a Changing Climate

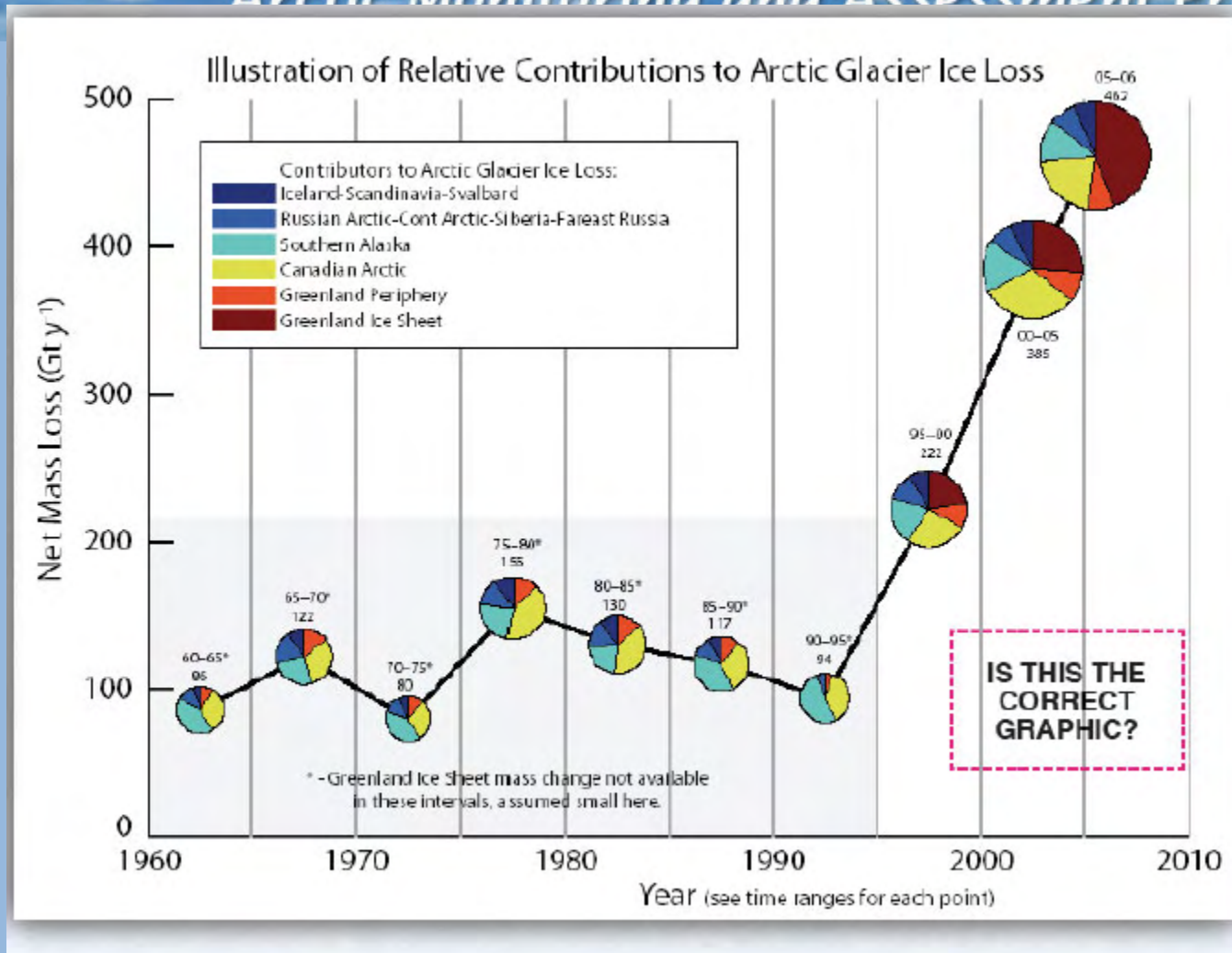
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Greenland Mass Balance



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Surface Mass Balance				Sea Level Rise	
Snow fall (acc.)	Run off (melt)	Ice Discharge	Tot. Mass Bal.	Greenland	Global Eust.
550  570 Gt/yr	250  350 Gt/yr	300  400 Gt/yr	-30  -205 Gt/yr	0.1  0.6 mm/yr	1.7  3.3 mm/yr

