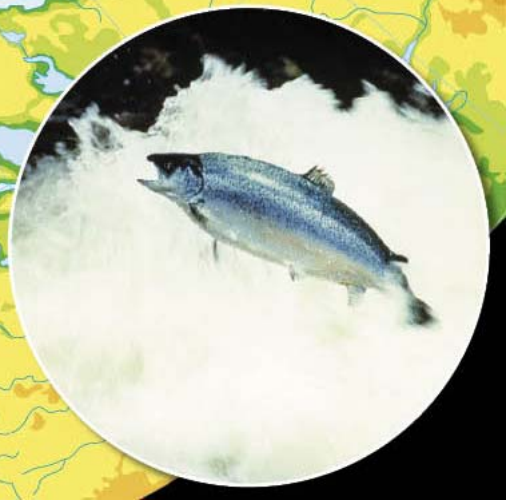
INSTITUTE OF MARINE RESEARCH

Ferryboxes in the frame of the operational oceanography activities at IMR

Henning Wehde

IMR is doing
Research for better management advice

- on Aquaculture and ecosystems of
  - the Barents Sea
  - the NorwegianSea
  - the North Sea
  - the Norwegian coastal zone
  - developing countries



Vision

Knowledge and advice for rich and clean marine and coastal regions.

Main goal

Deliver operational information on the marine environment
to support research and
to improve knowledge-based

ecosystem

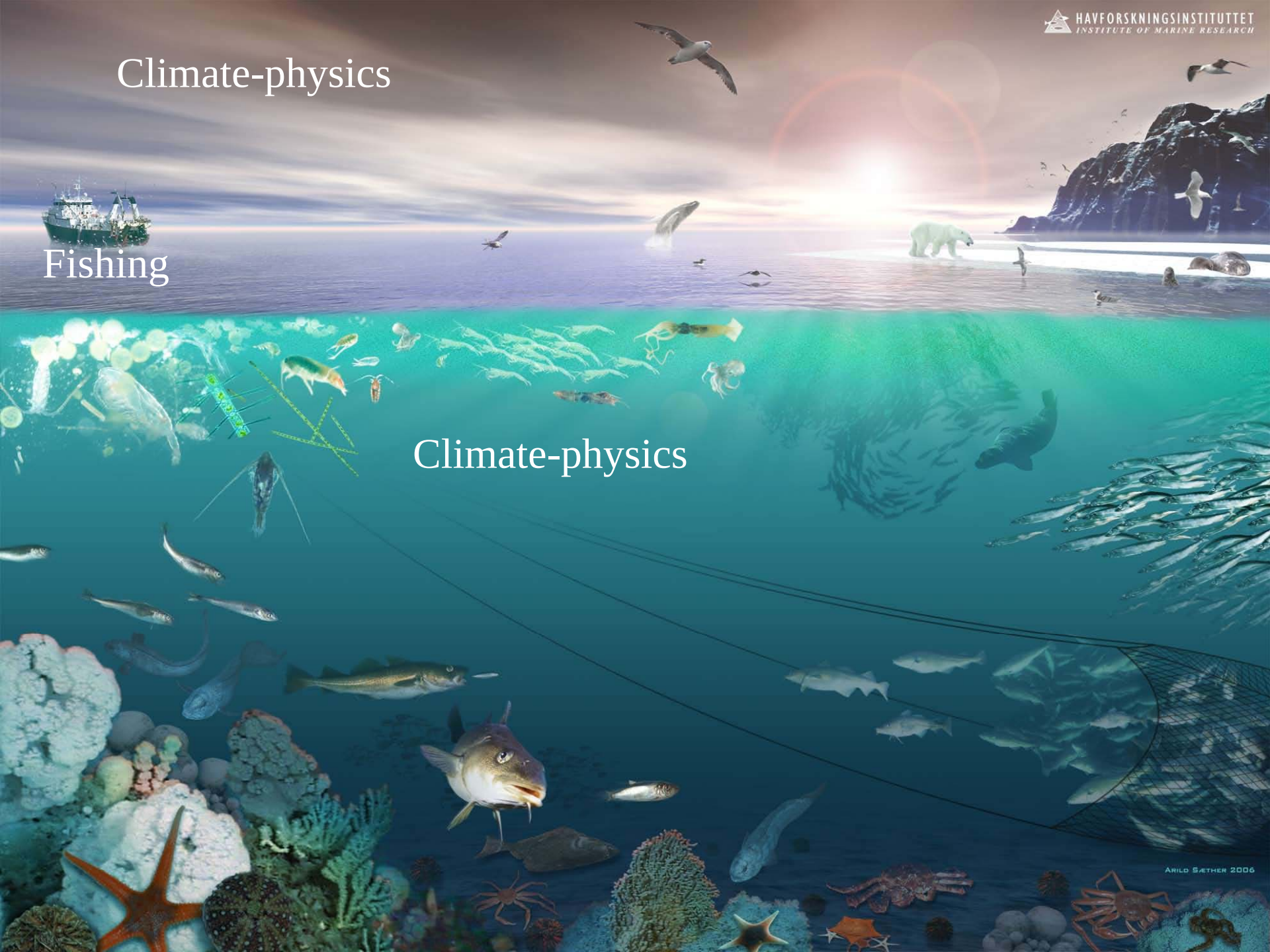
assessment - prediction - management

Approach:

To consider the most important driving forces on, and the processes within the ecosystems

Driving forces:

- **Climate-physics** (directly on all trophic levels and indirectly bottom-up through the lower trophic levels
- **Fisherman-fisheries management** (top-down)
  - Fertilization
  - Pollution
  - Introduction of new species
  - Habitat disturbance


HAVFORSKNINGSINSTITUTTET
INSTITUTE OF MARINE RESEARCH
Climate-physics
Fishing
Climate-physics
ARILD SÆTHER 2006

ICES WG on Operational Oceanographic Products for Fisheries and Environment (WGOOFE)

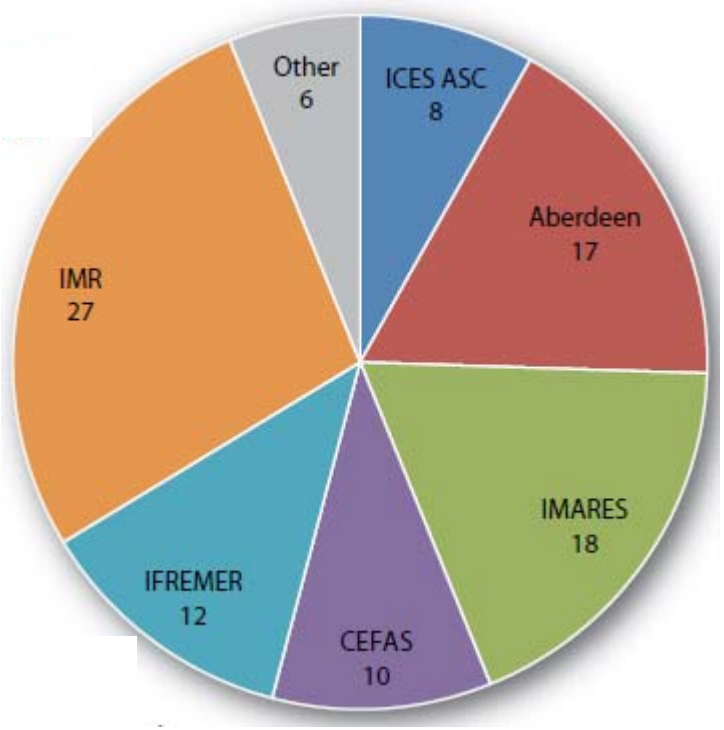
User needs

Questionary

what kind of products do the users really want to have to support the work to assess, predict and manage the ocean ??

Questionary to ICES users of oceanographic data (fisheries and environmental) scientists:

- 100 scientists responded



- **Data access.** Data should be free and operationally available to all. Registration prior to data access should be avoided.
- **Time scale.** Two-thirds of users highlighted monthly average data as important. All other time-scales were requested by less than 50% of users.
- **Data type.** More than 90% of ICES users requested access to historical data. This forms a stark contrast to the move in operational oceanography to develop forecast, nowcast, and real-time systems.
- **Data updates. Regular on an annual basis;** quarterly and monthly updates were also requested by a large proportion of users.
- **Data format.** An overwhelming majority requested that **data values** be available for download in **ASCII format**. Graphical outputs were seen as a good way to characterize the data, but the users wanted access to data that they could manipulate.
- **Meta data.** Users want a **description of the methodology** accompanying the data.

