



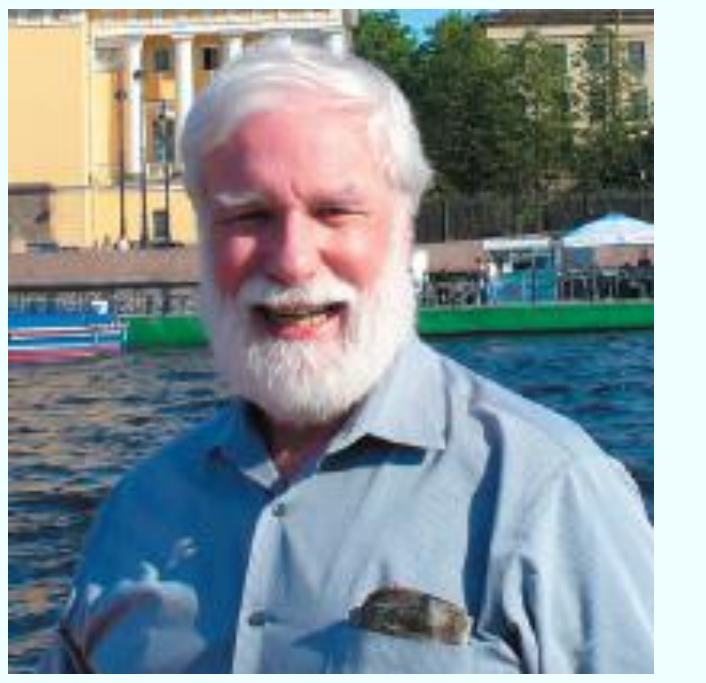
ESSAS – Ecosystem Studies of Sub-Arctic Seas



