



Microzooplankton grazing in Arctic waters

Calbet, Albert; Saiz, Enric; Riisgaard, Karen; Almeda, Rodrigo; Movilla, Juan Ignacio; Alcaraz, Miquel; Zamora, Sara; Nielsen, Torkel Gissel

Publication date:
2011

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):
Calbet, A., Saiz, E., Riisgaard, K., Almeda, R., Movilla, J. I., Alcaraz, M., Zamora, S., & Nielsen, T. G. (2011). *Microzooplankton grazing in Arctic waters*. Poster session presented at 5th International Zooplankton Production Symposium, Púcon, Chile. <http://www.pices.int/publications/presentations/zoop-2011/s6/S6-1430-Calbet.pdf>

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

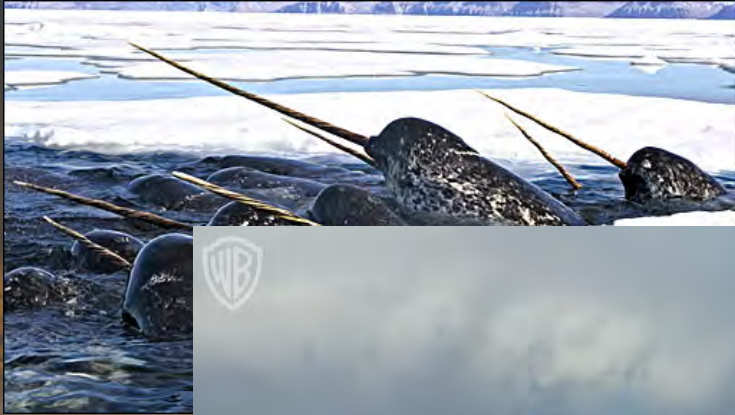
If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Microzooplankton grazing in Arctic waters

Albert Calbet
Enric Saiz
Karen Riisgaard
Rodrigo Almeda
Juan Ignacio Movilla
Miquel Alcaraz
Sara Zamora
Torkel Gissel Nielsen

Institut de Ciències del Mar (CSIC). Spain
National Institute of Aquatic Resources, DTUaqu. Denmark

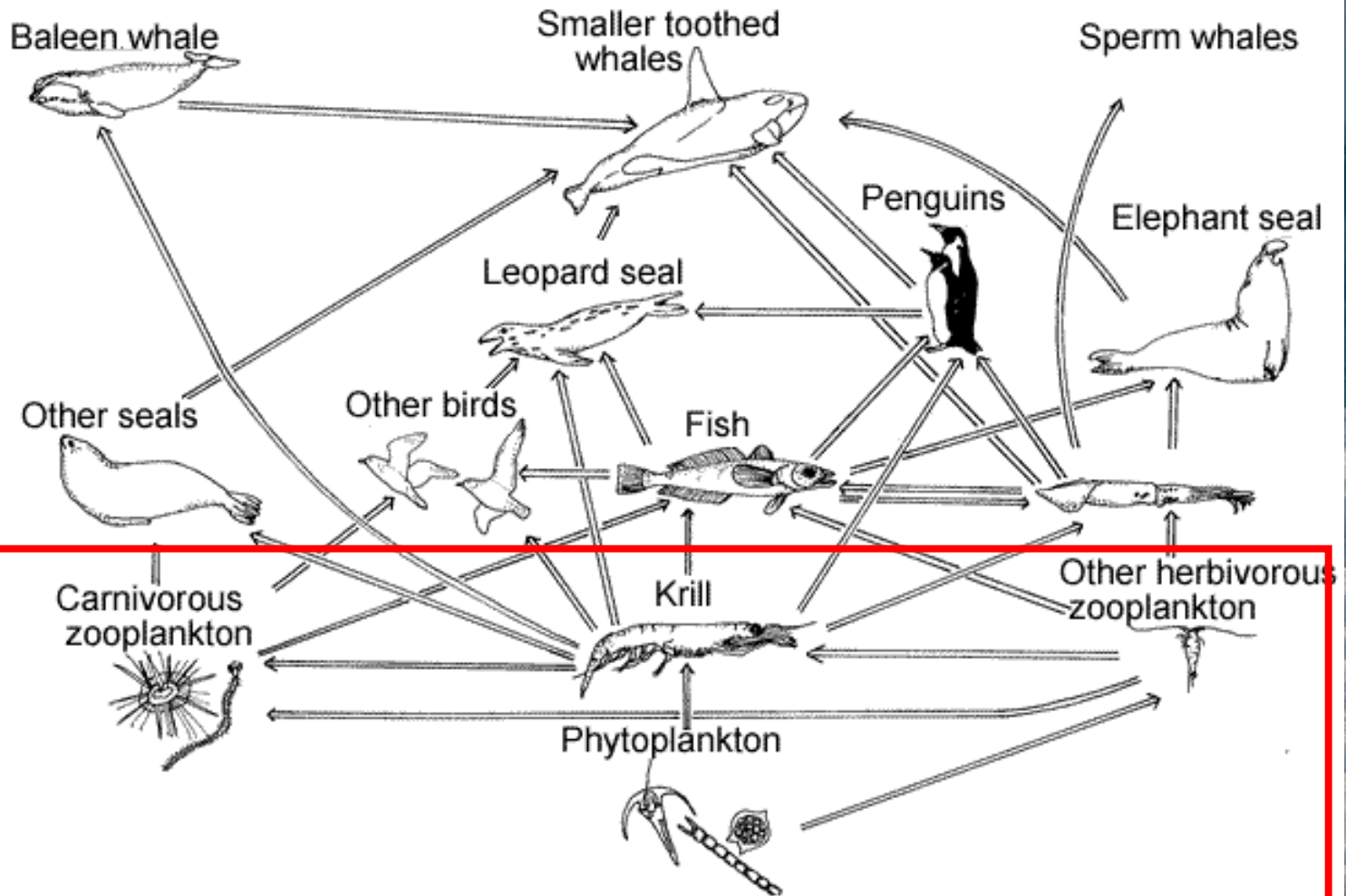
Global warming is seriously threatening Arctic wild life



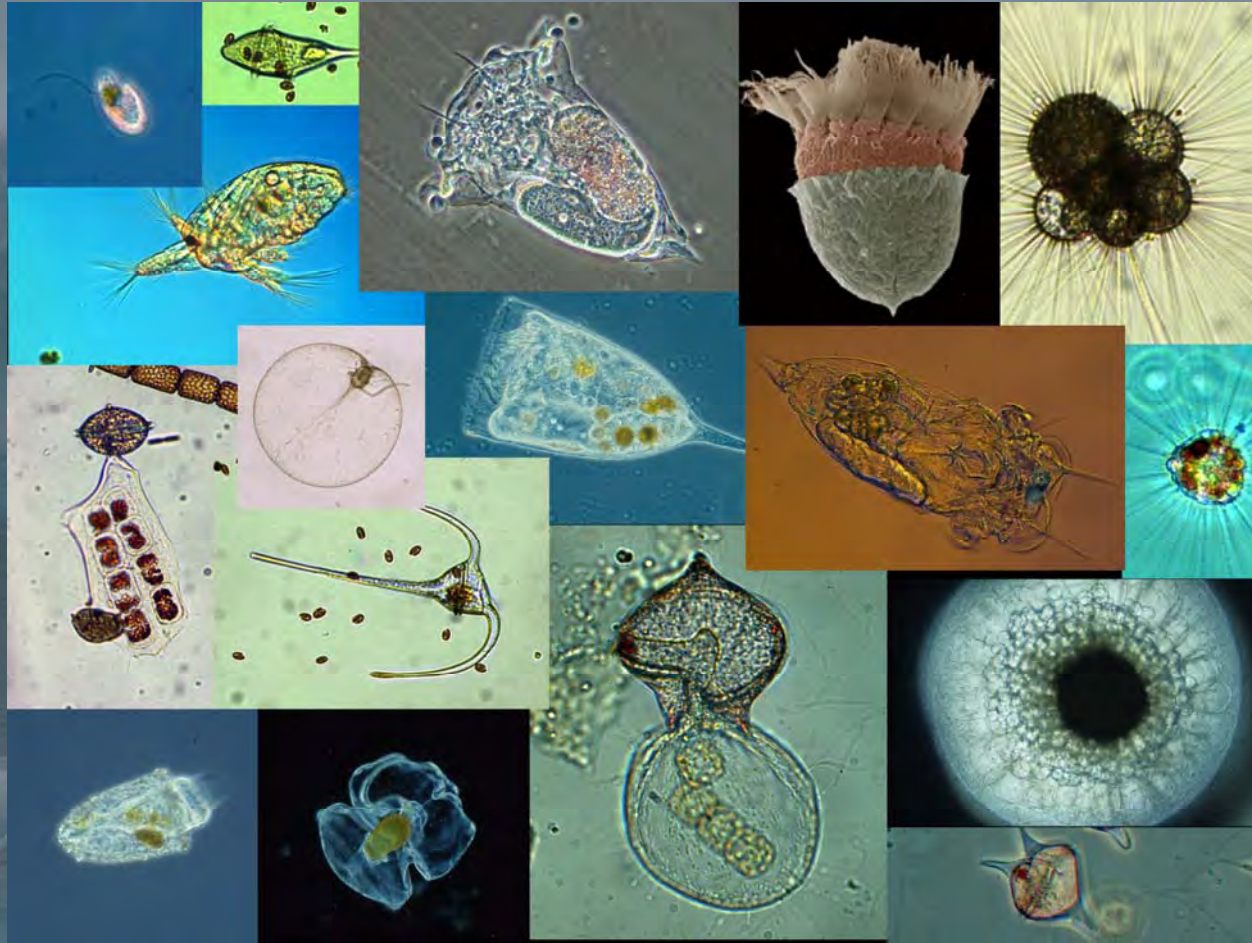
If I don't do something I will be homeless in a few years



What about plankton?