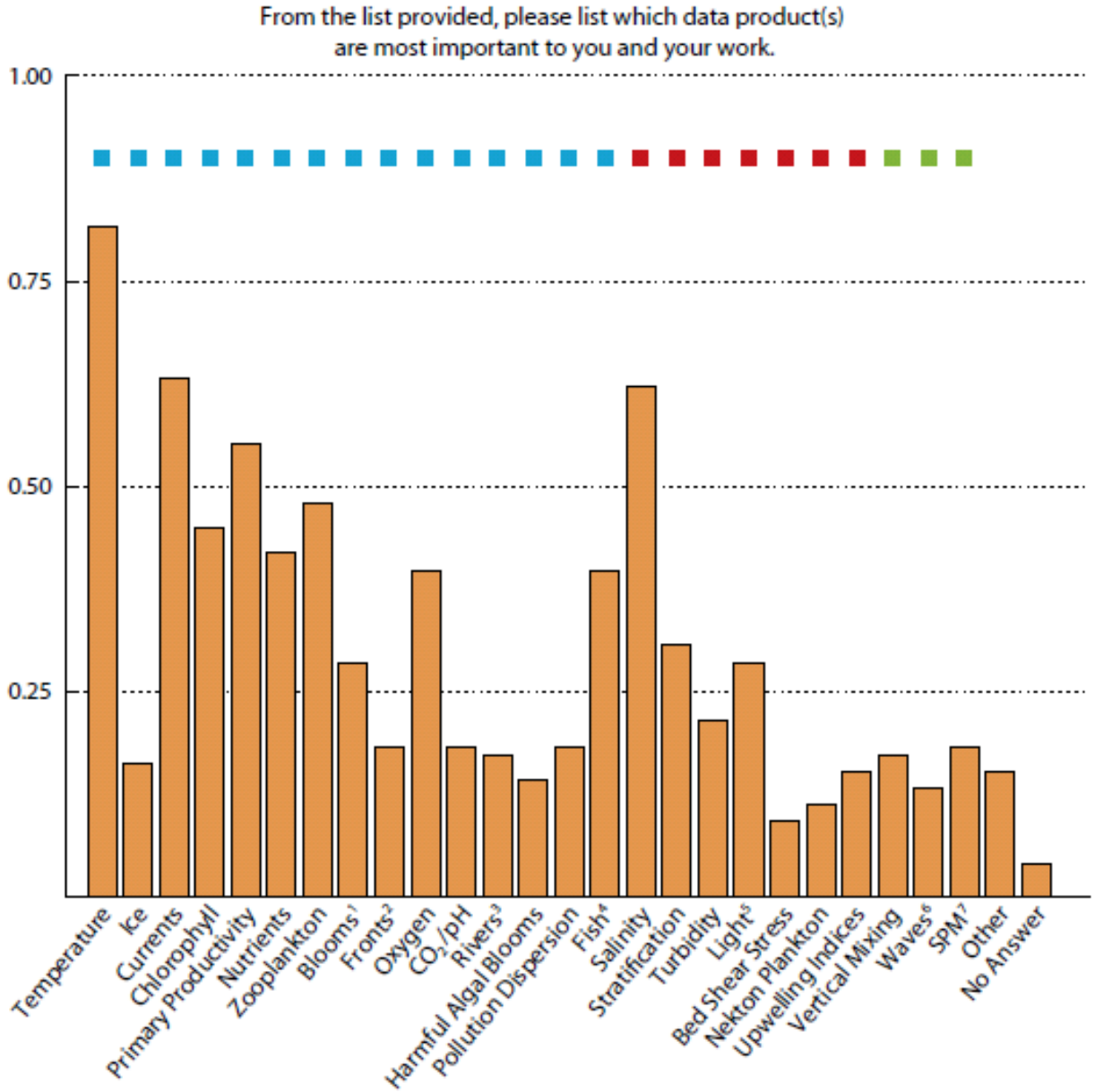
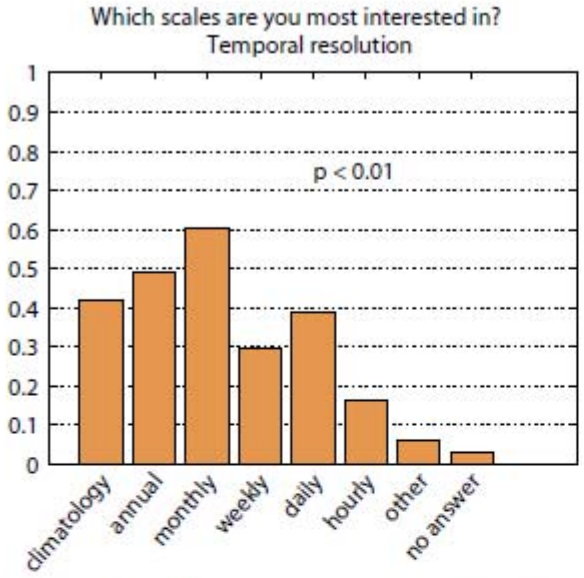


Figure 2. Required oceanographic variables for data products. Variables in the horizontal axis sorted according to initial ranking (ICES, 2009) with squares representing original ranking: blue = high, red = medium, and green = low. [1] Blooms = bloom time/duration/intensity. [2] Fronts = location of frontal regions. [3] Rivers = river plumes and loads. [4] Fish = fish larvae growth and distribution. [5] Light = light in the water column. [6] Waves = wave height and direction. [7] SPM = suspended particulate matter.



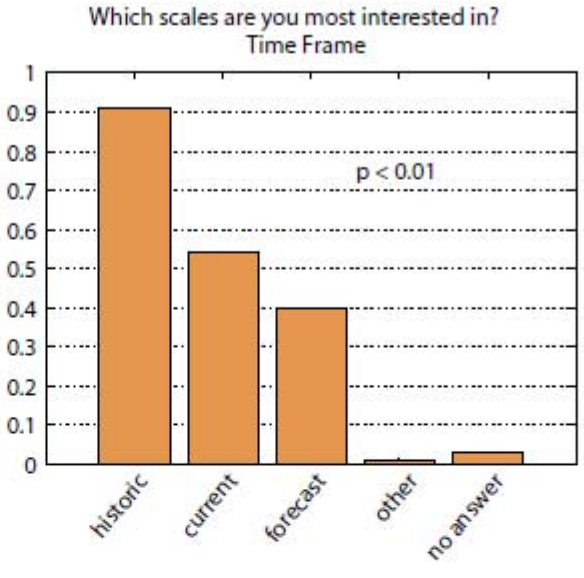
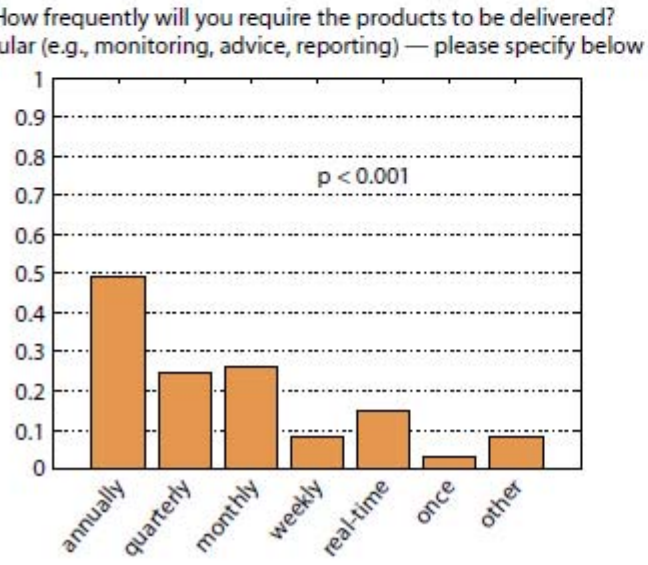
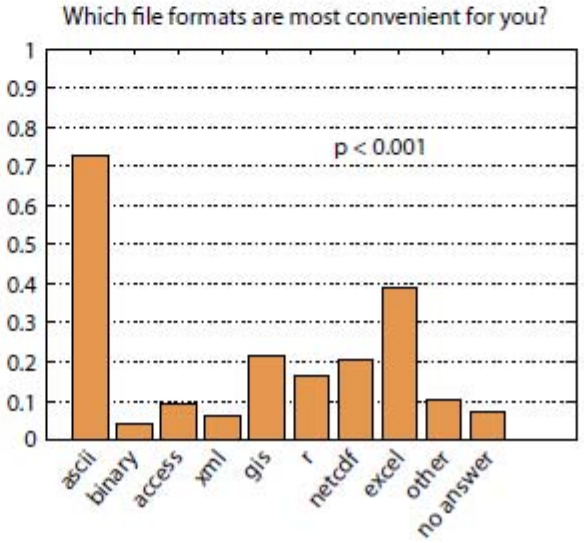


Figure 3. Data products required and data formats requested. Respondents could choose more than one option. The P values show the chi-squared test of the results against purely even results for all categories (other and no answer not included).