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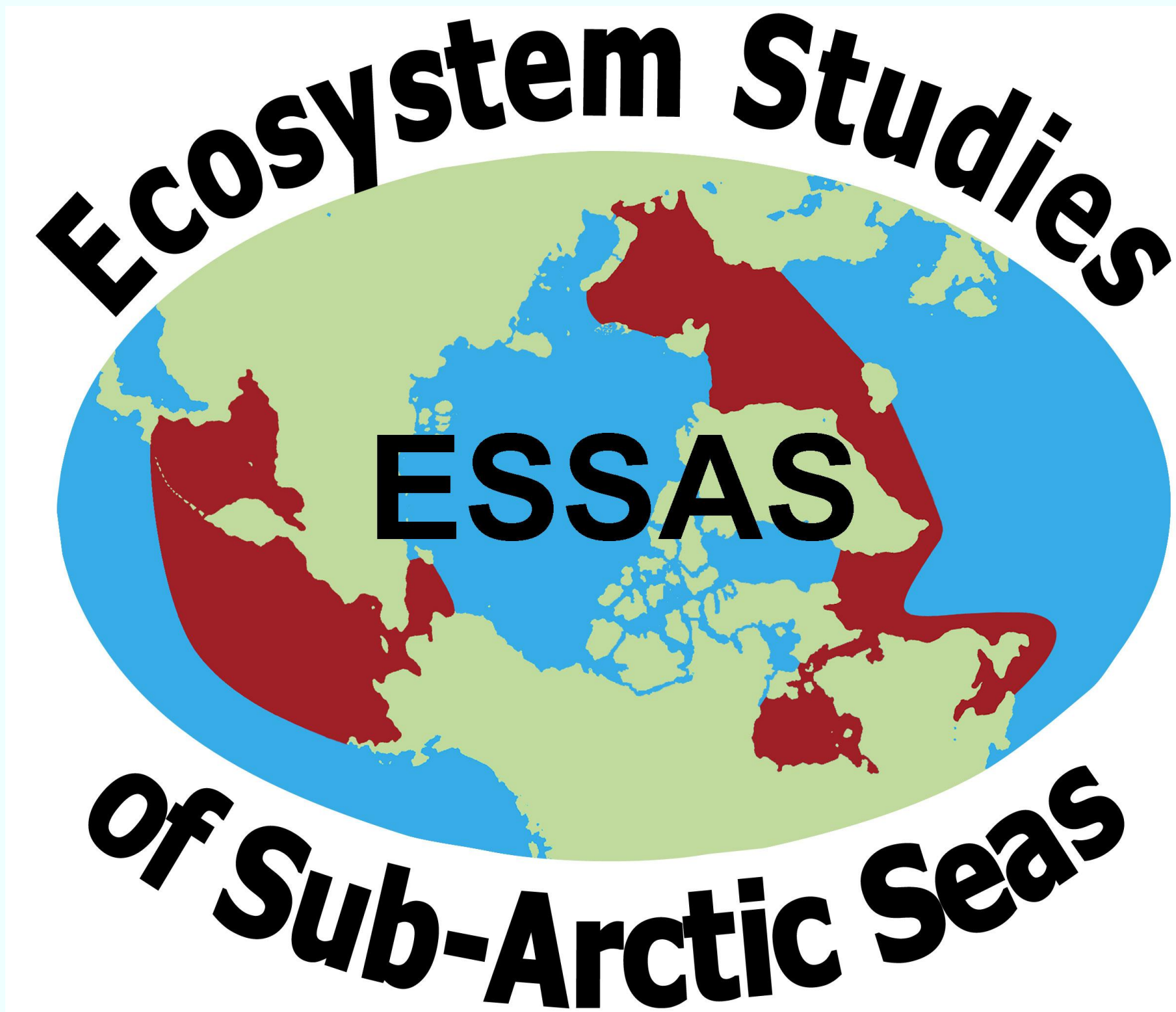
1. Introduction