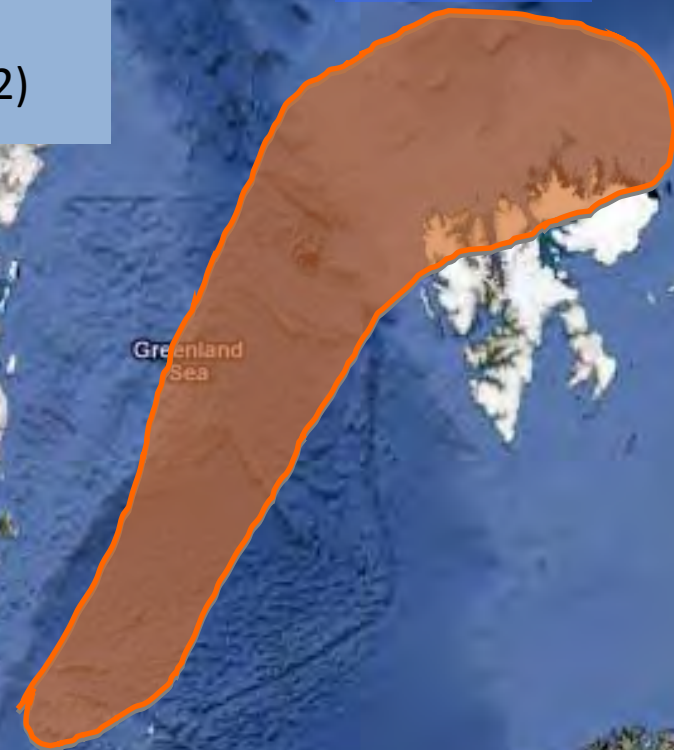


Here we will focus on microzooplankton, and on their role as grazers of phytoplankton



- Structure of the microplankton community
- Microzooplankton grazing (dilution technique; Landry and Hassett 1982)

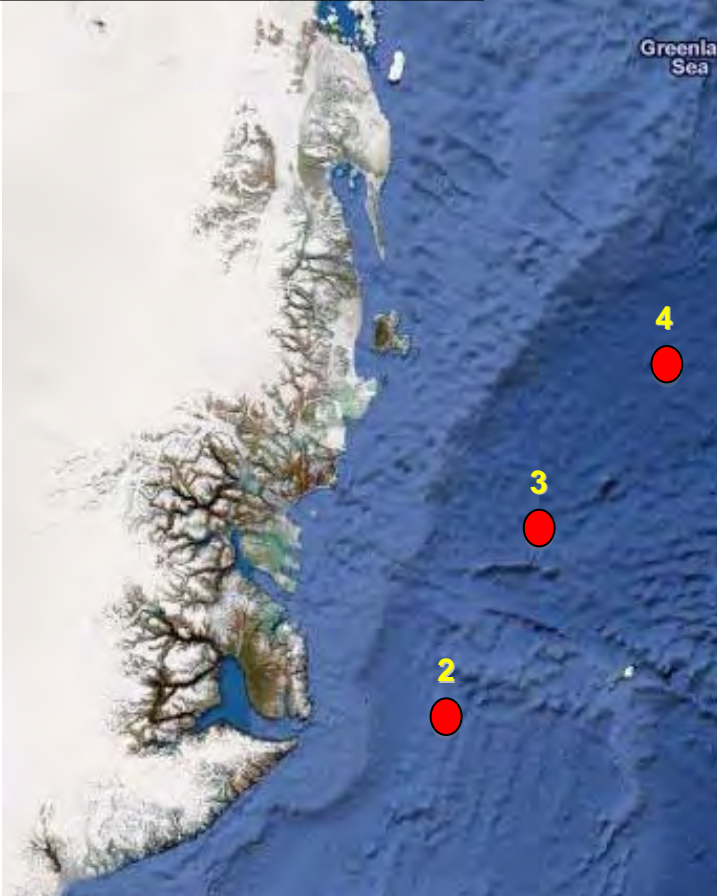
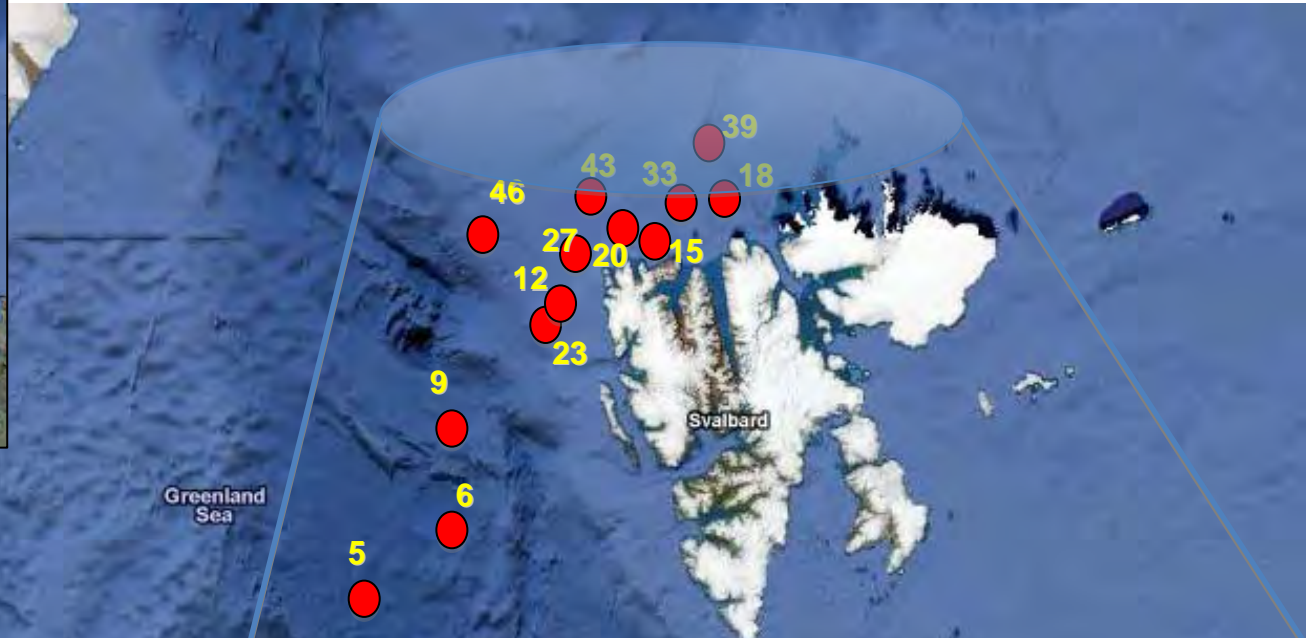
July 2007