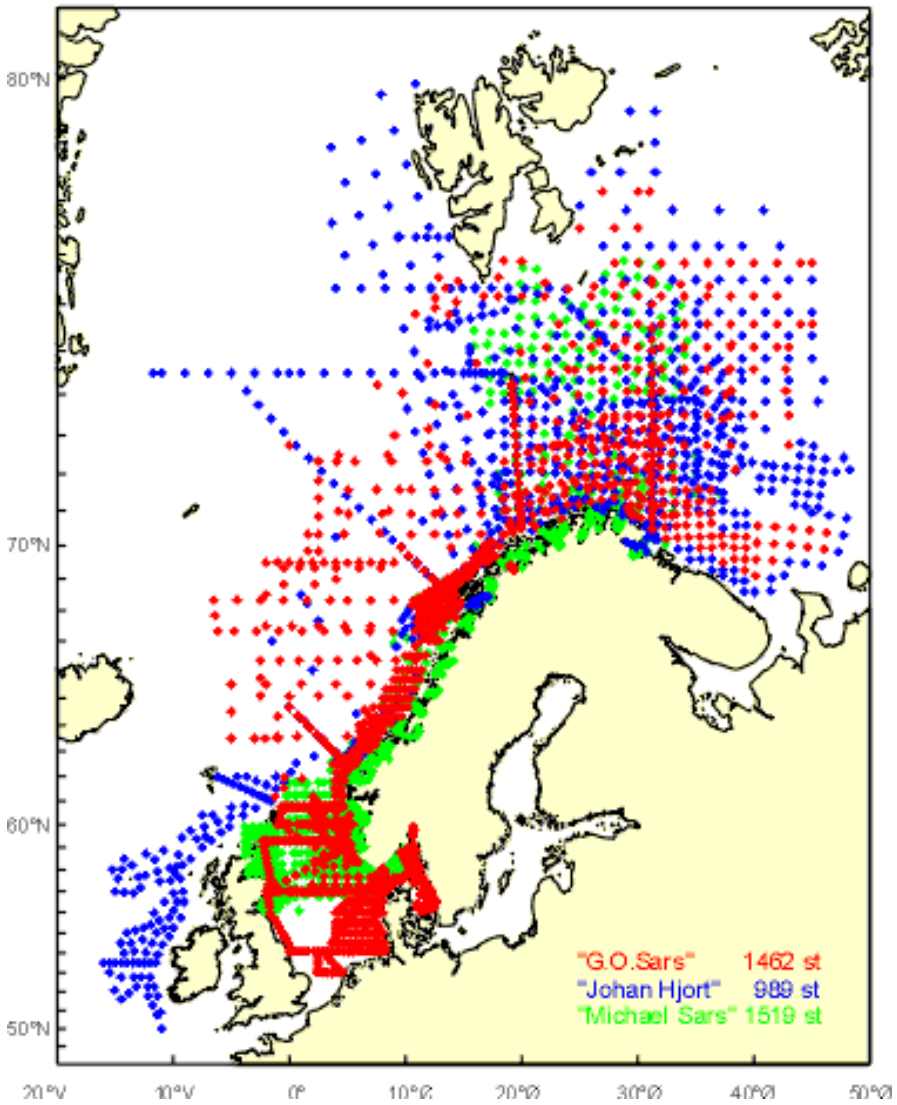
Berx *et al.*, 2011, Oceanography 24(1):166-171

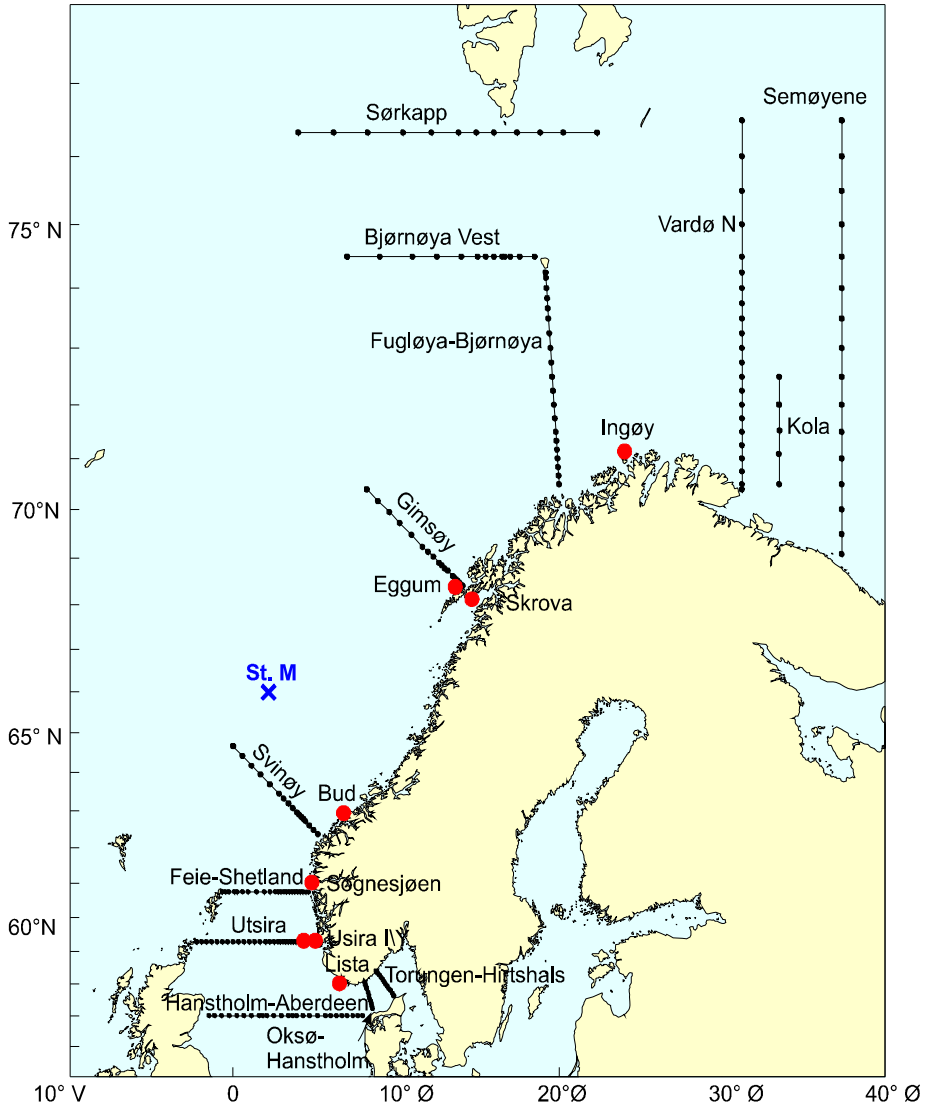
Working on for users relevant indicators

- Position of fronts
- Area and volume of specific water masses
- Upwelling indexes
- Currents, temperature, salinity and turbulence
- Particle and tracer distributions from given sites (spawning, oil production….)
- Fluxes of water masses and nutrients (though given sections)
- Timing (of peak spring bloom) and strength of primary prod.
- Light in water column
- Transport, growth and distribution of zoo-plankton
- Transport, growth and distribution of selected fish larvae
- Contaminant exposure on plankton and benthic ecosystems
- Sedimentation (resuspension)
- Overlap between species (prey and predators)

