



ESSAS – Ecosystem Studies of Sub-Arctic Seas

Ken Drinkwater¹ (ken.drinkwater@imr.no) and George Hunt² (geohunt2@u.washington.edu)

¹Institute of Marine Research and Bjerknes Center of Climate Research, Bergen, Norway

²School of Aquatic and Fishery Sciences, University of Washington, Seattle, USA

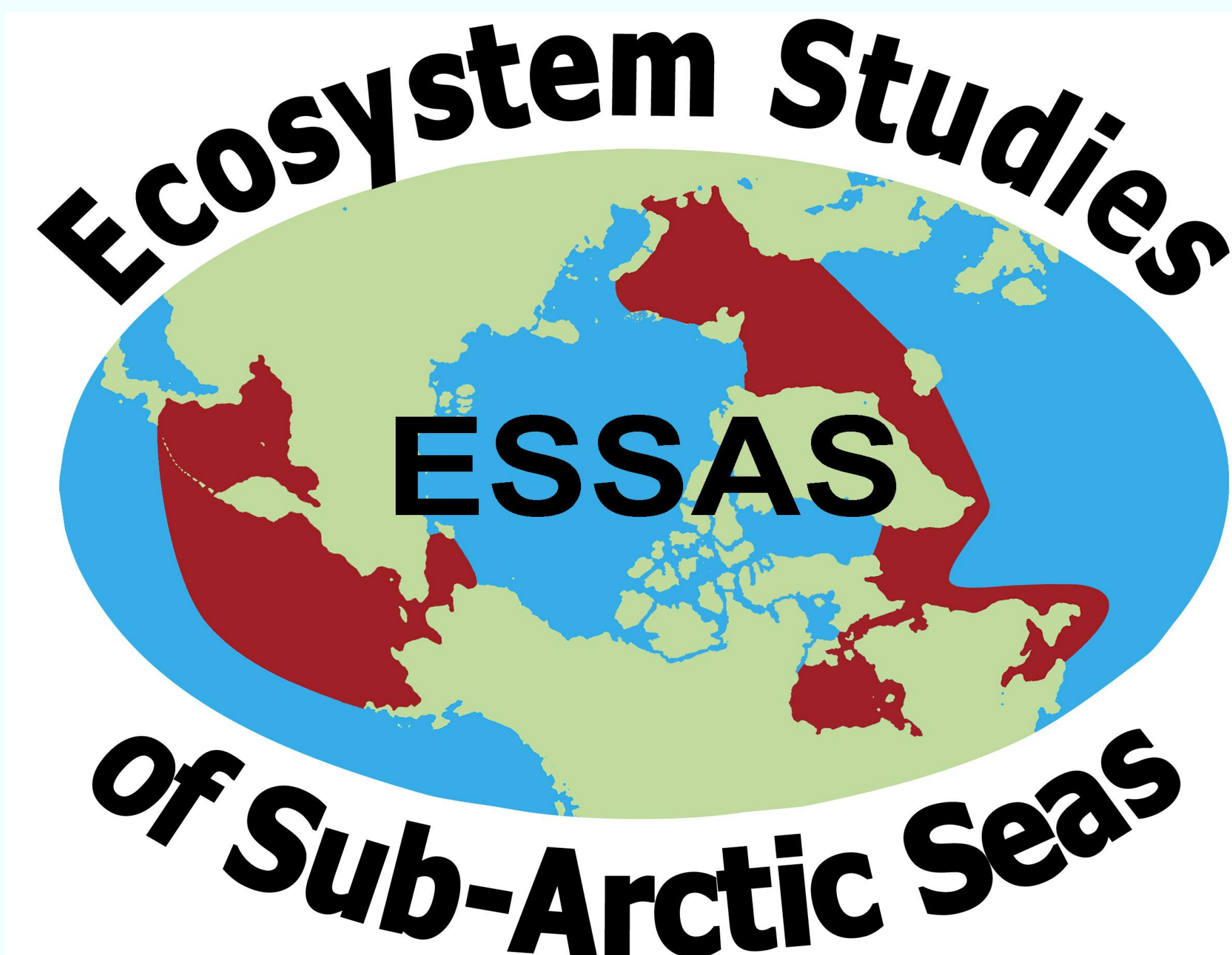
1. Introduction

ESSAS is a comparative, ecosystem-based regional programme of GLOBEC.