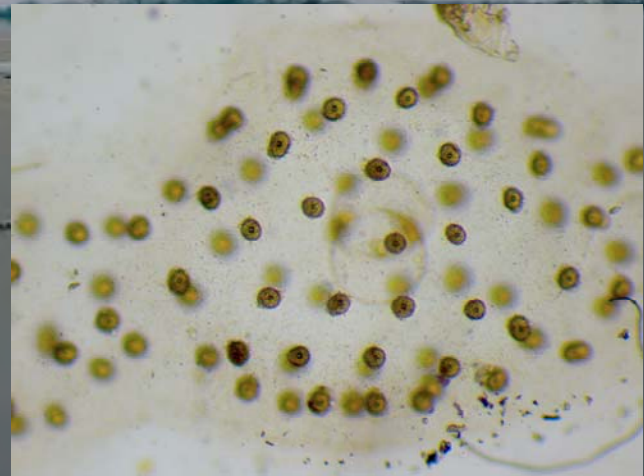
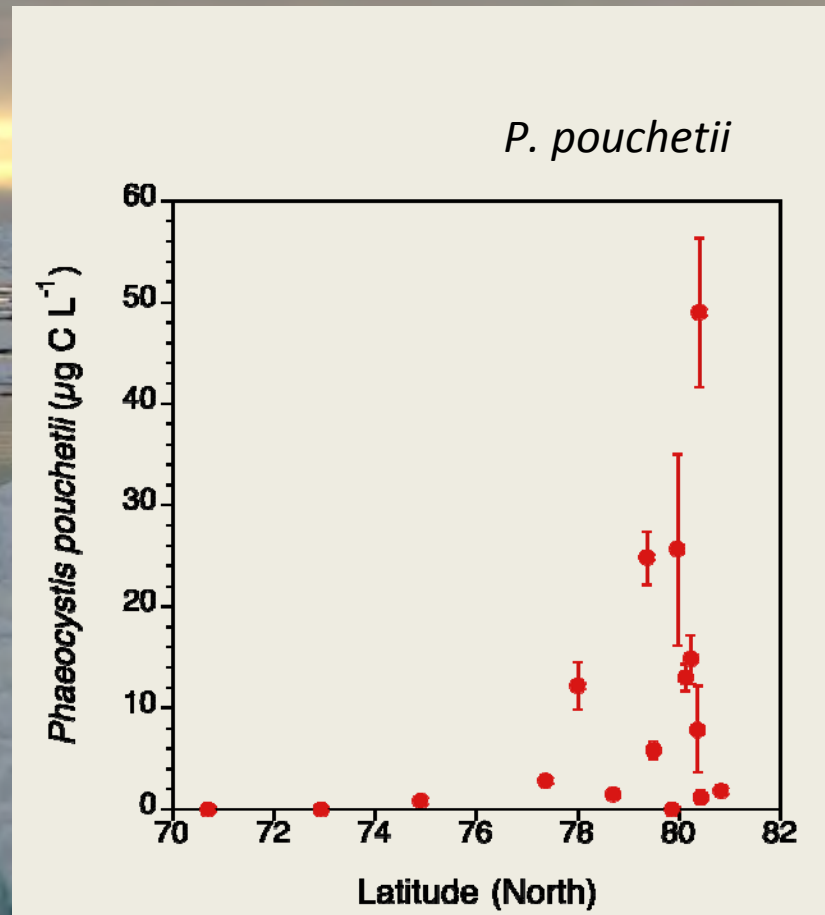
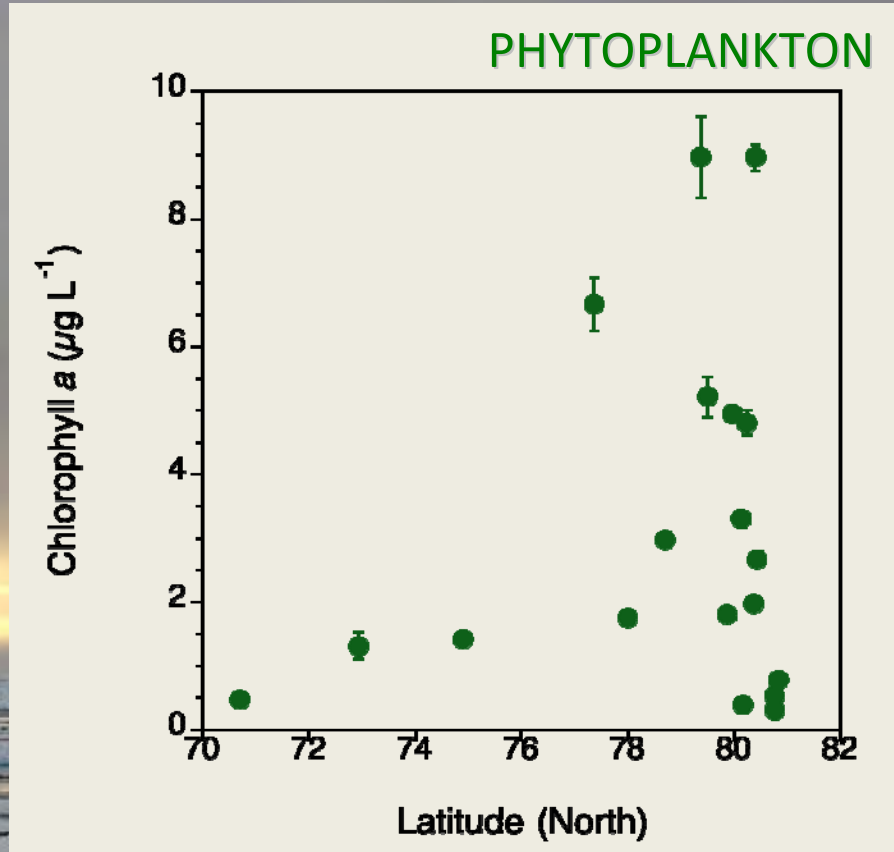


June 2010

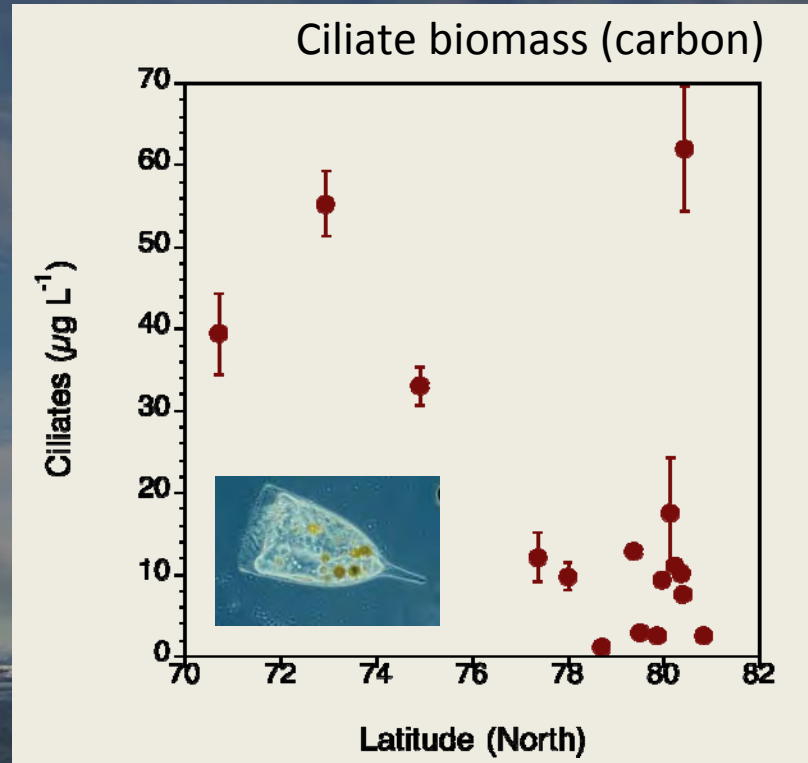
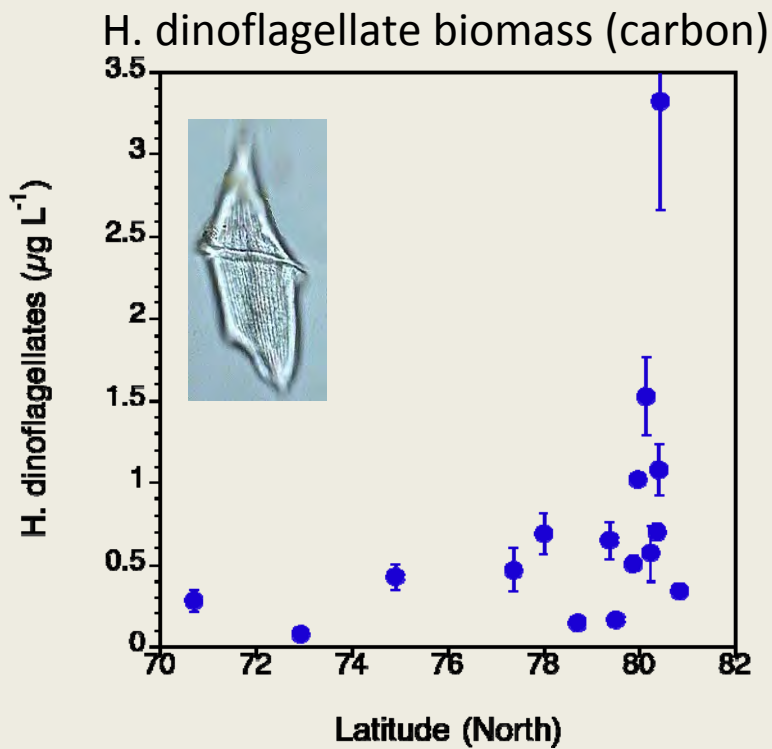


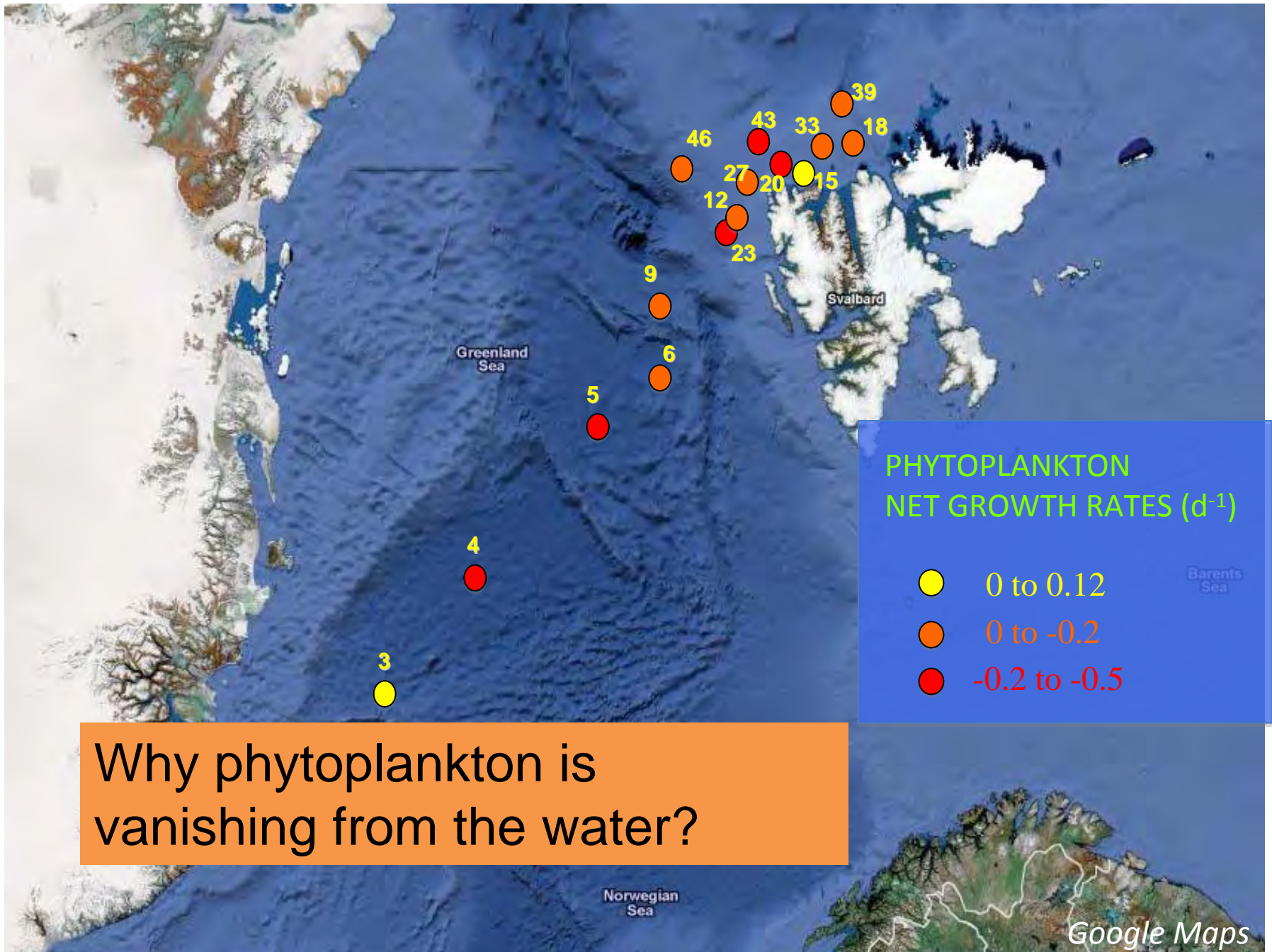
- Phytoplankton mortality rates (grazing)
- Phytoplankton instantaneous growth rates
- Phytoplankton net growth rates