Traditional measuring programme

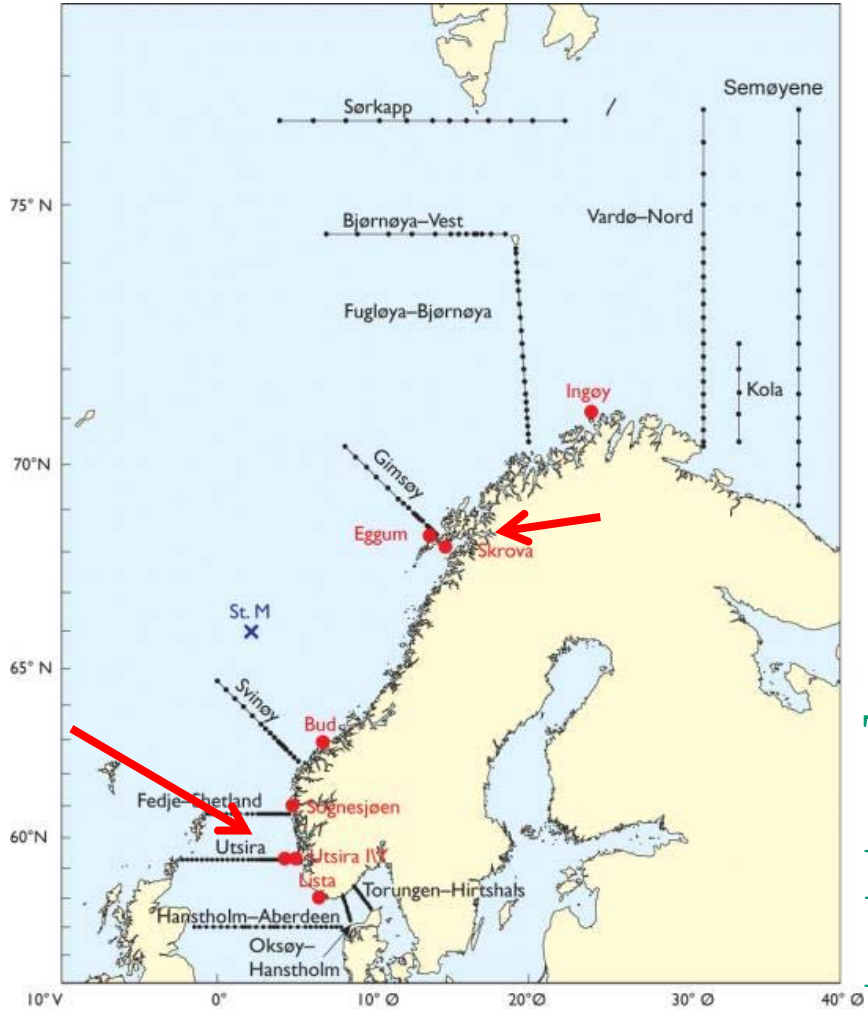
Marine monitoring Norway

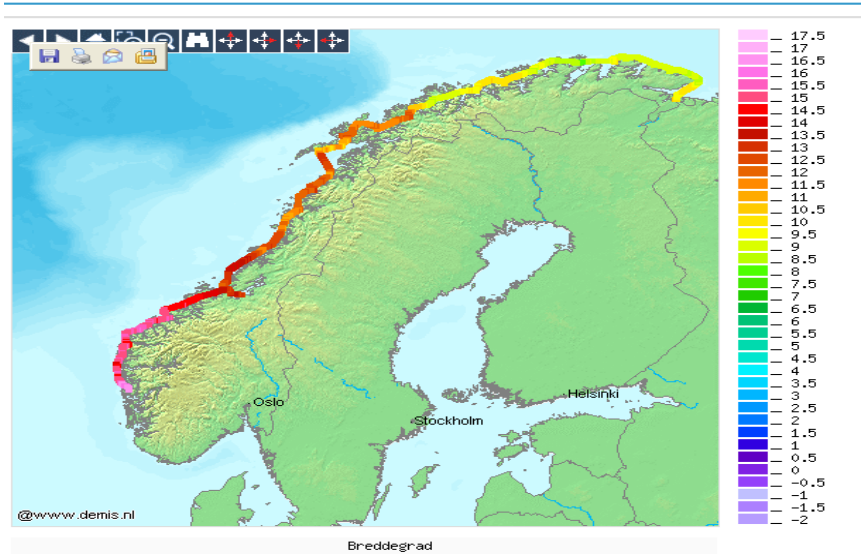




Station M to be replaced by a moored buoy
Excluding Ferryboxes here

Regular oceanographic monitoring

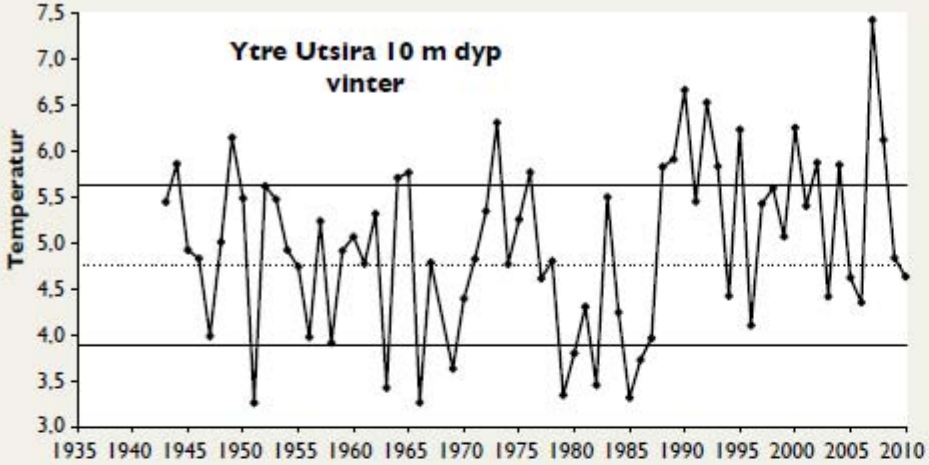


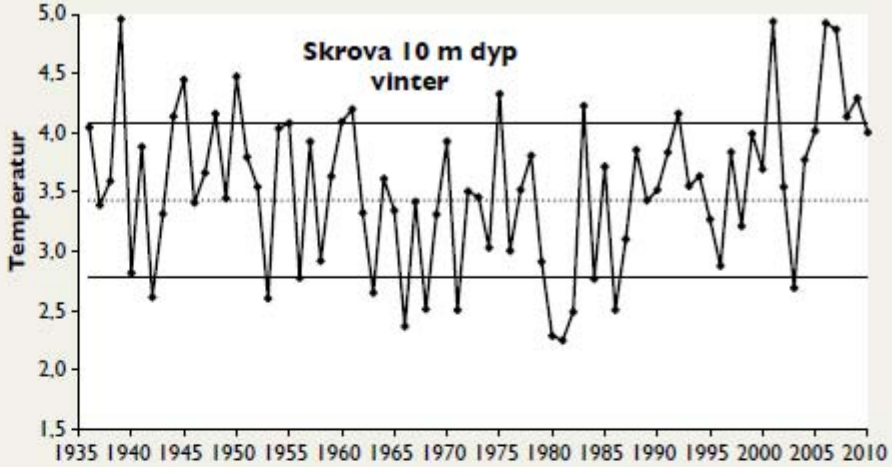


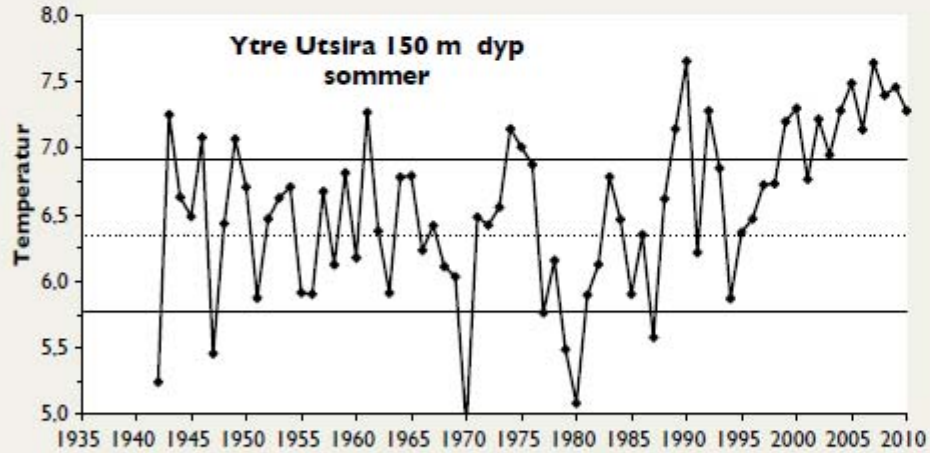
Thermosal/Ferrybox 1930ties

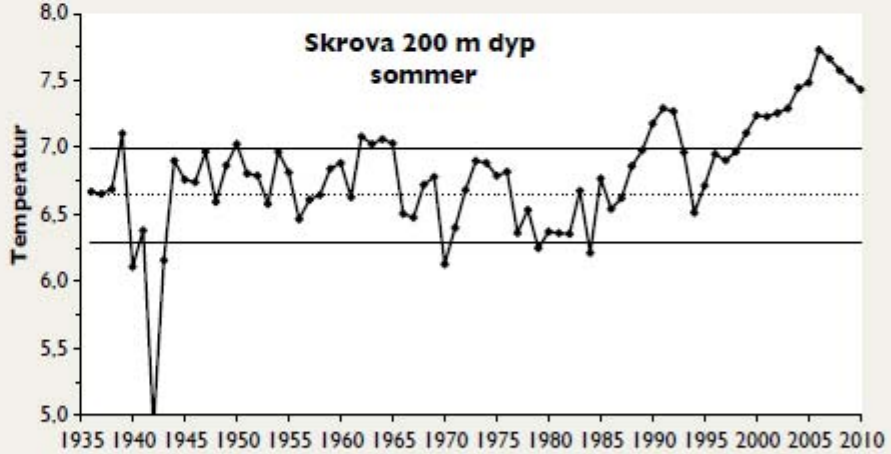
Regular Transects since 1930ties

Fixed stations since 1930ties





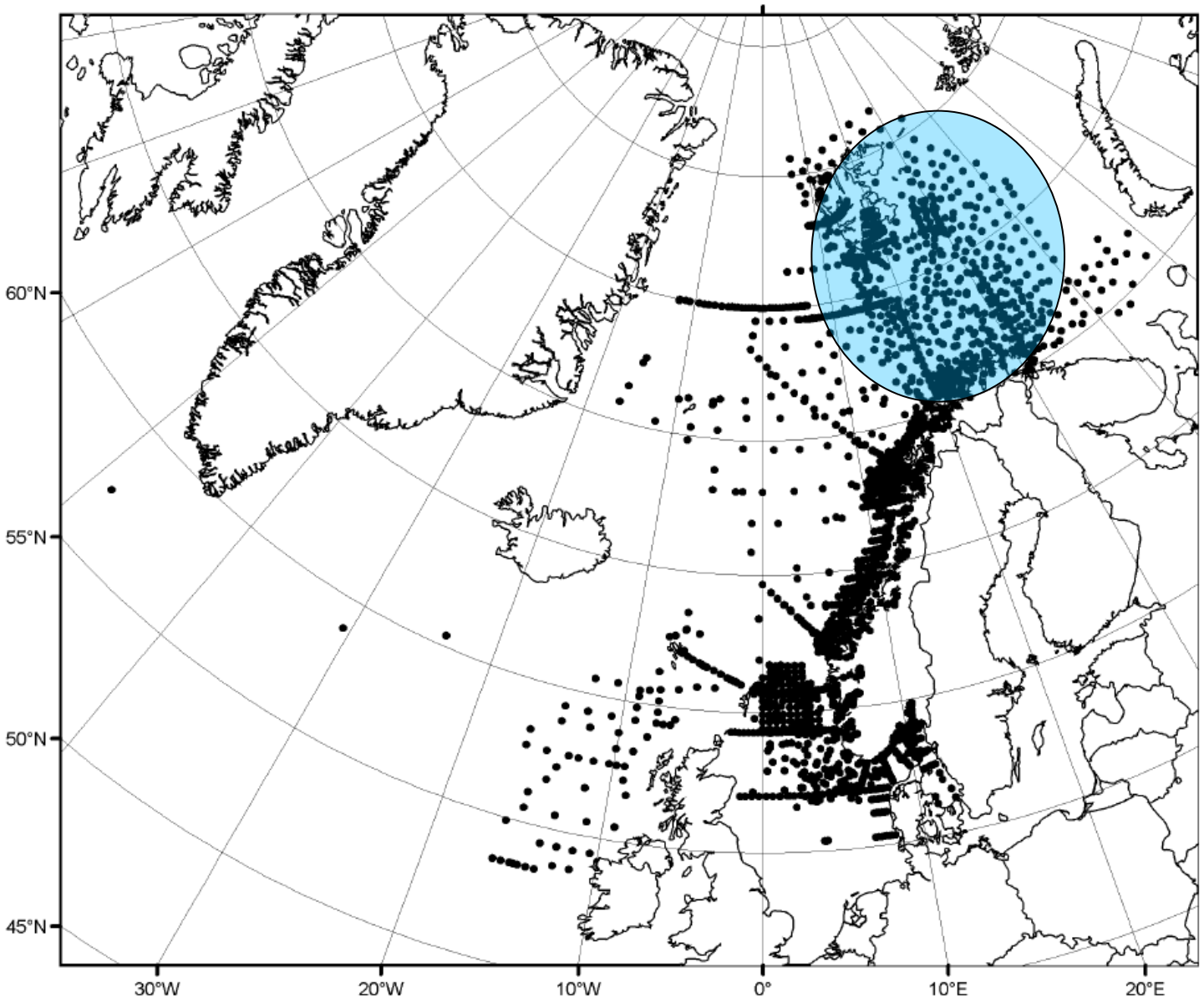