The Sub-arctic Seas are important because of:

- High biological productivity
- Large commercial demersal fisheries
- Large numbers of marine mammals and seabirds
- Projected large effects due to global climate change

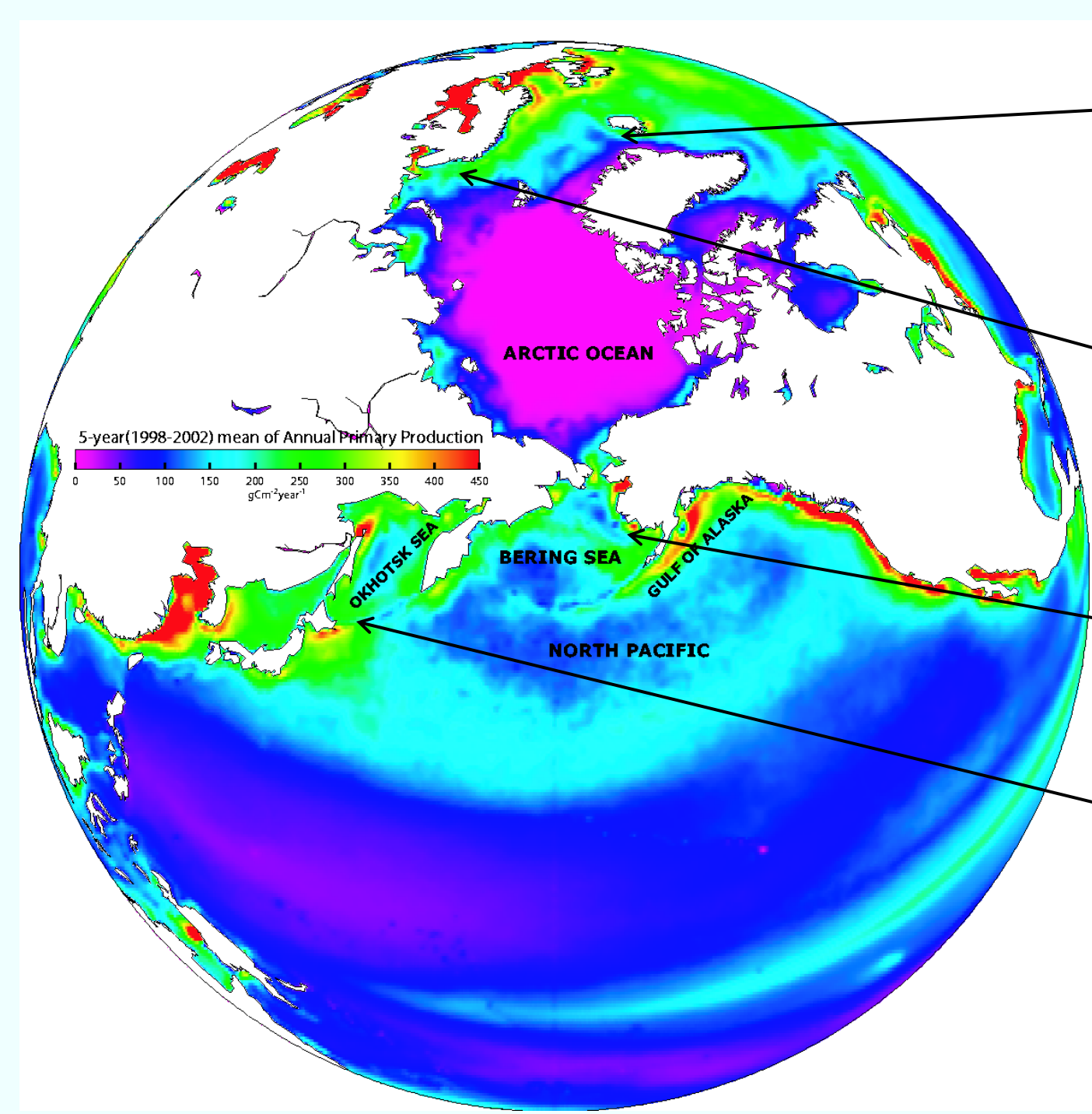
Goal of ESSAS: to compare, quantify and predict the impact of climate variability on the productivity and sustainability of Sub-Arctic marine ecosystems.



2. Geographical Areas of Interest

• The principal regions of interest within ESSAS are the Oyashio, the Sea of Okhotsk and the Bering in the Pacific and the Barents Sea, the Nordic Seas, Iceland, Greenland shelves, Newfoundland/ Labrador shelves, Gulf of St. Lawrence and Hudson Bay in the Atlantic (outlined in red in ESSAS logo).