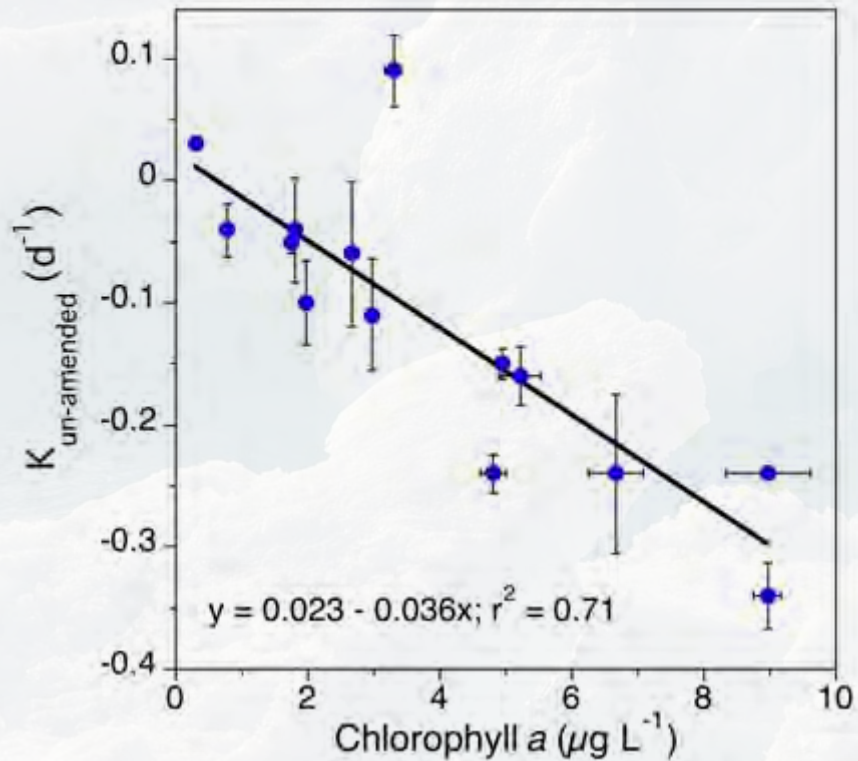
MICROZOOPLANKTON



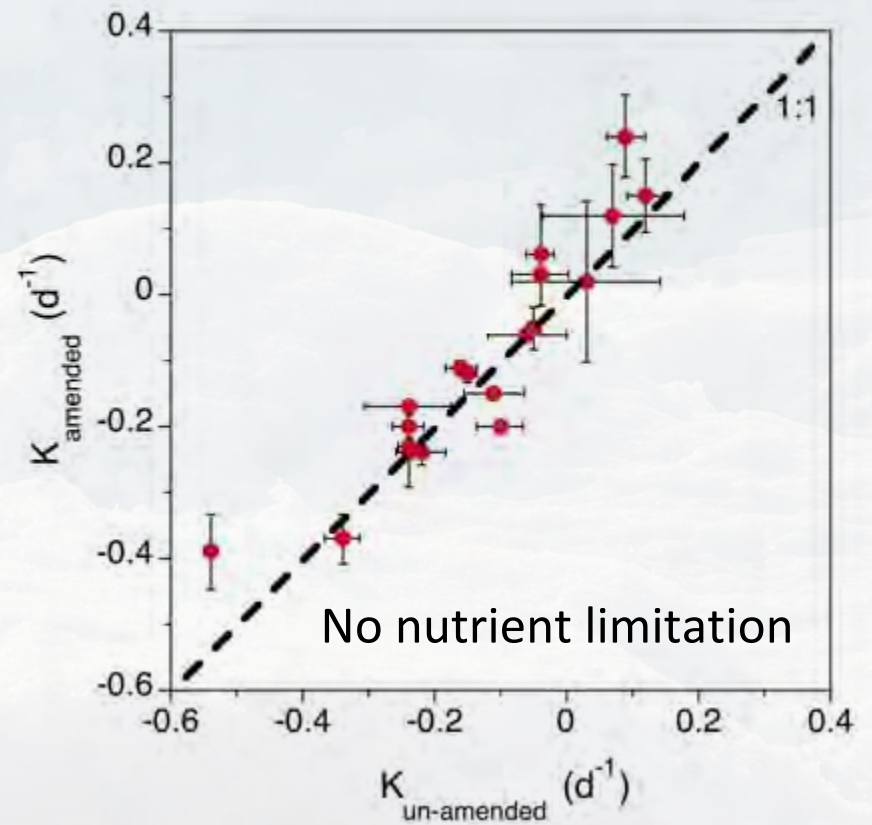


Why phytoplankton is vanishing from the water?