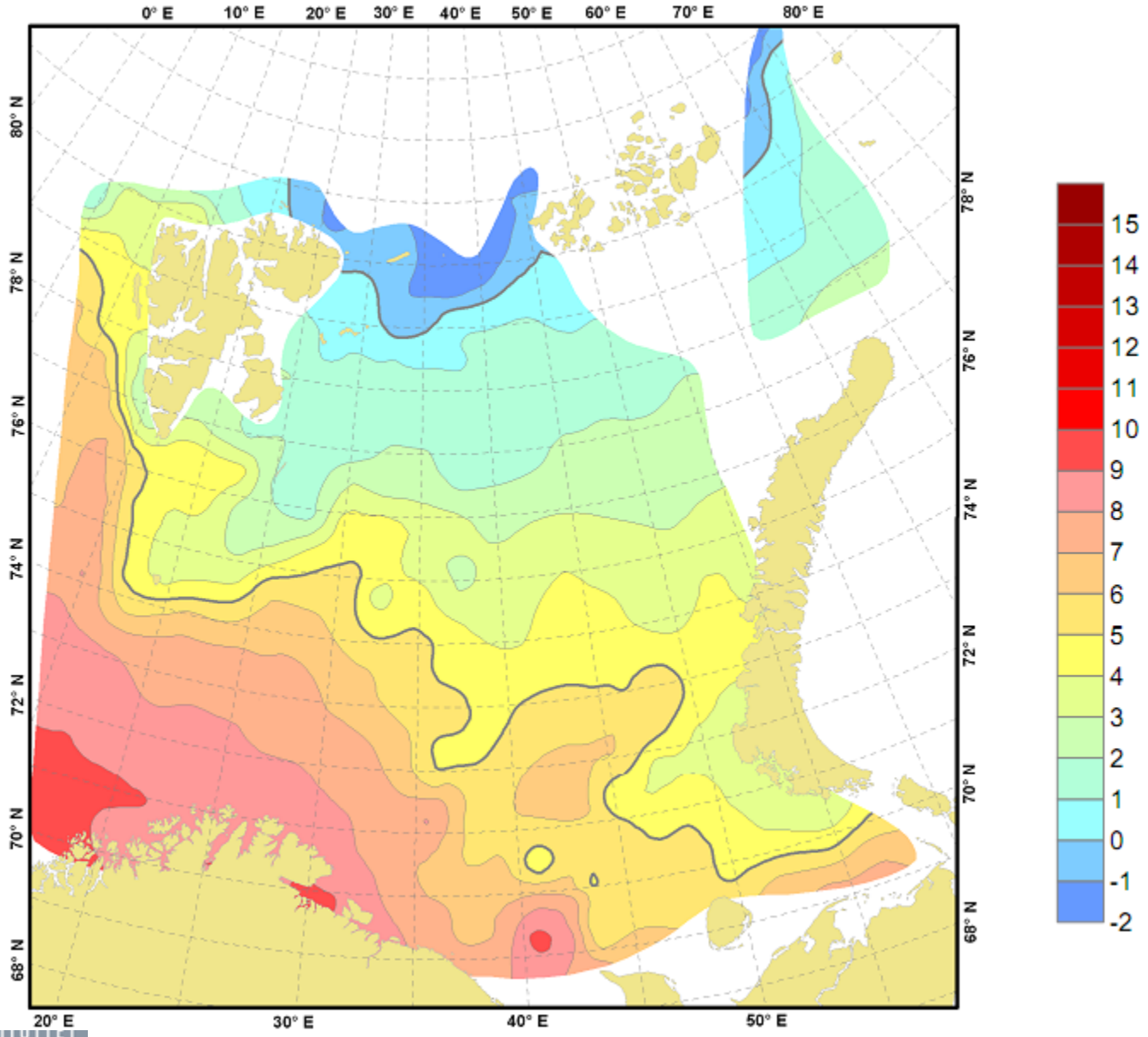
Figur 2. Midlere temperaturer i overflatelaget om vinteren (januar–mars) og på 150–200 m dyp på sensommeren (juli–september) ved Ytre Utsira og Skrova i årene 1936–2010. Prikket linje angir middelverdien (1936–1990) og heltrukken linje angir +/- ett standardavvik.

Mean surface temperature in January–March and at 150–200 m depth in July–September at outer Utsira and Skrova through 1936–2010. The dotted line represents the mean value (1936–1990) and solid lines +/- one standard deviation.