3. Nationally Funded ESSAS Programs

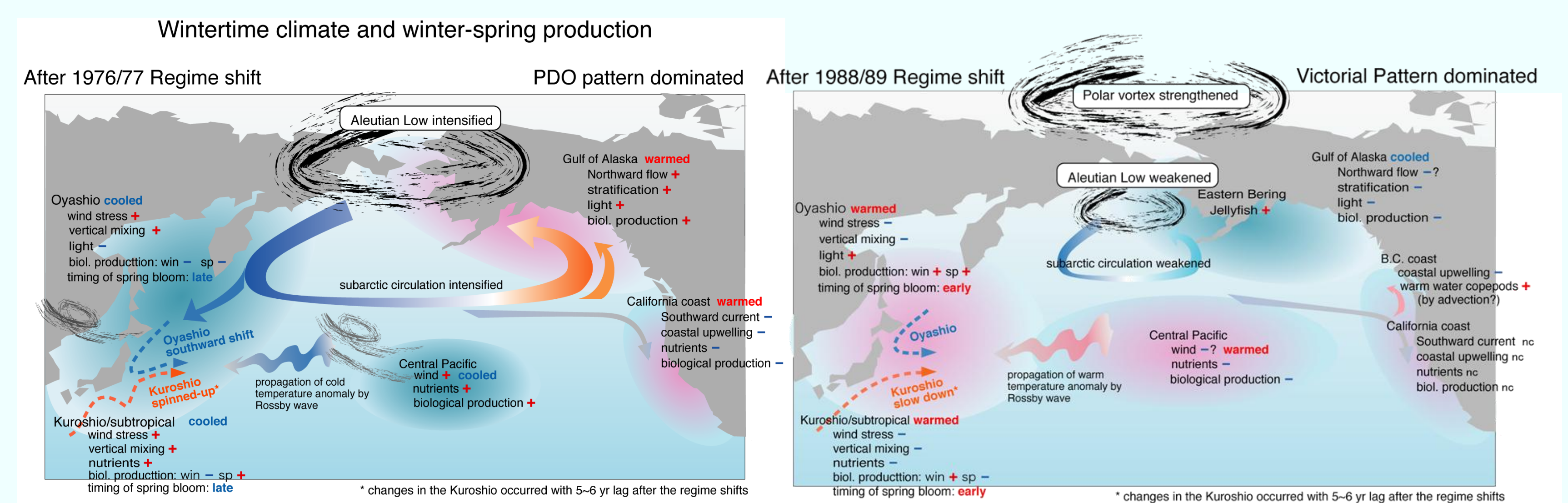


- Iceland**
- ISE (Iceland Sea Ecosystem) Project
- Norway**
- Norwegian ESSAS in the Barents Sea
- USA**
- BEST (Bering Sea Ecosystem Study)
- Japan**
- Japanese ESSAS in the Oyashio