ESSAS is a comparative, ecosystem-based GLOBEC regional program.

Goal : *to compare, quantify and predict the impact of climate variability on the productivity and sustainability of Sub-Arctic marine ecosystems.*



Photographs by C. Morel: <http://www.ourpolarheritage.com/en/accueil.php>

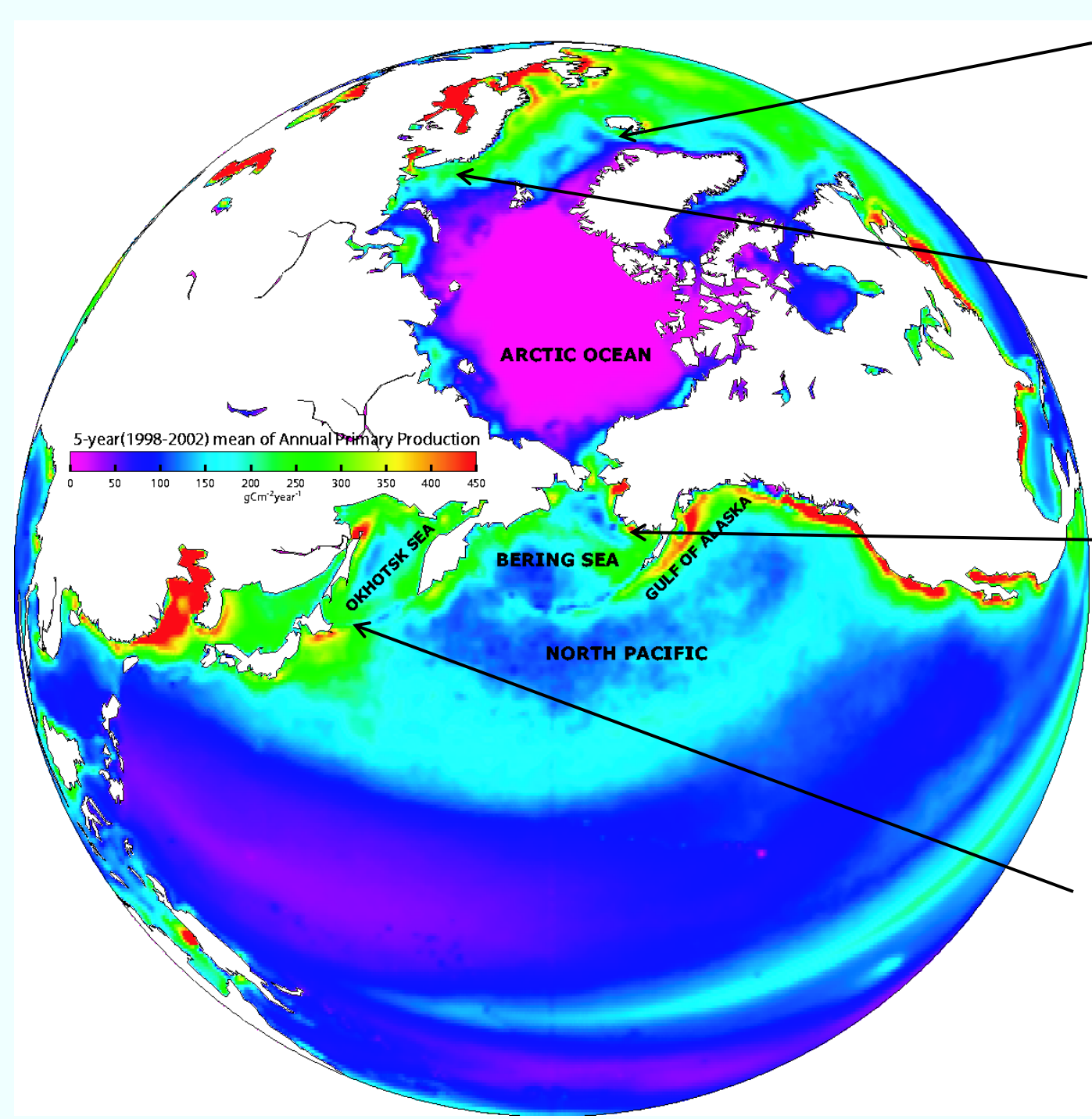


2. Geographical Areas of Main Interest

Pacific Ocean:

- Oyashio; Sea of Okhotsk; Bering Sea
- Atlantic Ocean
- Barents Sea; Nordic Seas; Iceland Sea; Greenland shelves; Labrador Sea; Newfoundland/Labrador shelves; Gulf of St. Lawrence; Hudson Bay

3. Nationally Funded ESSAS Programs



- Iceland**
 - ISE (Iceland Sea Ecosystem) Project
- Norway**
 - Norwegian ESSAS in the Barents Sea
- USA**
 - BEST (Bering Sea Ecosystem Study)
 - BSIERP (Bering Sea Integrated Ecosystem Research Program)
- Japan**
 - Japanese ESSAS in the Oyashio