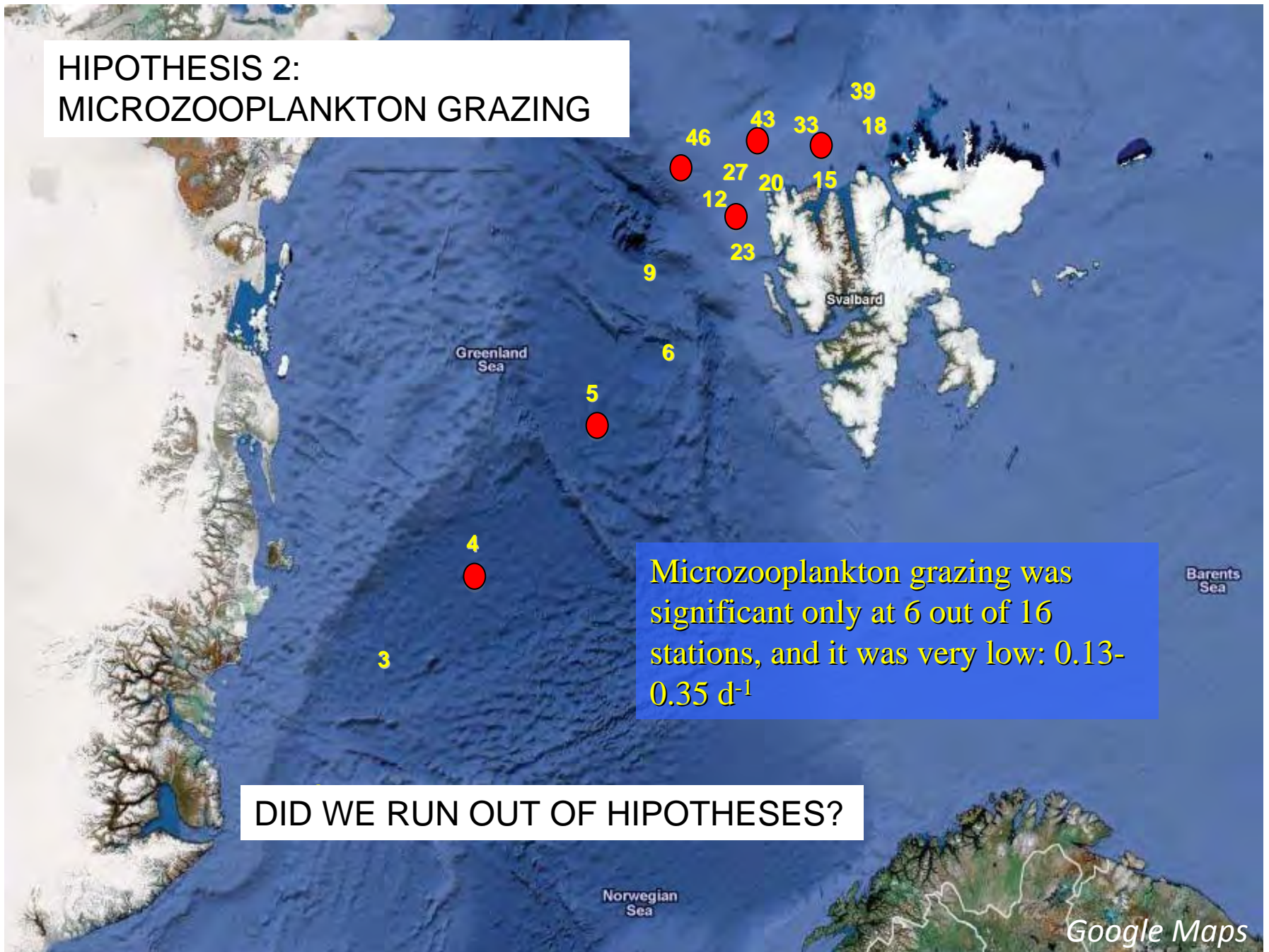
Biomass dependent mortality



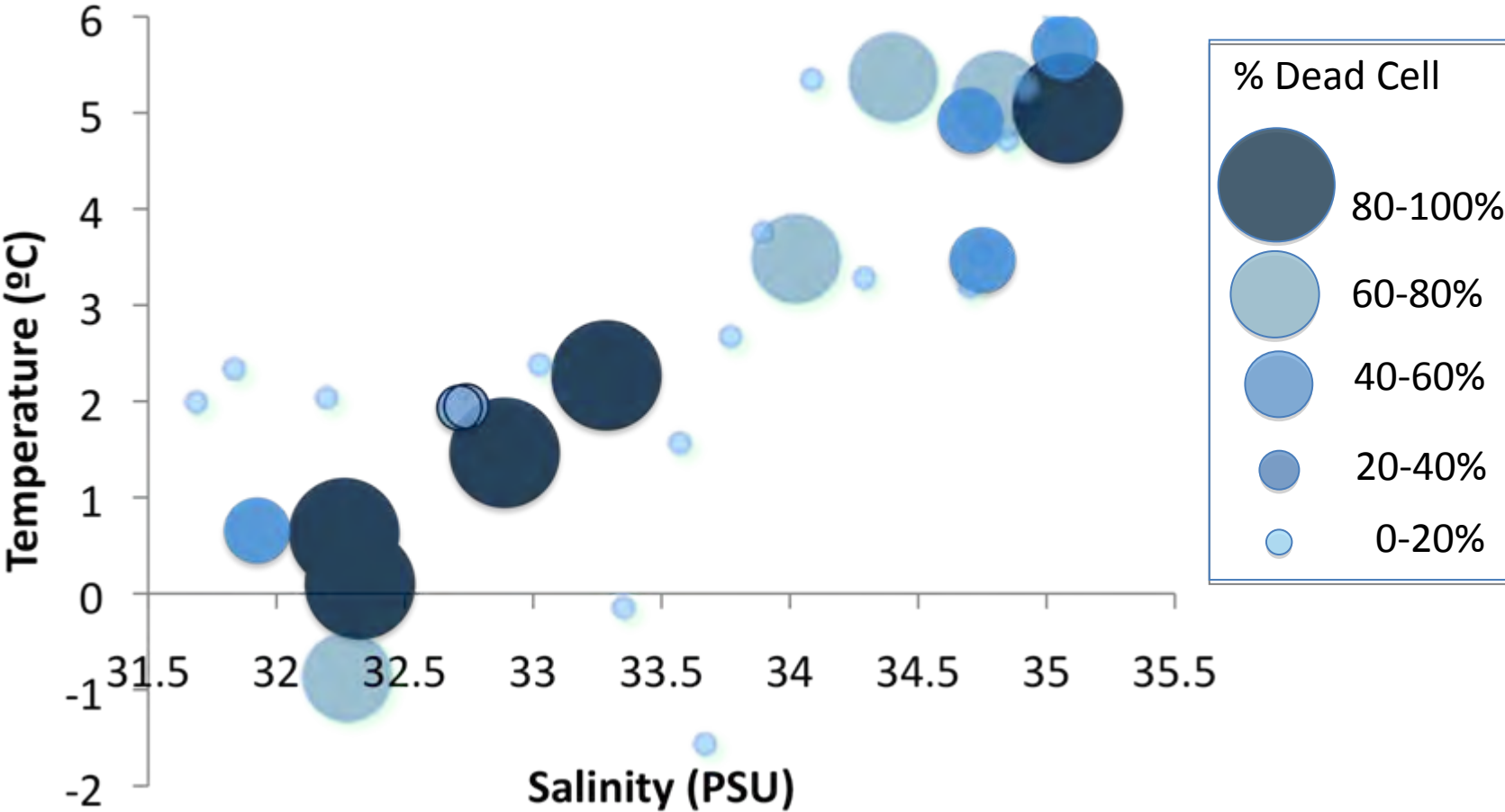
HIPOTHESIS 1: NUTRIENT LIMITATION



HIPOTHESIS 2: MICROZOOPLANKTON GRAZING



Natural *P. pouchetii* mortality (cell digestion assay which tests cell membrane permeability)



After Lasternas and Agustí 2011

Summary High Arctic

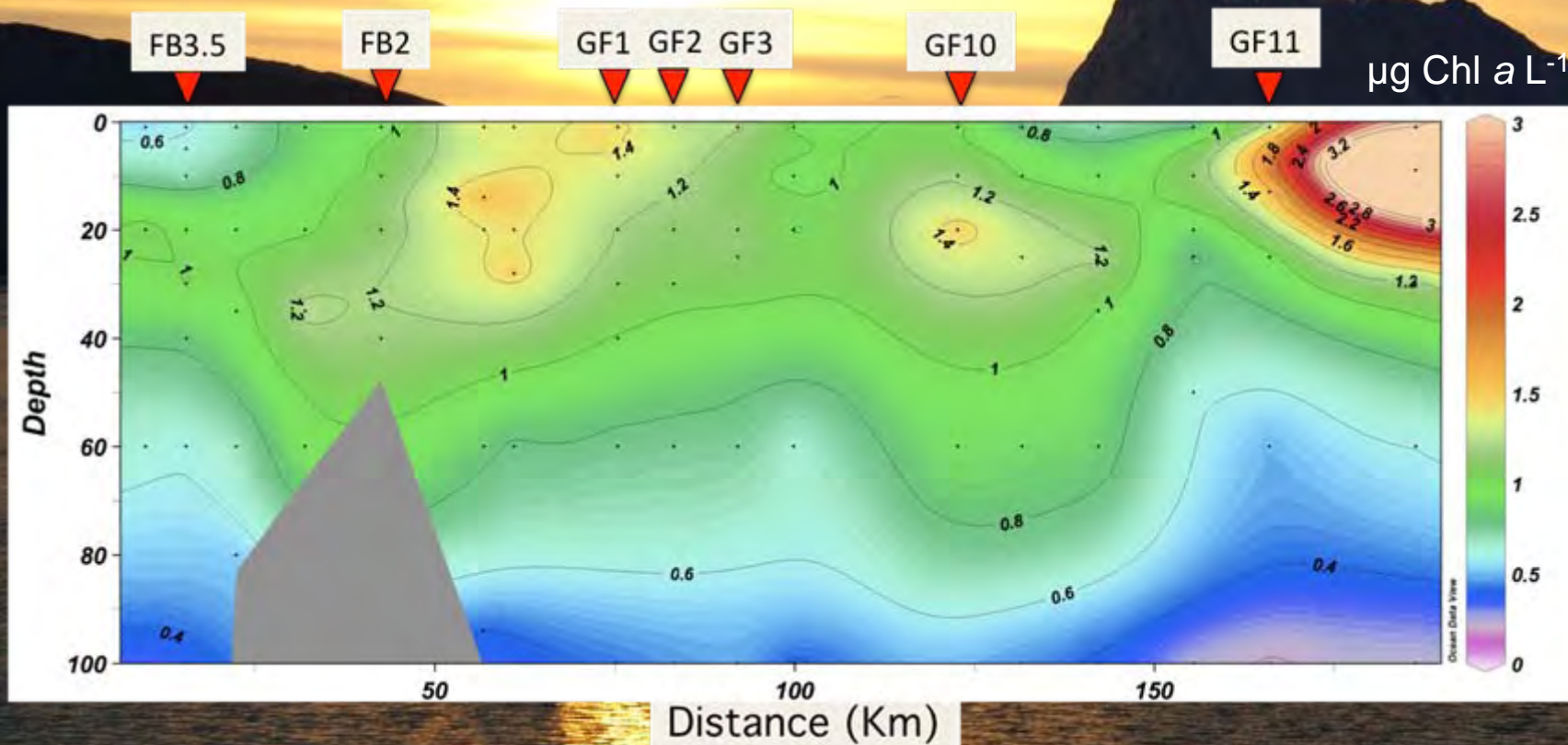
The background image shows a vast, high Arctic landscape. In the foreground, there is a calm, deep blue body of water. In the middle ground, a large, white glacier stretches across the valley. In the background, rugged mountains are covered in snow and patches of ice. A small, dark, triangular object is visible on the water's surface in the center of the frame.

In high Arctic waters north and west Svalbard Islands, during July 2007, we faced a senescent community, in which many organisms were dying, most likely not result of microzooplankton grazing.