4. ESSAS Working Groups

4.1. Biophysical Coupling

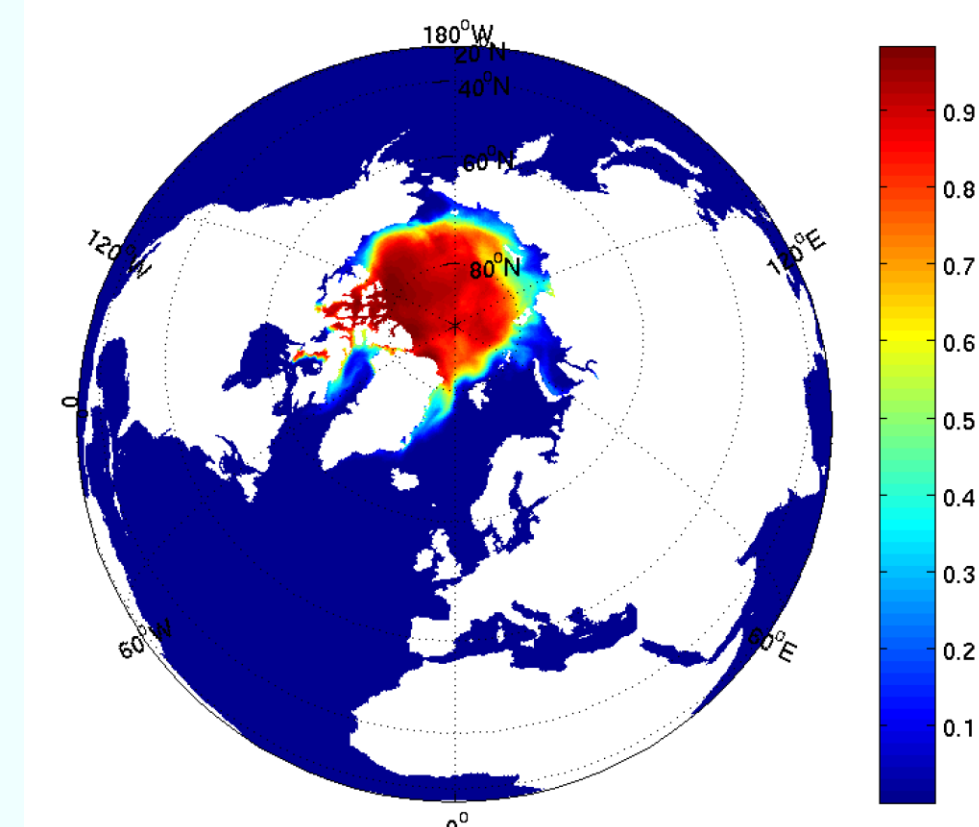
- to determine processes by which climate affects marine ecosystems and the transfer of energy and material through them.