4. ESSAS Working Groups

4.1. Biophysical Coupling

- determining processes by which climate affects marine ecosystems

4.2. Modelling

- developing models to facilitate ecosystem comparisons

4.3. Regional Climate Predictions

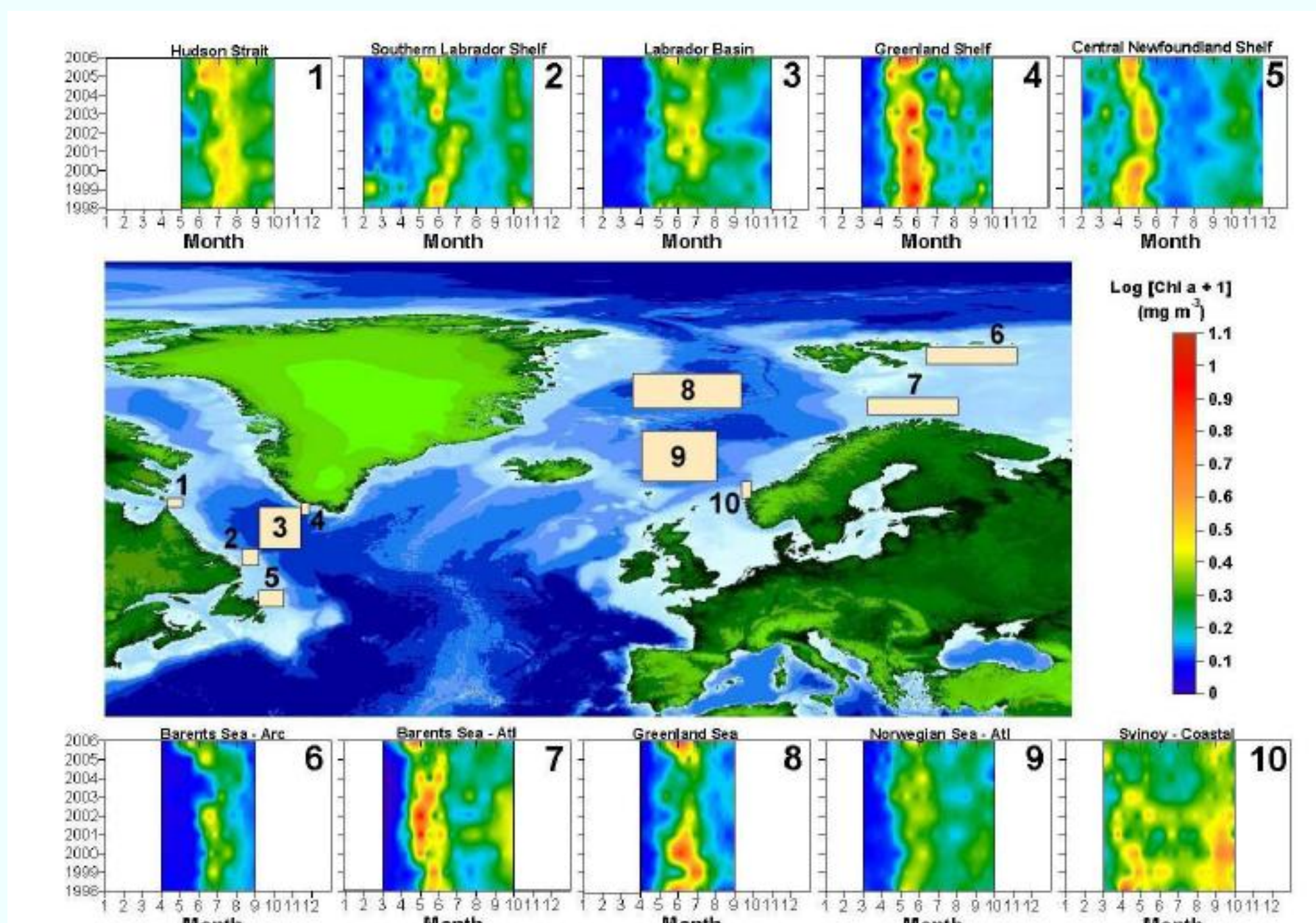
- providing quantitative estimates of future climate change and their impacts

4.4. Invertebrate – Gadoid Interactions

- comparing climate responses in different subarctic ecosystems

5. ESSAS Comparative Studies

5.1 NORCAN (NORway-CANada Comparison of Marine Ecosystems)



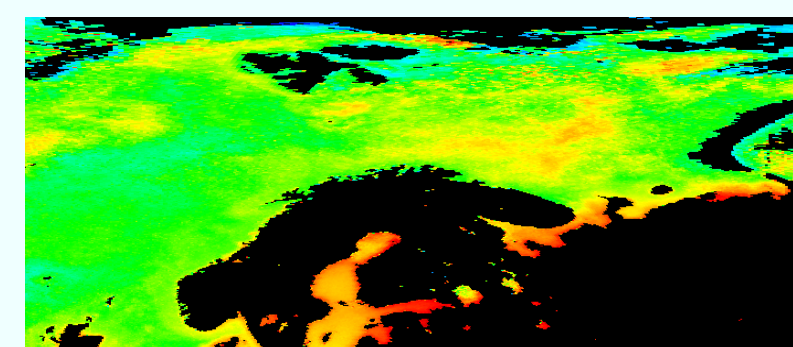
Surface Chlorophyll Concentrations derived from SeaWiifs