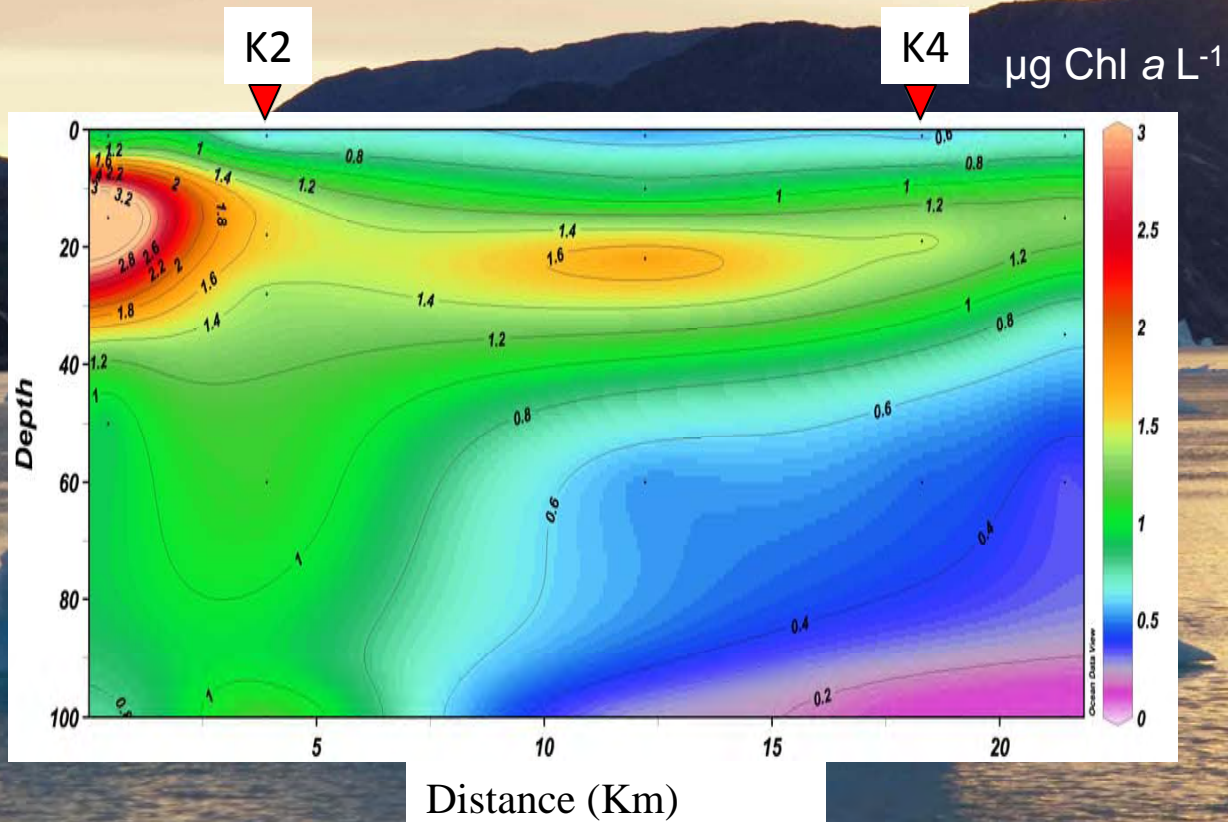
WEST GREENLAND WATERS JUNE 2010 SAMPLING STATIONS



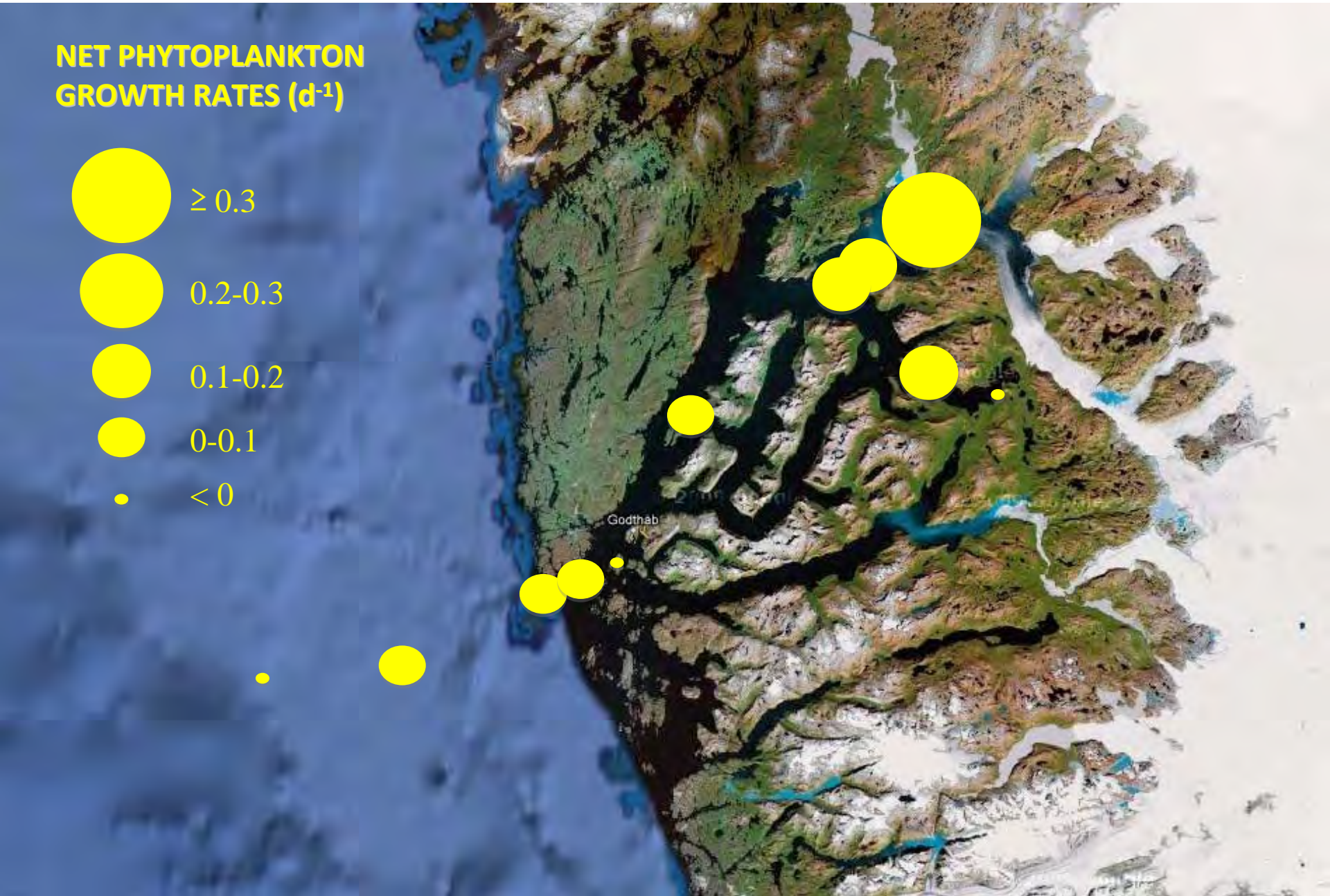
Chlorophyll *a* in the Godthåbsfjord



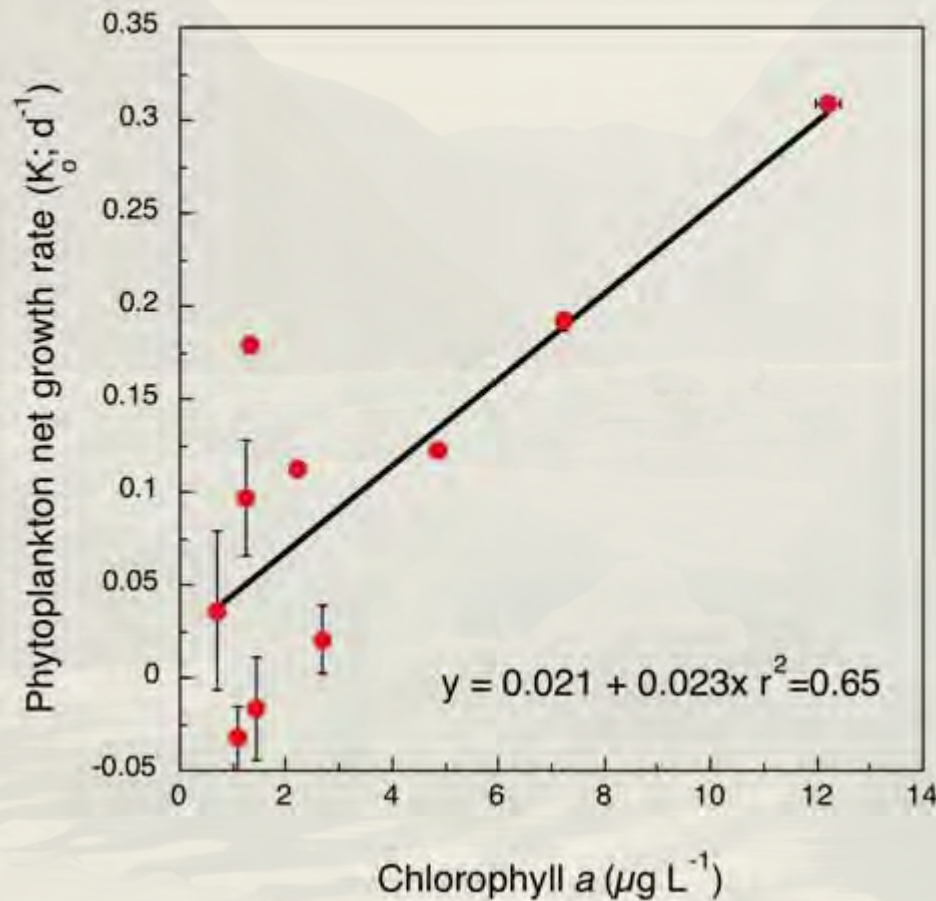
Chlorophyll *a* in the Kapisigdlit Fjord



NET PHYTOPLANKTON GROWTH RATES (d⁻¹)