CTD stations



T
Aug/Sep 2010



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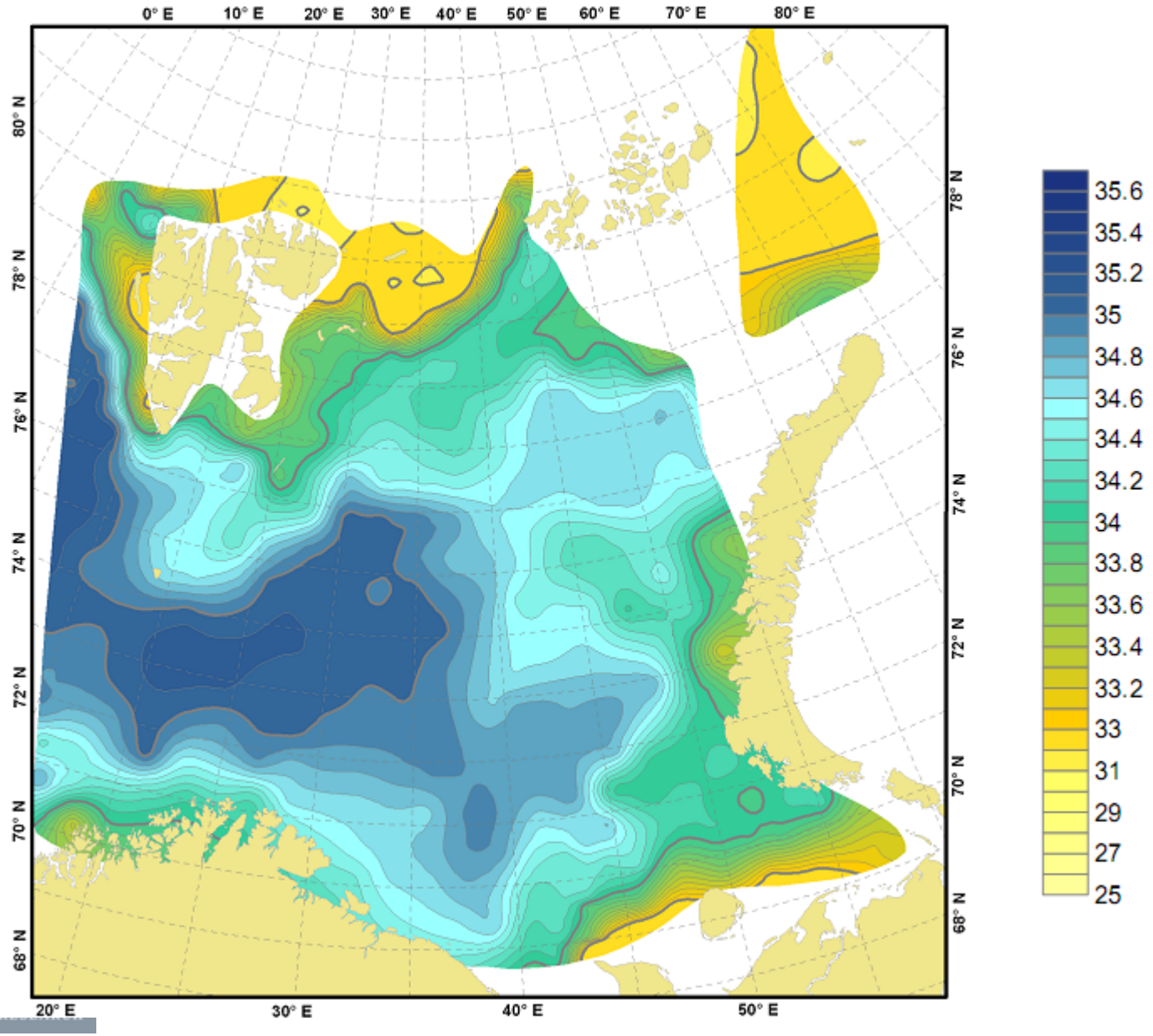
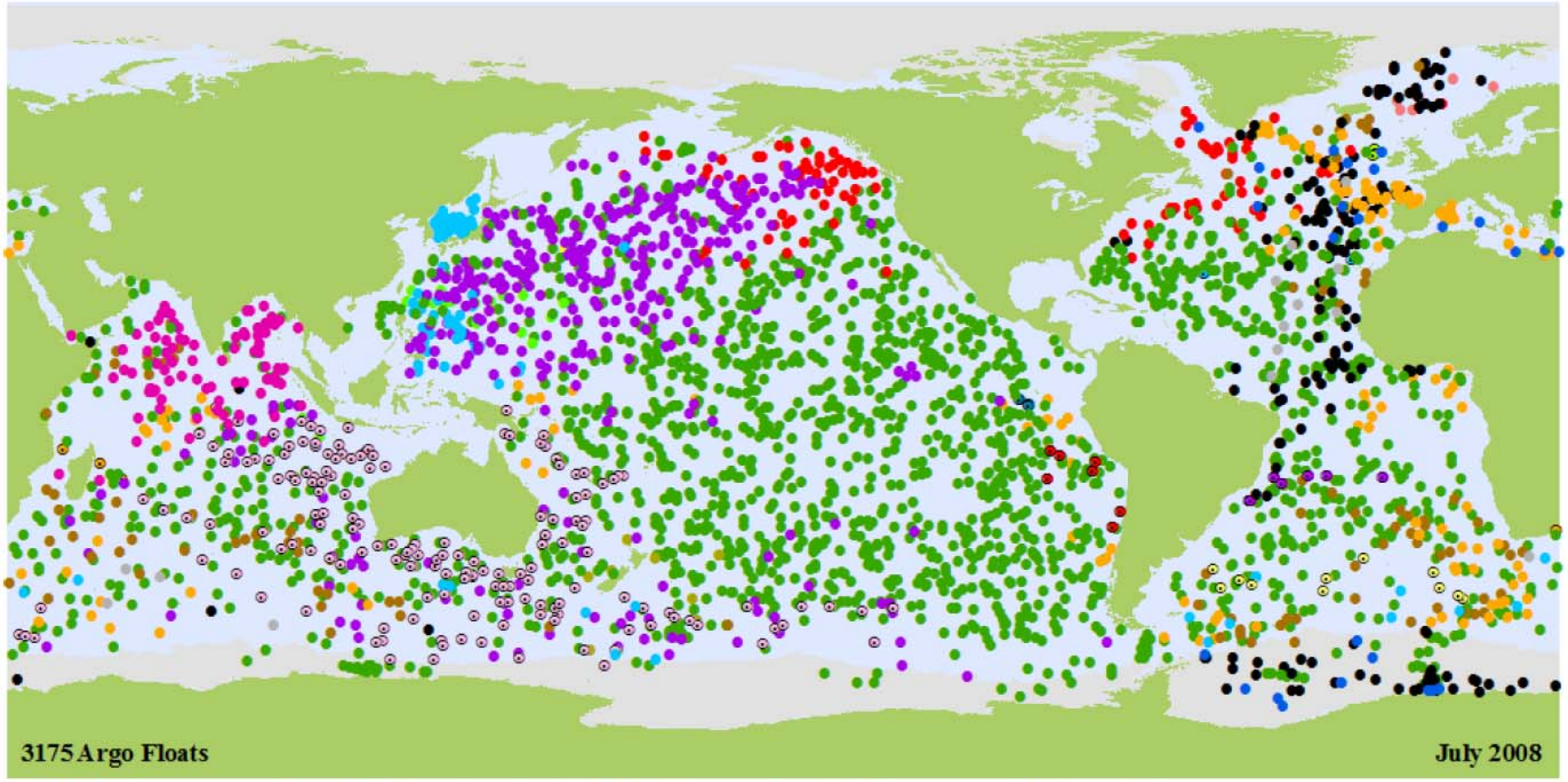
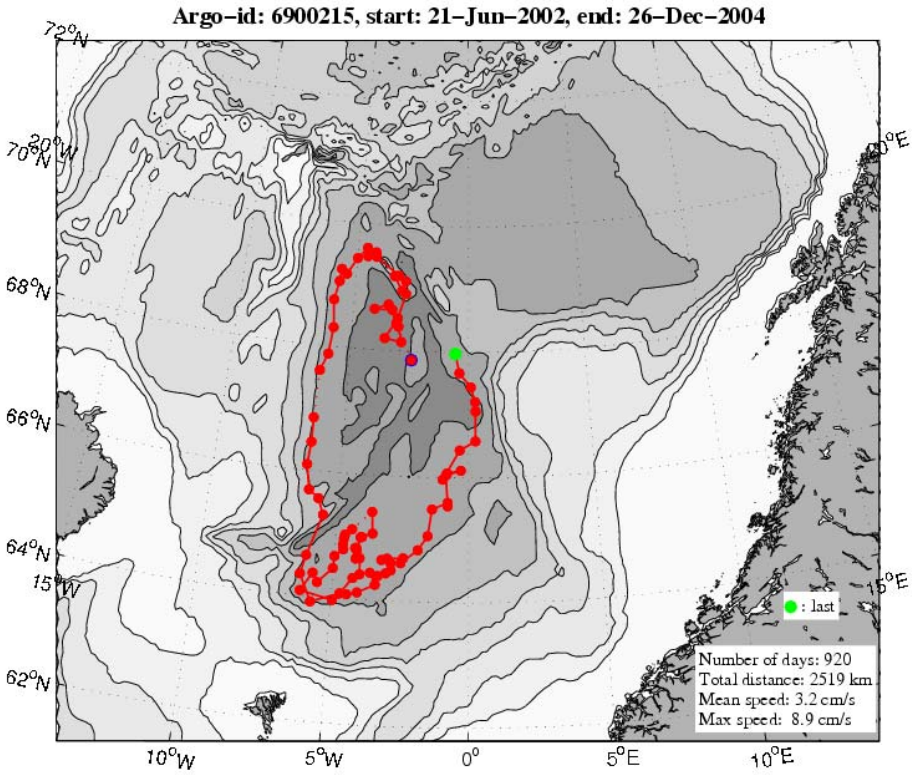
Aug/Sep 2010