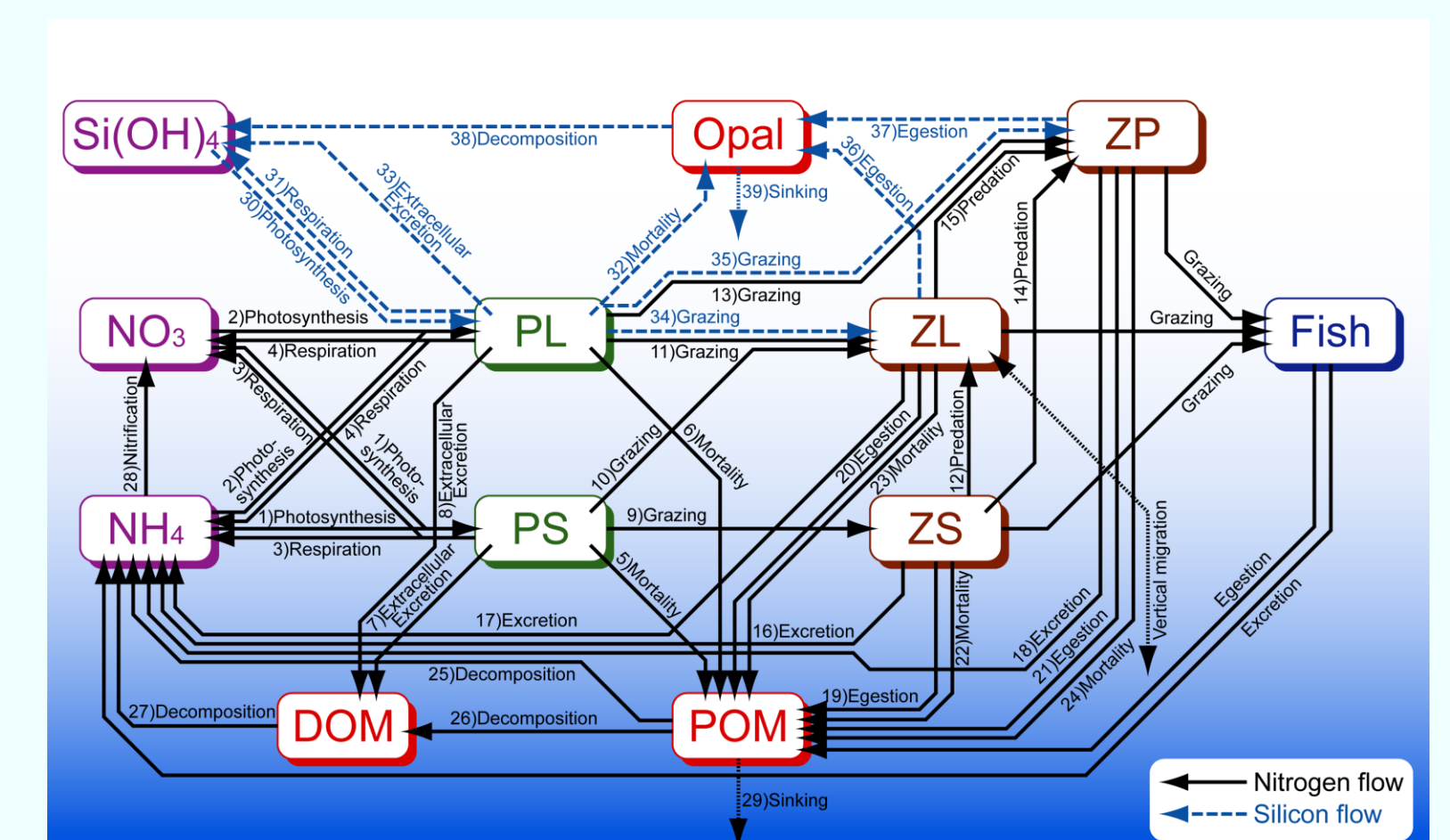
4.2. Modelling

- to develop conceptual, process, statistical, and/or simulation models to facilitate comparison of ESSAS ecosystems and to forecast the impacts of climate change

September sea-ice climatology from ROMS by P. Budgell, IMR



NUMERO FISH Model



4.3. Regional Climate Predictions

- to provide quantitative estimates of the magnitude and uncertainty of future climate change for the ESSAS regions, and the frequency distribution of natural variability

6. IPY

ESSAS is leading the international consortium ESSAR (Ecosystem Studies of Sub-arctic and Arctic Regions) that consists of 13 nationally funded projects led by 9 different nations.