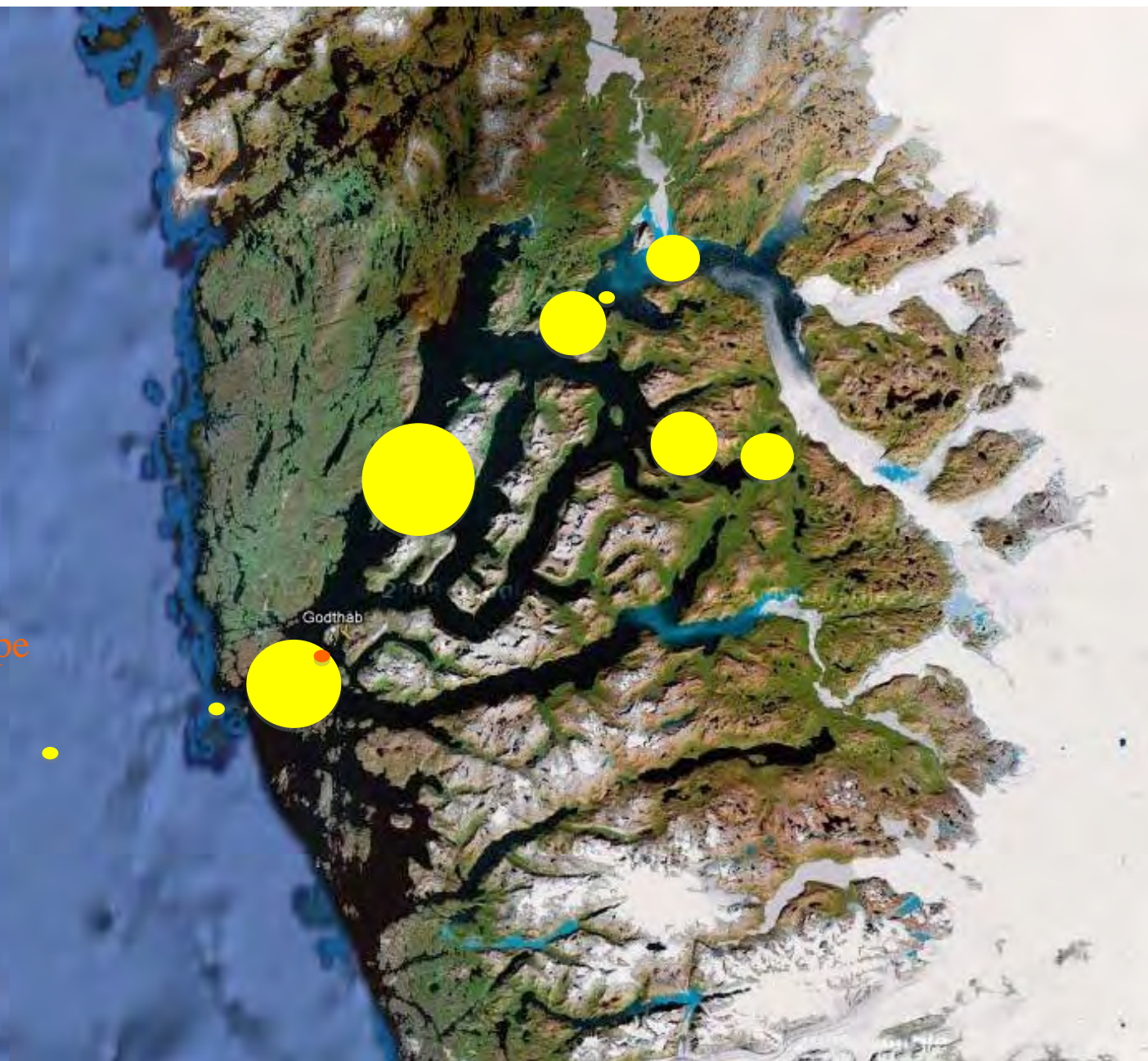
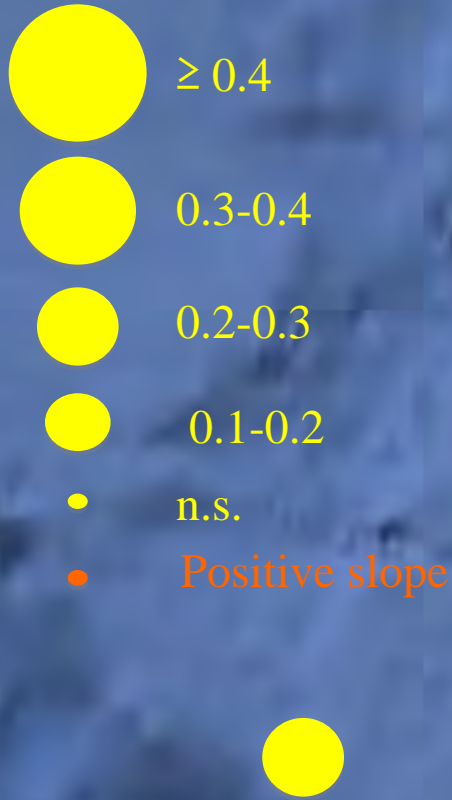


Was phytoplankton growth dependent on biomass?

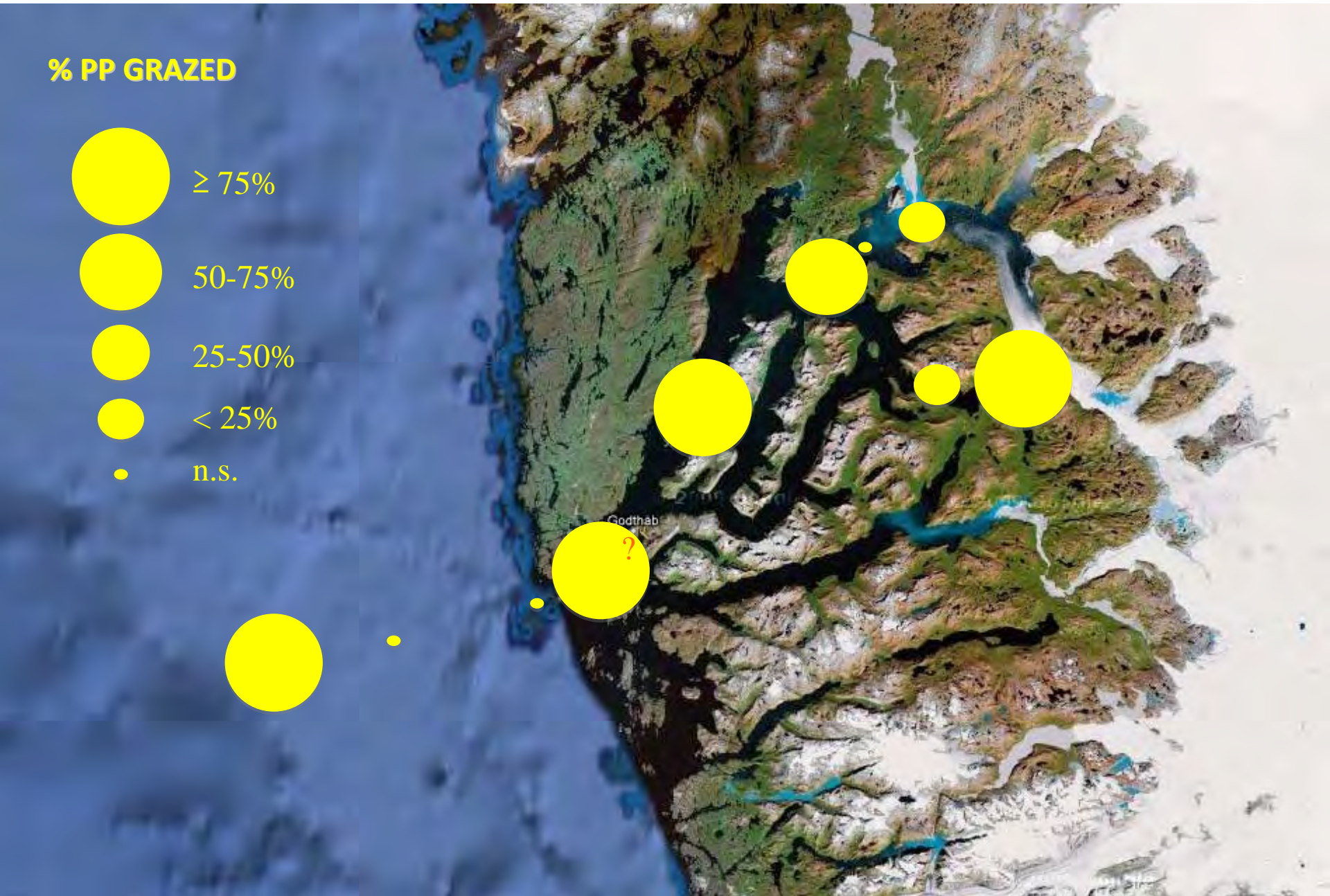
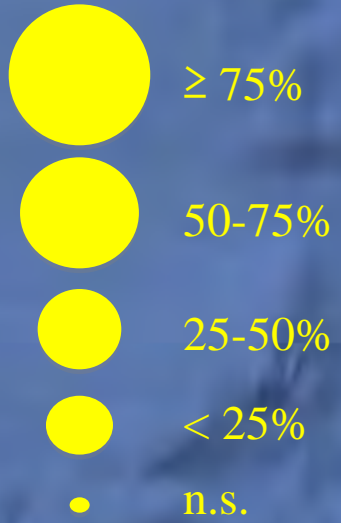


Phytoplankton growth rates were biomass-dependent. This seems to indicate the bloom was still developing.