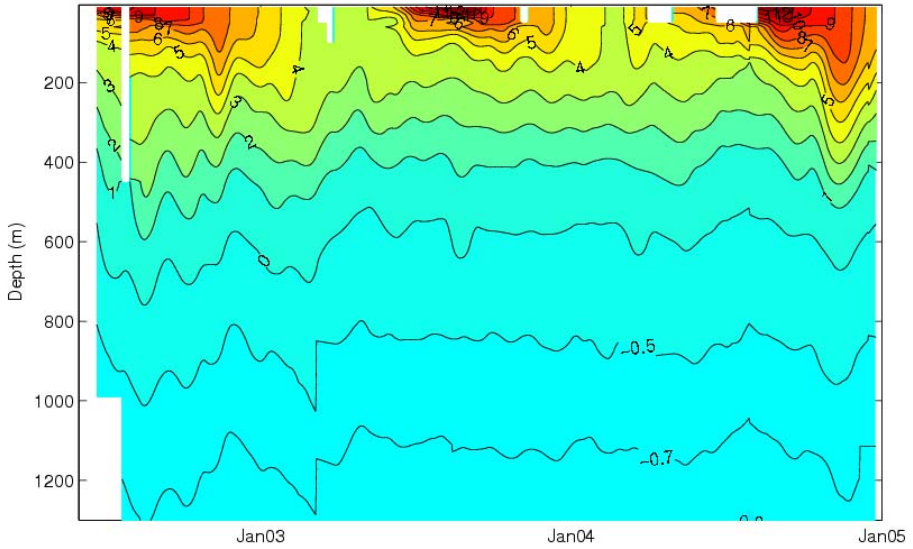


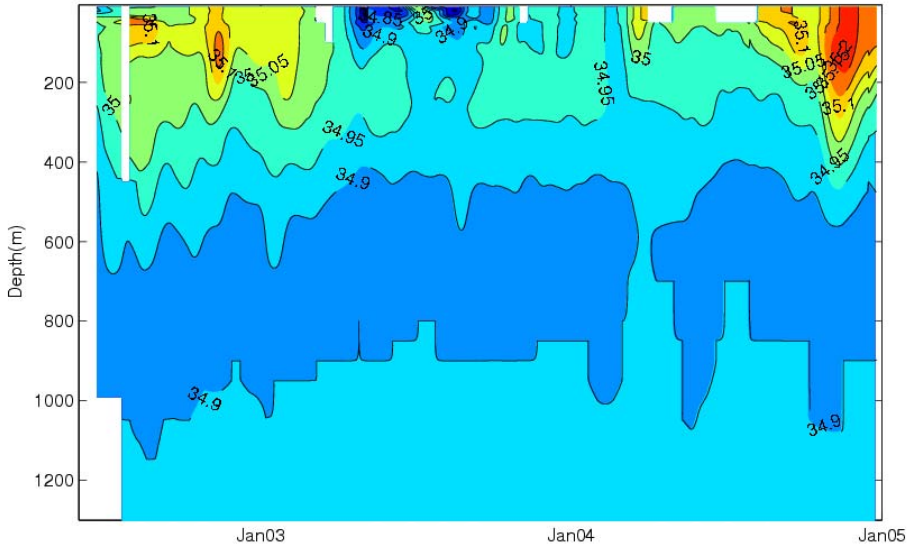
The ARGO program



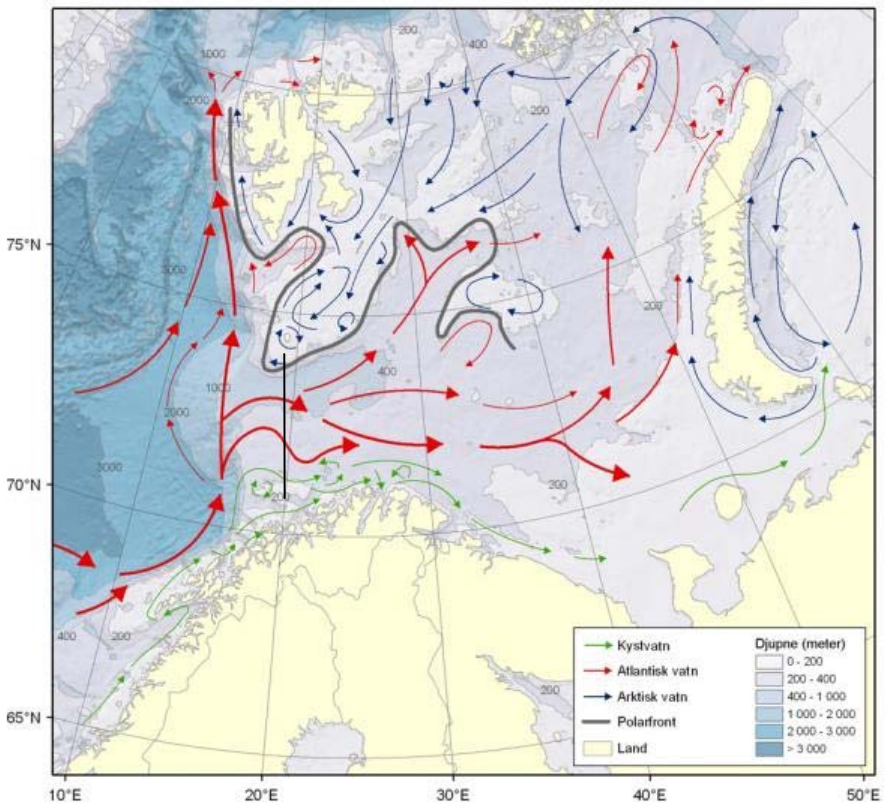
Drift, temperature and salinity from one Argo float