Harrison et al., in preparation

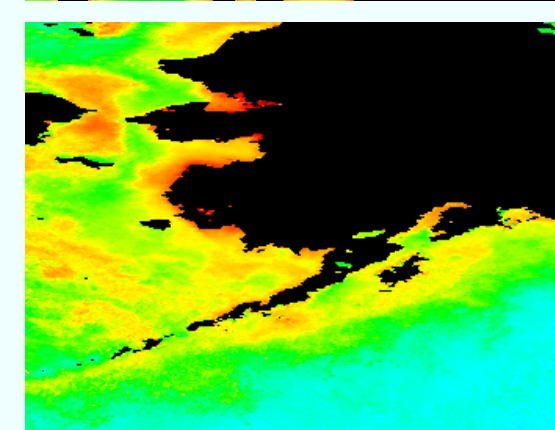
5.2 MENU

- Comparison of Marine Ecosystems of Norway and the United States
- Based on observations
- 5 Papers written
- MENU2 proposals submitted to national funding agencies
- Focus on model comparisons

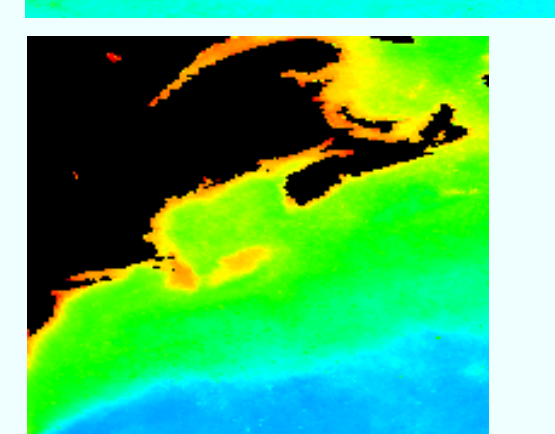