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

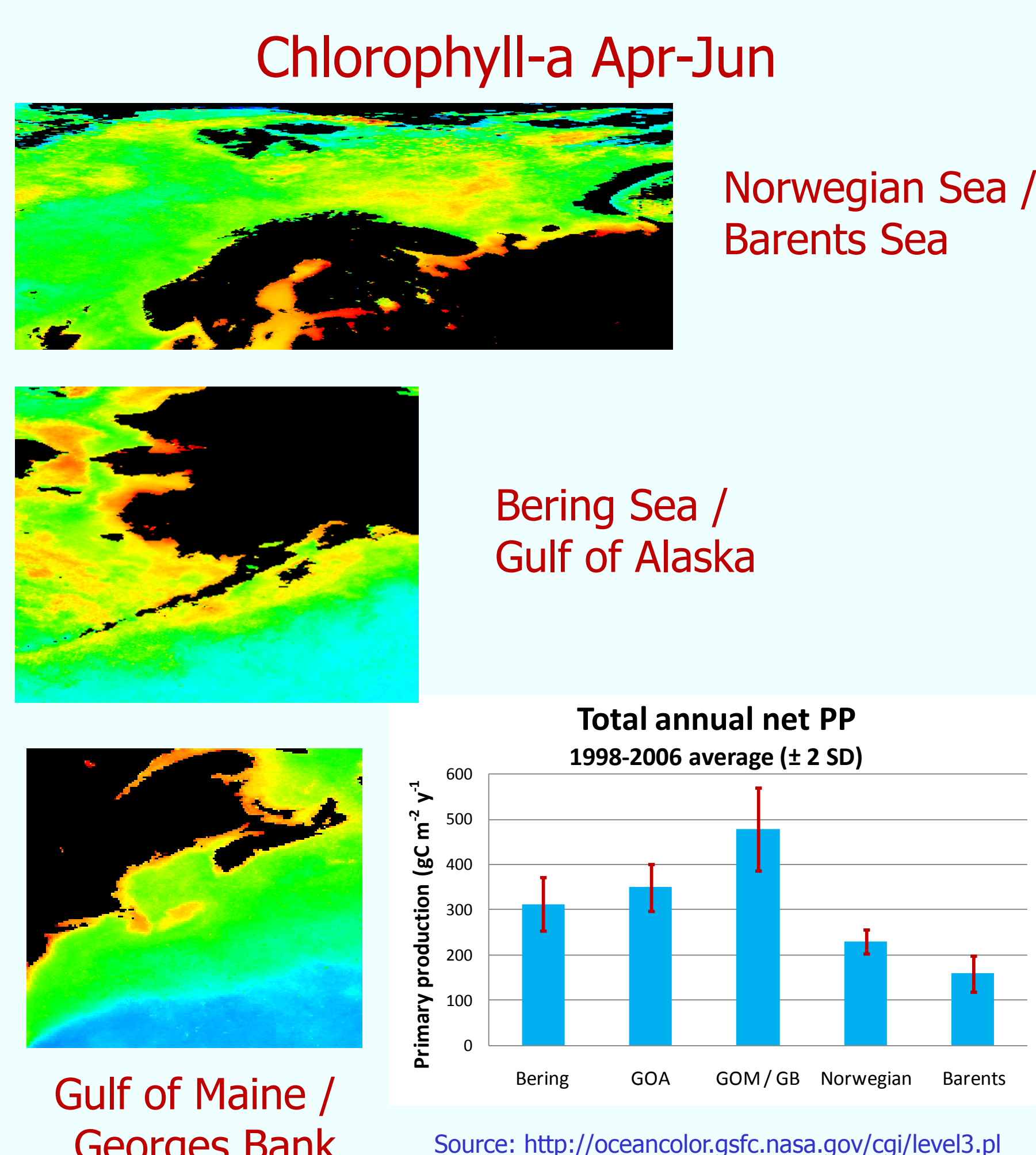
5. ESSAS Comparative Studies

5.2 NORCAN

- NORway-CANada Comparison of Marine Ecosystems
- Focus on Barents/Norwegian Seas and Labrador Sea/Shelf
- Since December 2005, held 3 meetings, with one scheduled for January 2008
- Eight separate writing groups presently drafting comparative papers with plans to submit in 2008

5.2 MENU

- Comparison of Marine Ecosystems of Norway and the United State
- Focus on the Bering Sea, Gulf of Alaska, Georges Bank/Gulf of Maine and Barents/Norwegian Seas
- Sponsored Theme Session on Ecosystem Comparative Studies at 2007 ICES Annual Science Conference
- 8 MENU papers presented at Theme Session with 5 to be submitted for publication from Theme Session.



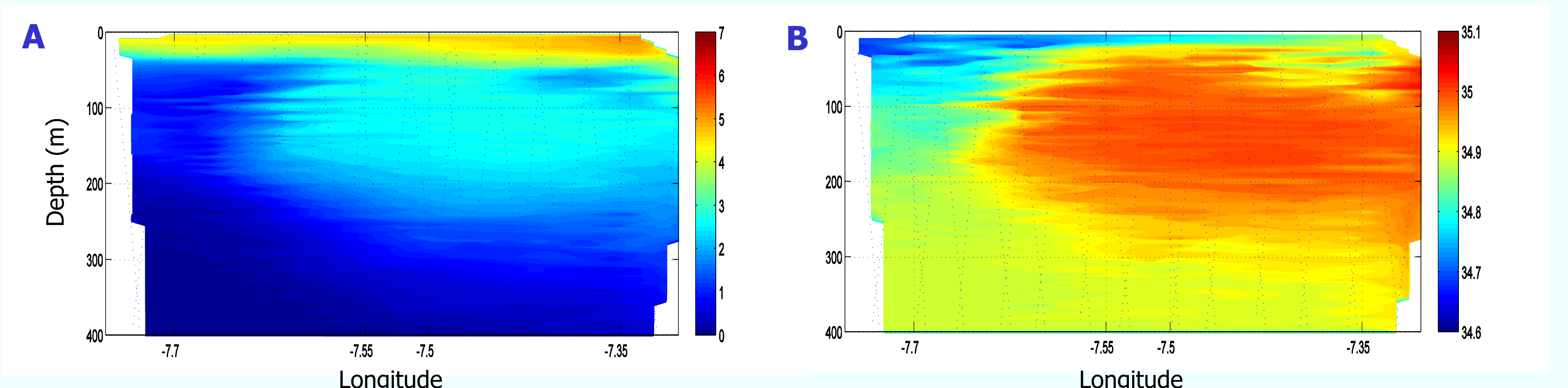
7. Upcoming ESSAS Activities

Ocean Sciences Meeting

- March 2008 in Orlando, Florida, USA.
- Sponsoring Theme Session on Comparisons of Sub-arctic Ecosystems

Annual ESSAS meeting

- September 2008 in Halifax, Nova Scotia, Canada.
- Workshop on the Role of Transport in Structuring Sub-arctic Marine Ecosystems



Temperature (A) and salinity (B) transects across the Jan Mayen Front in the Norwegian Sea taken with an autonomous glider and showing interleaving between the cold, fresher Arctic Waters and warm, saltier Atlantic Waters.