Grey1990's

Black: 2005-2006

Yellow: before 1990

Red: 1992-2010

Future Predictions

2100 AD (IPCC 2007):

Greenland SLR: 0.05 m

Global SLR: 0.35 m

2100 AD (AMAP 2011):

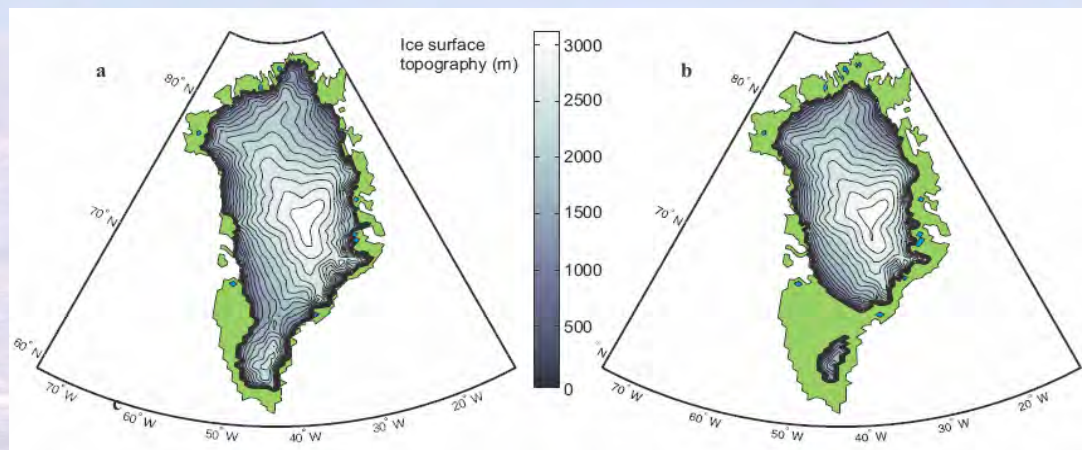
Greenland SLR: 0.14 m

Global SLR: 0.9-1.6 m

3000 AD (AMAP 2011):

Greenland SLR: 1-3 m ?

Global SLR: 5-8 m ?



3000 AD: +4 °C

3000 AD: +8°C

S. Marshall, U. of of Calgary

The Greenland Ice Sheet in a Changing Climate

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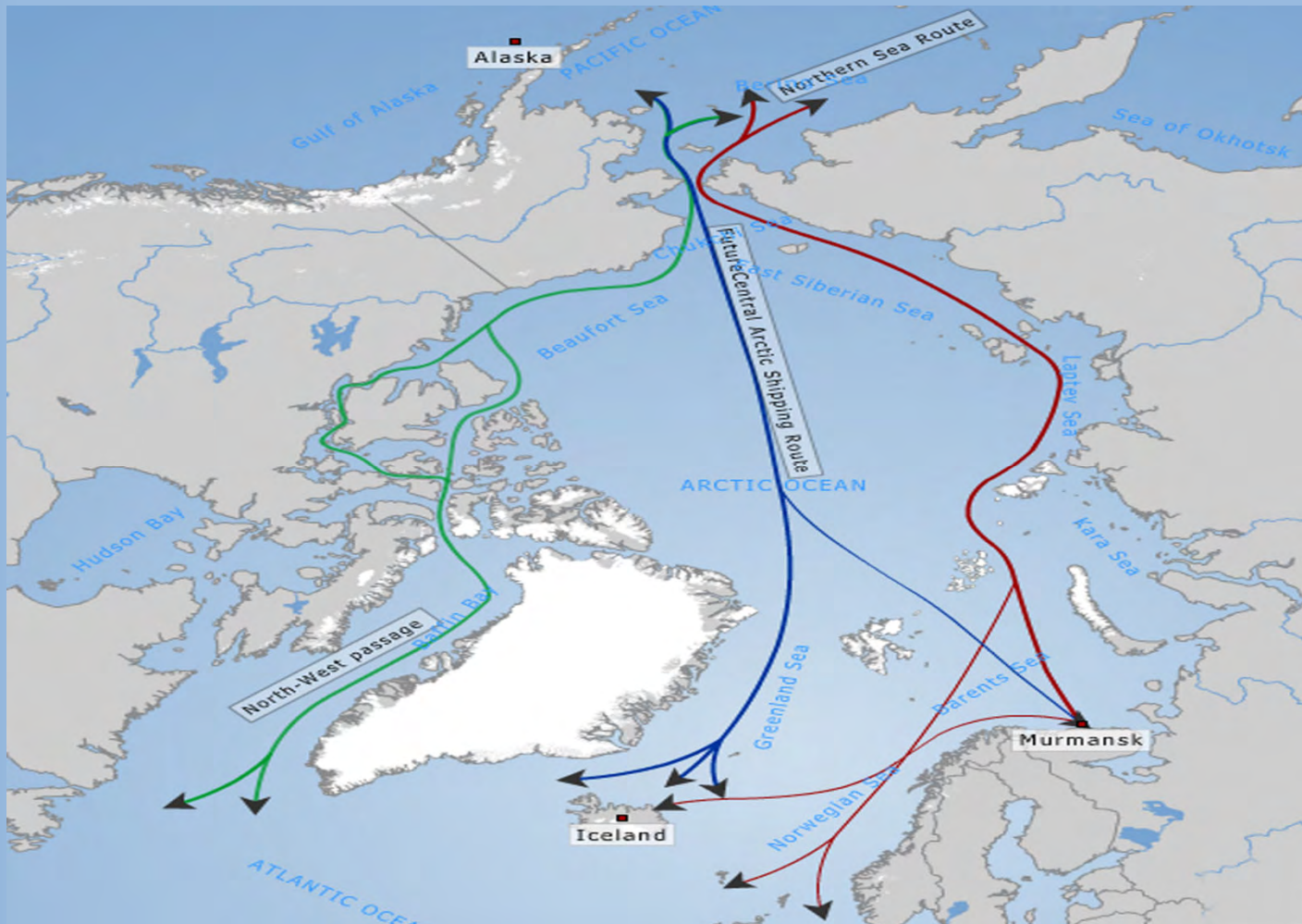