Chlorophyll-a Apr-Jun



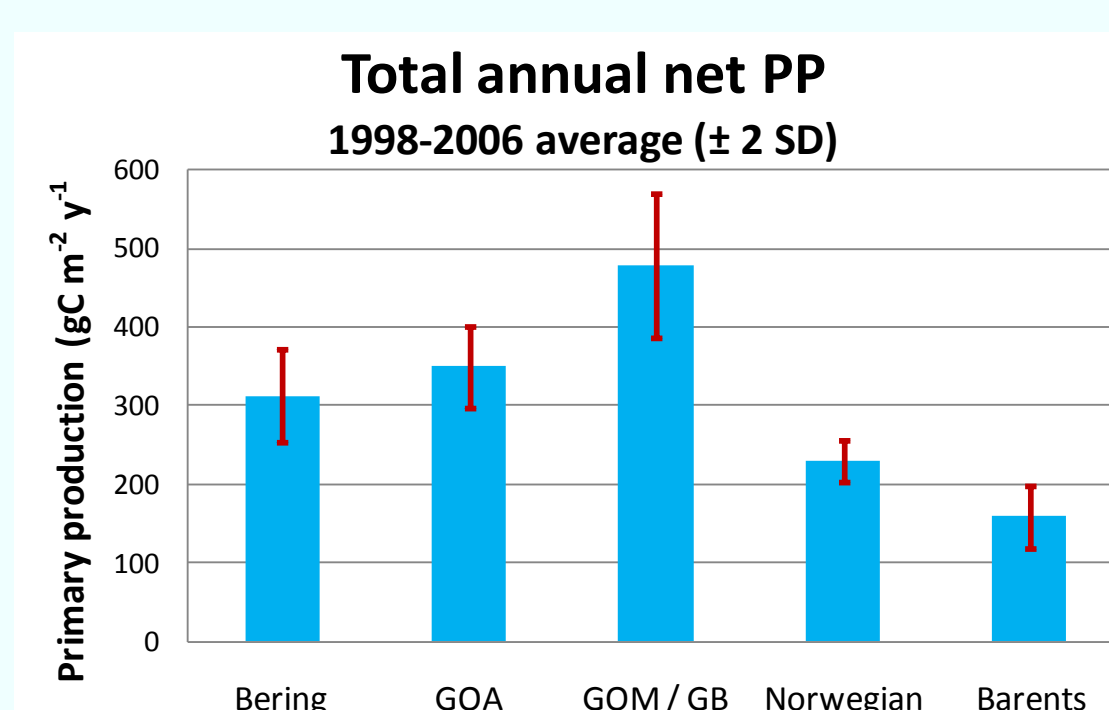
Norwegian Sea / Barents Sea



Bering Sea / Gulf of Alaska



Gulf of Maine / Georges Bank

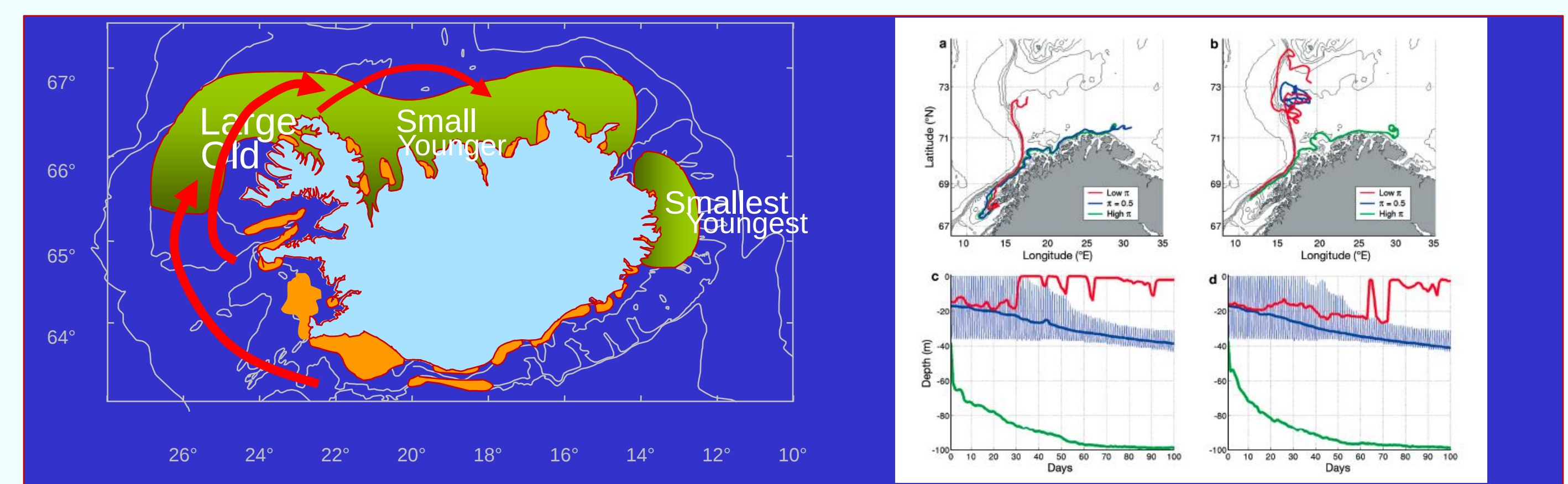


Source: <http://oceancolor.gsfc.nasa.gov/cgi/level3.pl>
Mueter et al., PiO, accepted