Microzooplankton grazing rates (d⁻¹)



% PP GRAZED

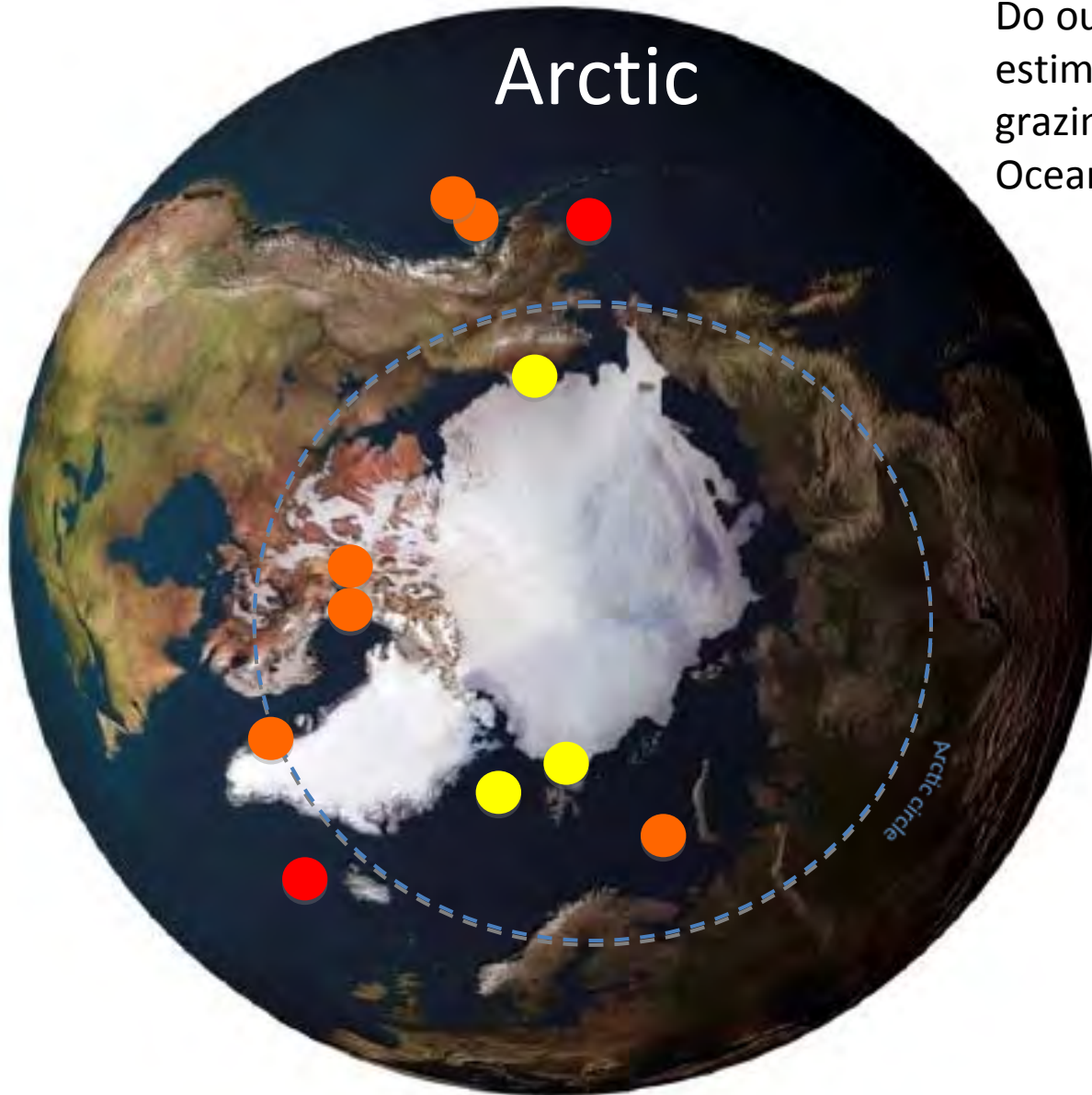


Summary SW Greenland fjord

In the Godthåbsfjord system and adjacent waters we found a phytoplankton community expanding from the glacier out, heavily grazed in the middle part, but uncoupled from microzooplankton grazing in the inner and outer part of the fjord.

No much PP seems to be exported out of the fjord.

Arctic



Do our data compare with previous estimates of microzooplankton grazing in the Arctic and Sub-Arctic Ocean?

% PP grazed daily

● 0 – 30%

● 30 – 80%

● > 80 %

Gifford et al. 1995

Olson et al. 2002

Paranjape 1987

Sherr et al. 2009

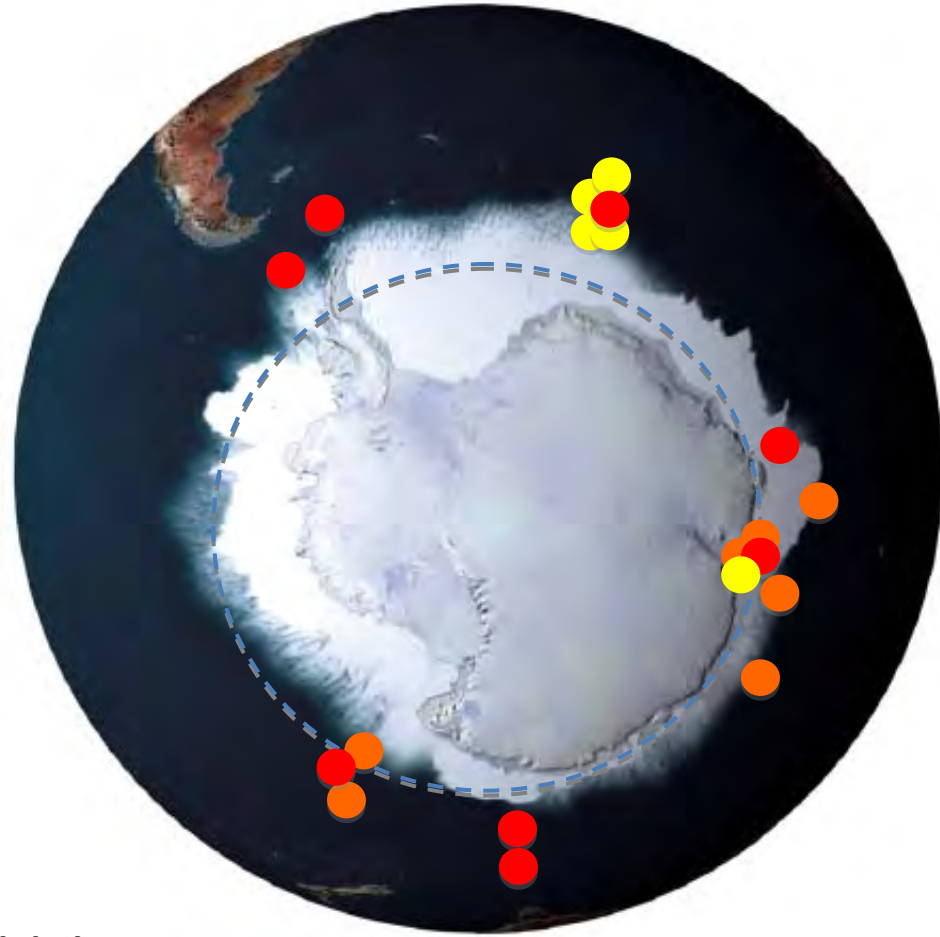
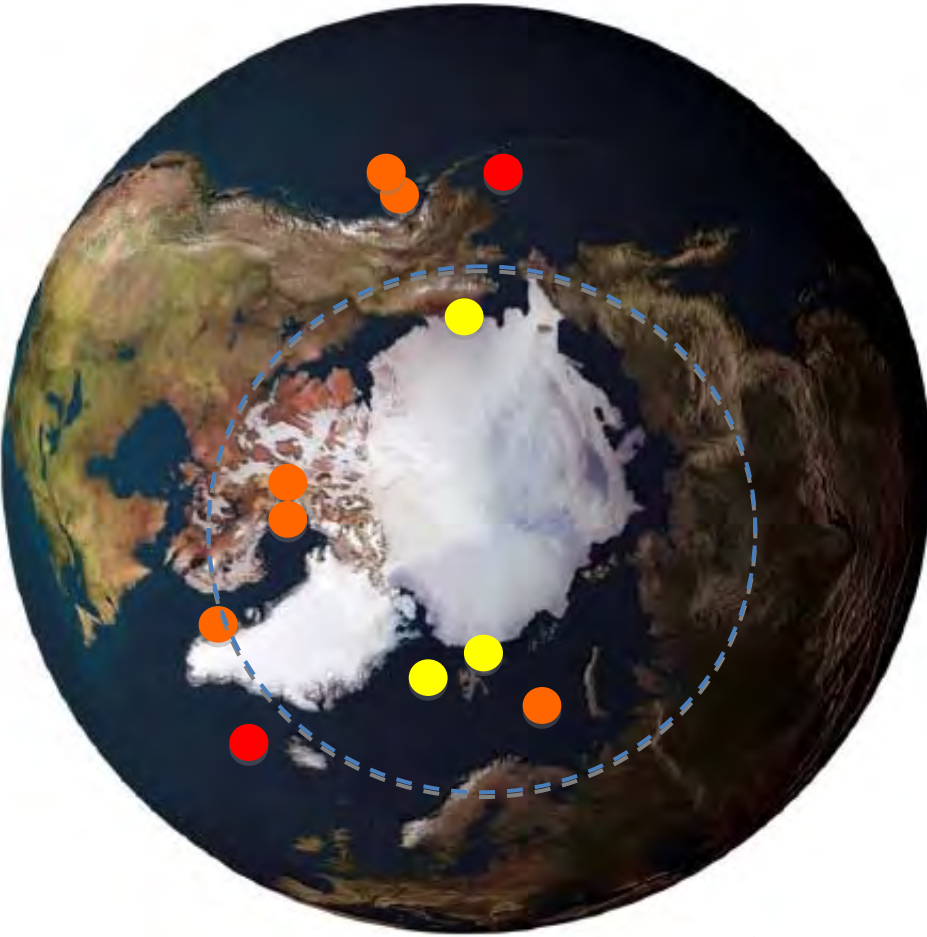
Strom and Welschmeyer 1991

Strom et al. 2007

Verity et al. 2002

Arctic

Antarctic



% PP grazed daily

- 0 – 30%
- 30-80%
- > 80 %

Burkill et al. 1995
Froneman et al. 1996
Froneman et al. 1997a
Froneman et al. 1997b
Froneman et al. 2004
Froneman & Perissinotto
1996

Landry et al. 2002
Landry et al. 2001
Li et al. 2001
Pearce et al. 2010 Safi et
al. 2007
Selph et al. 2001
Tsuda & Kawaguchi 1997

Thanks!