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New possibilities arise





ROYAL DANISH DEFENCE COLLEGE

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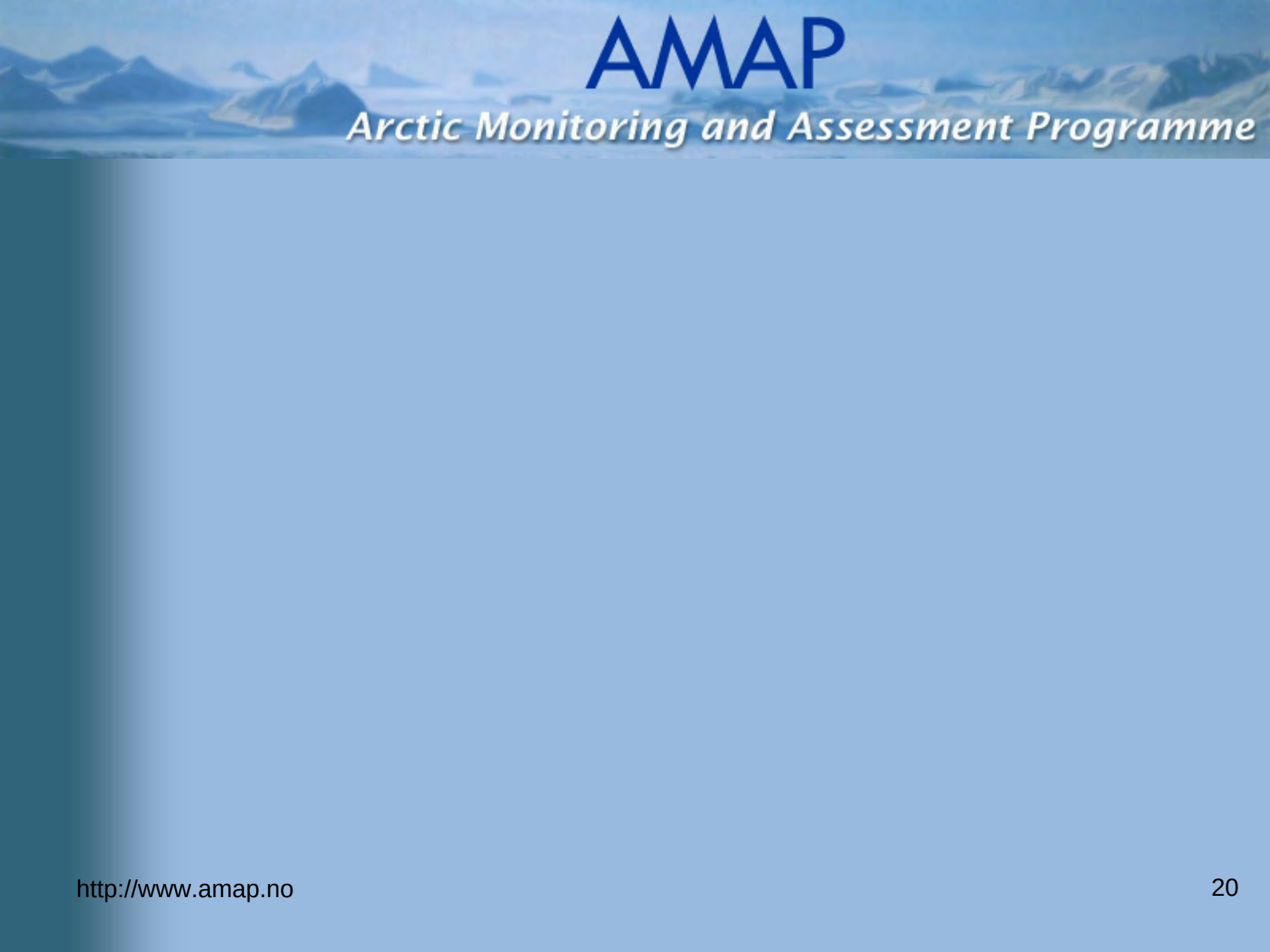


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Arctic – the barometer of the globe



The background of the slide features a stylized, blue-toned illustration of an Arctic landscape. It shows snow-capped mountains and ice formations under a pale sky. The text 'AMAP' is prominently displayed in the upper center in a large, bold, blue sans-serif font.

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