6. Workshops at 2008 ESSAS Meeting

6.1. Role of Advection in Polar Ecosystems

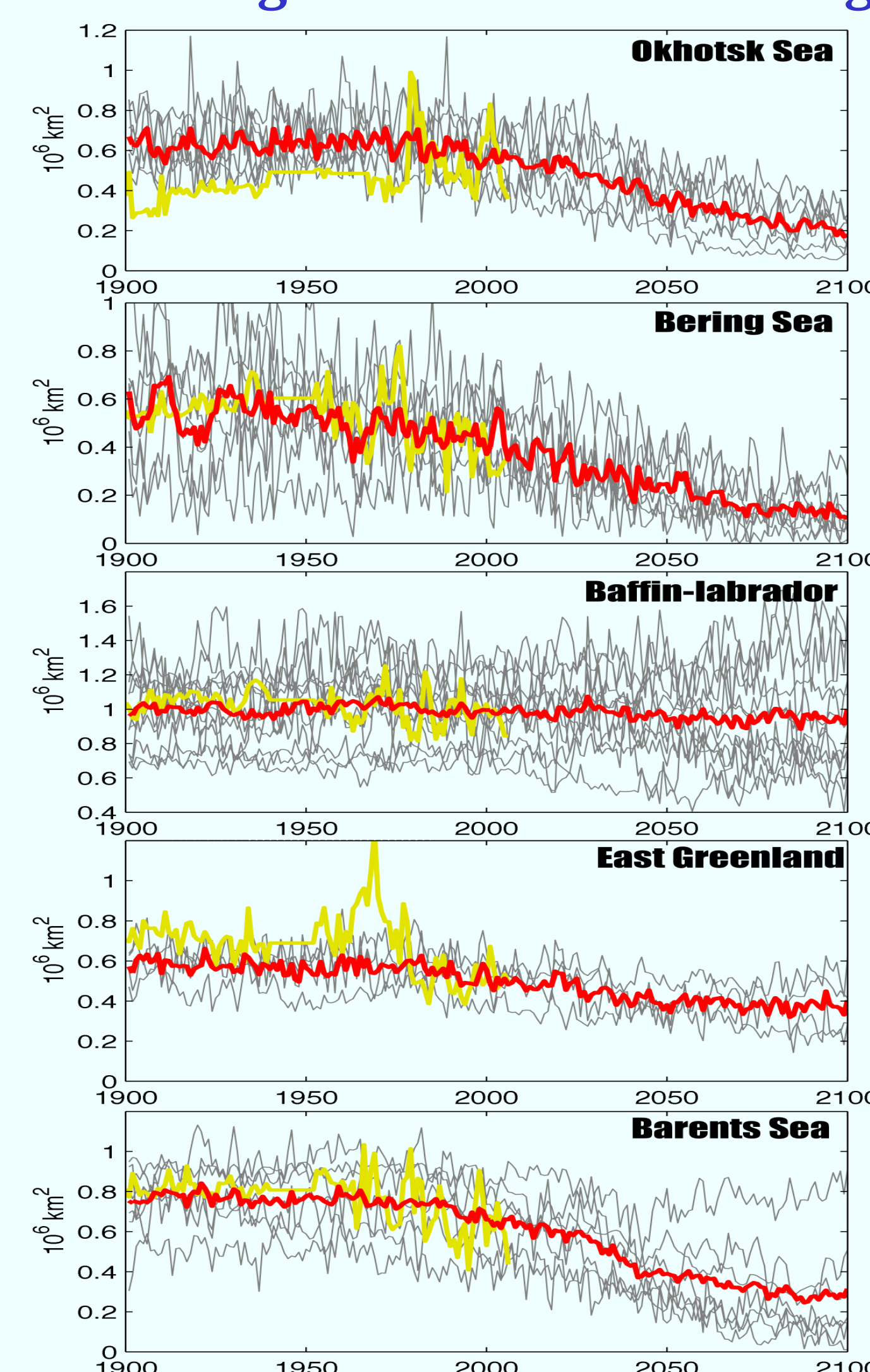
Modelling advection of cod larvae



Off Iceland: Brickman et al., 2007

Off Norway: Vikebø et al., 2007

6.2. Forcing Under Climate Change



IPCC modelled and observed (yellow line) winter sea ice cover in subarctic seas from Overland and Wang (2007).

6.3. Modelling Ecosystems

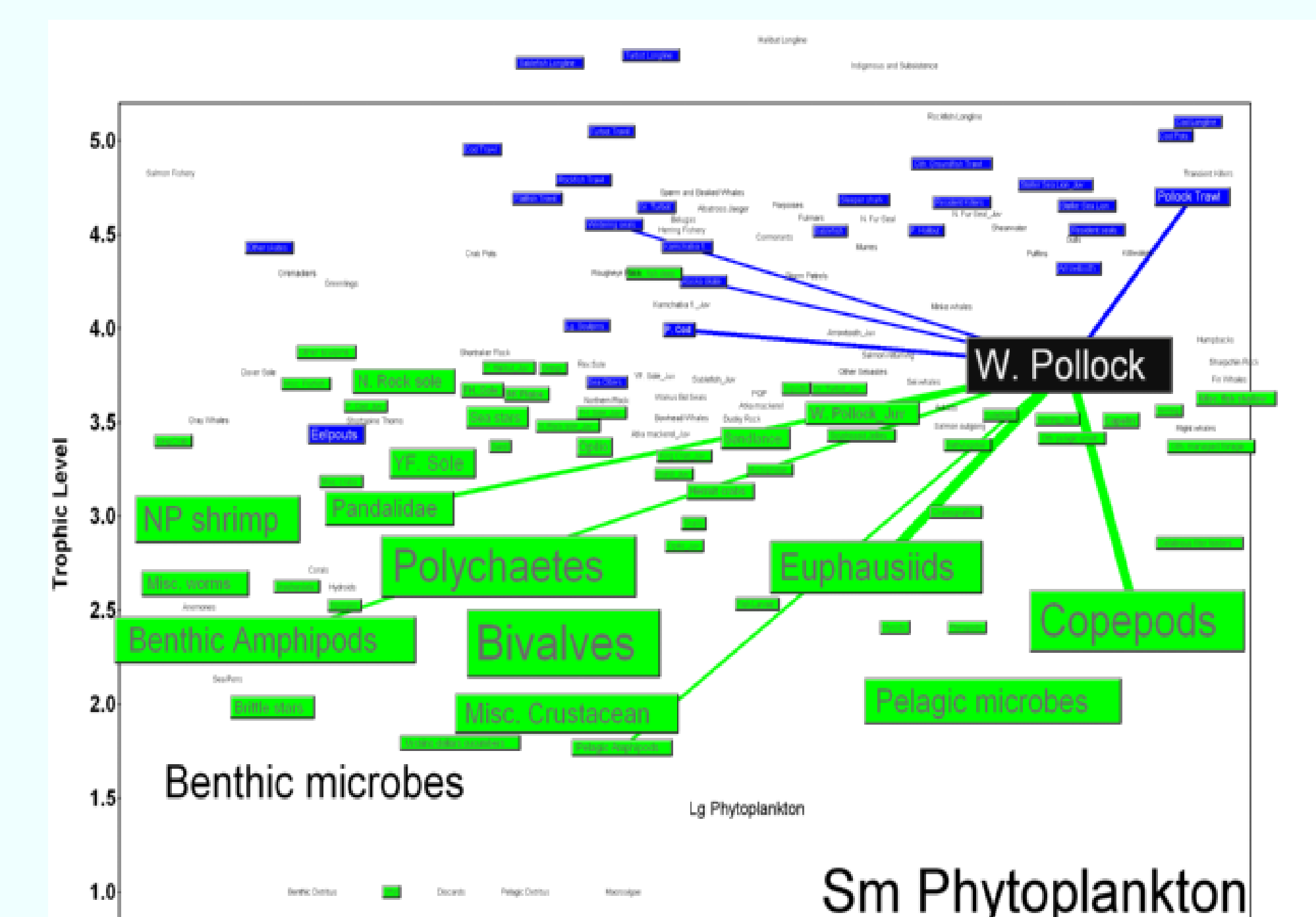


Figure showing central role of Walleye pollock in the Eastern Bering Sea. Green lines connect to their prey and blue to their predators. (From presentation by K. Aydin)

7. Future ESSAS Activities

Annual ESSAS meeting: June 2009 in Seattle, USA.

GLOBEC Open Science Meeting

- June 2009 in Victoria, Canada.
- Co-Sponsoring Comparative Ecosystem Workshops on (1) Antarctic-Subarctic, (2) Marginal Seas, and (3) Modelling Ecosystems End-to-End

6. IPY

ESSAS is leading the international consortium ESSAR (Ecosystem Studies of Sub-arctic and Arctic Regions)

- Canada, China, Denmark, France, Iceland, Japan, Norway, Poland, US
- Includes studies of sea ice, Arctic fronts, phytoplankton, fish, marine mammals, and seabirds.