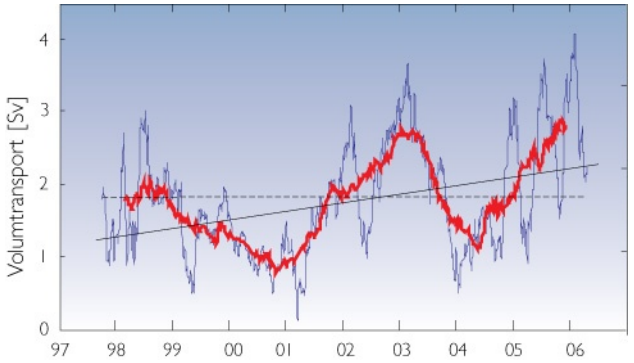


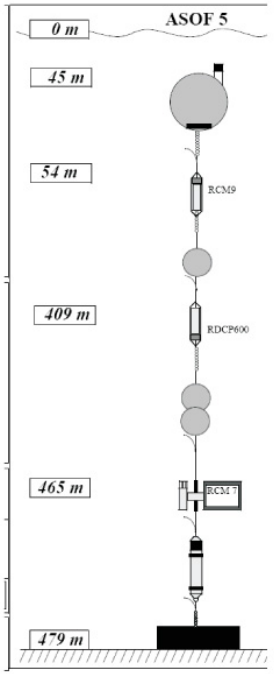


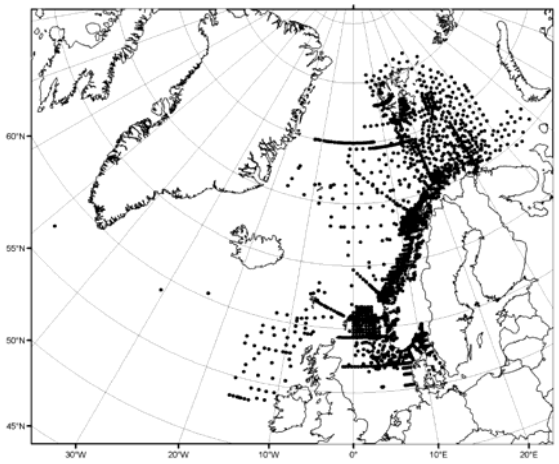


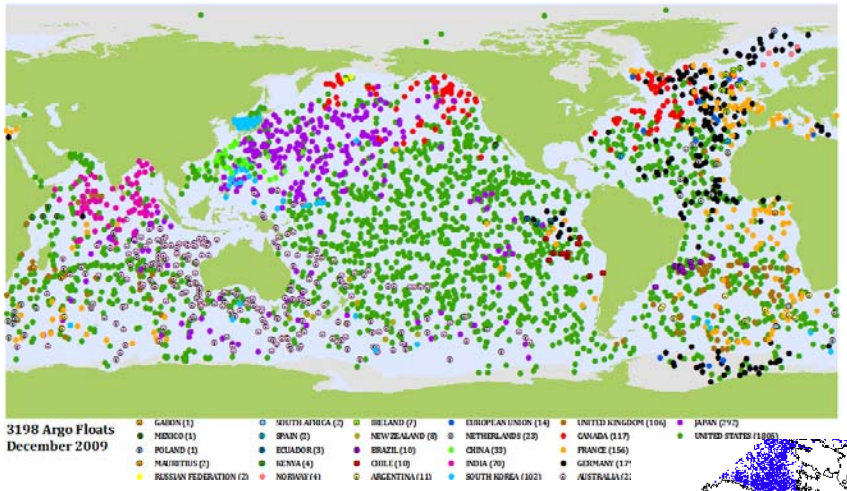
Current measurements



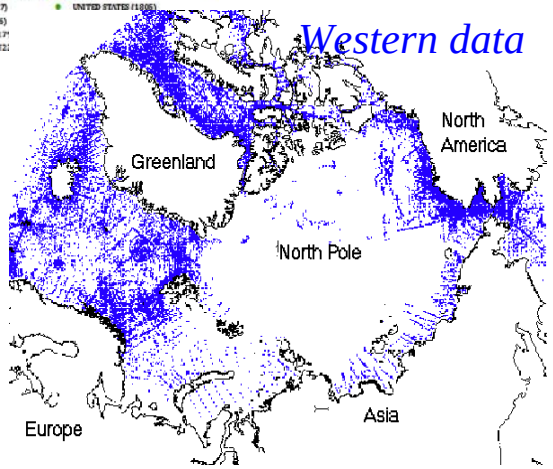


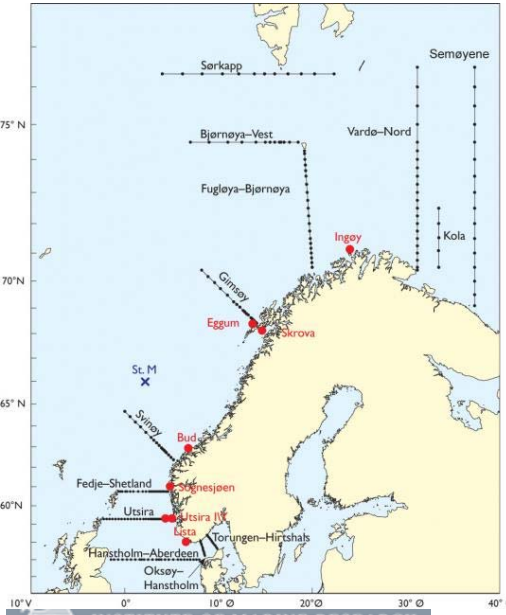


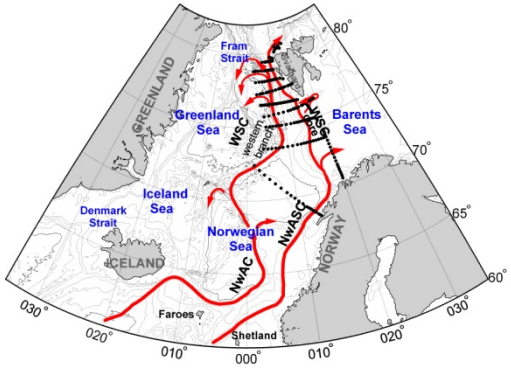


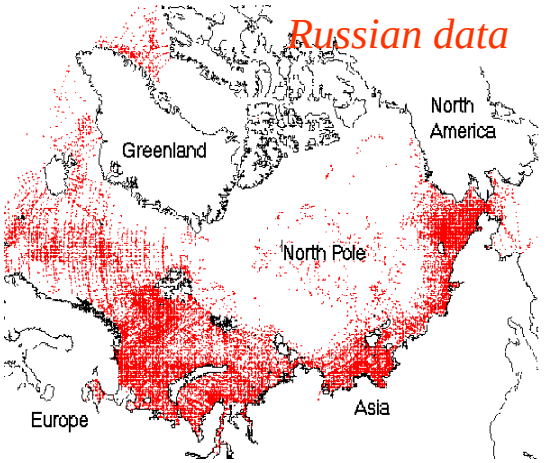


Available InSitu Observations

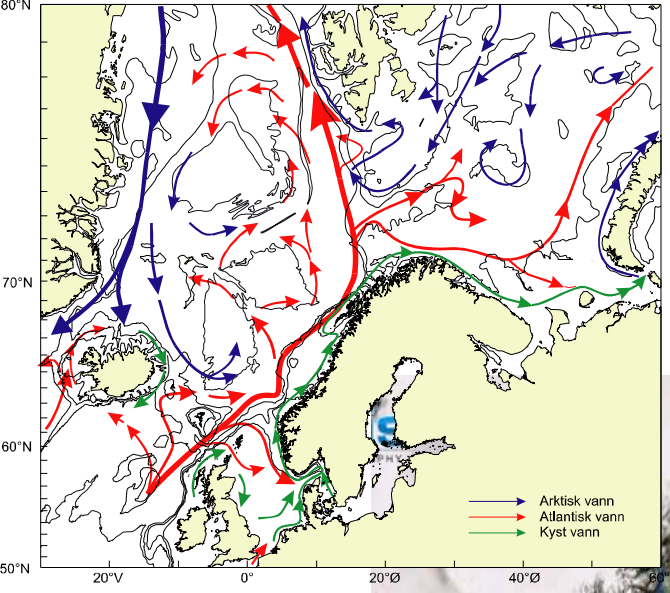


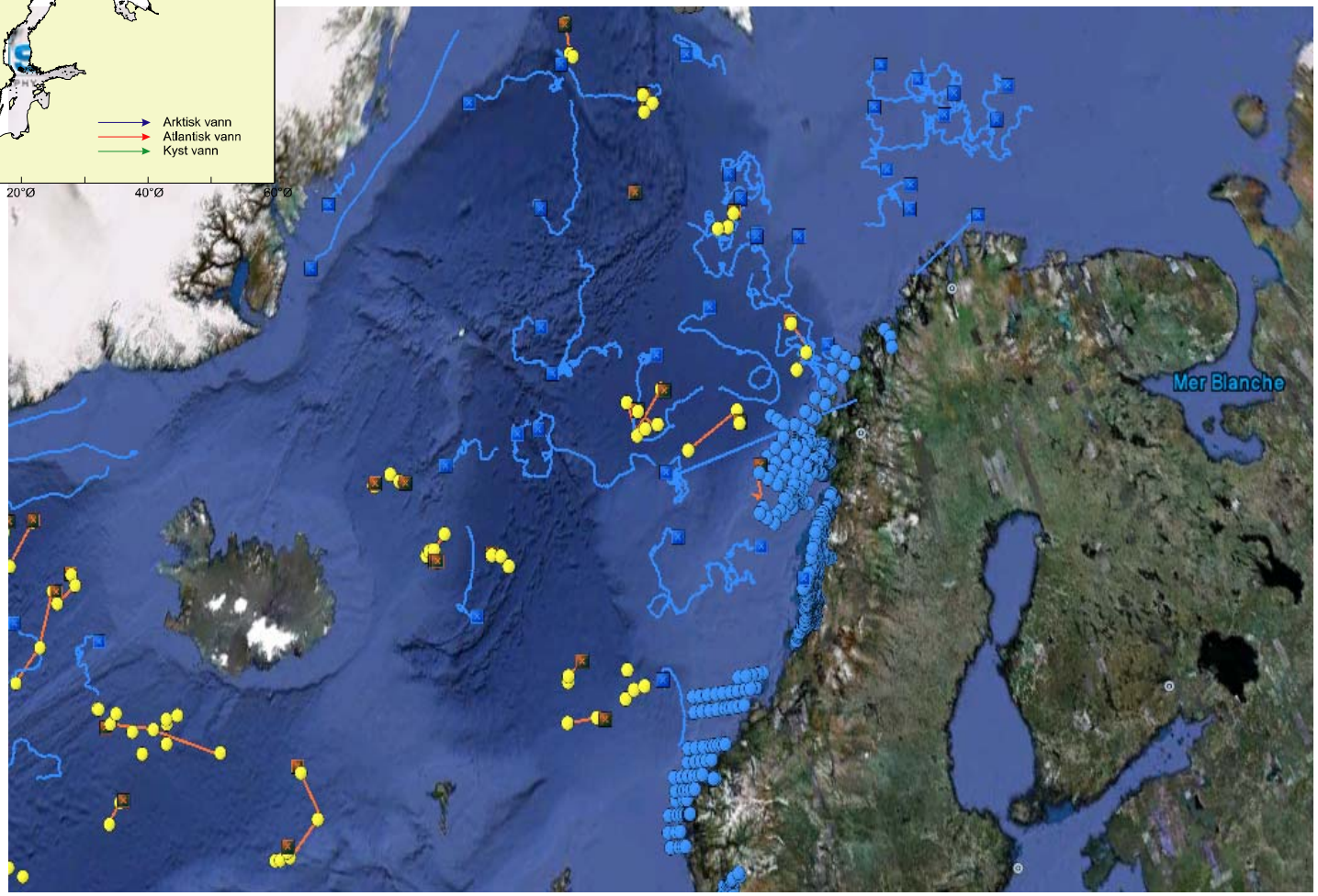


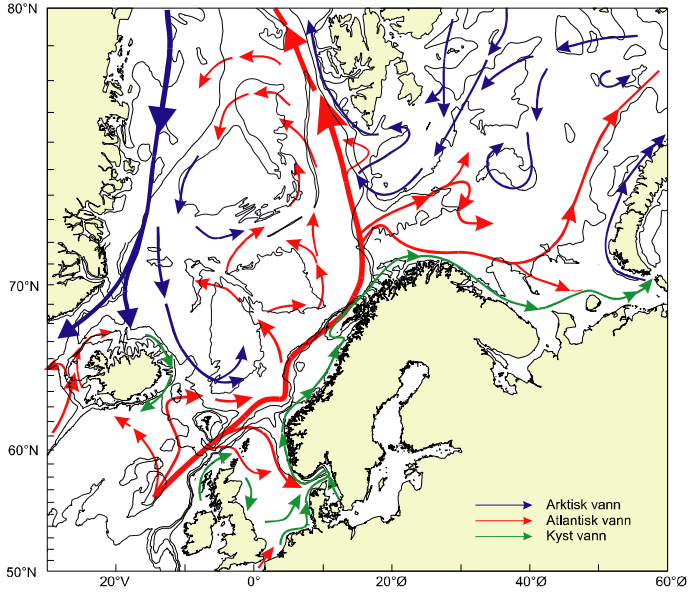




InSitu Observations: April 2011

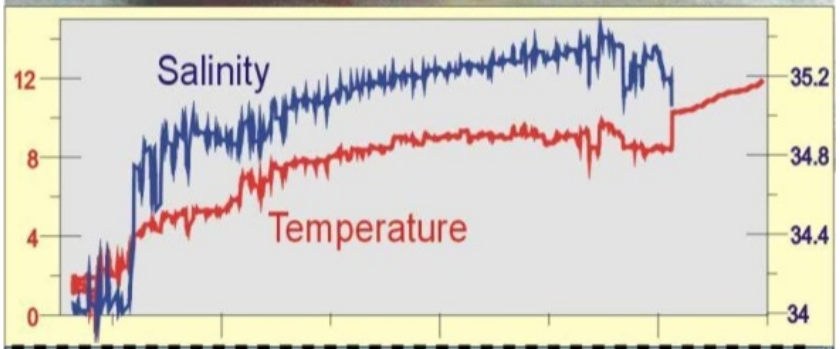


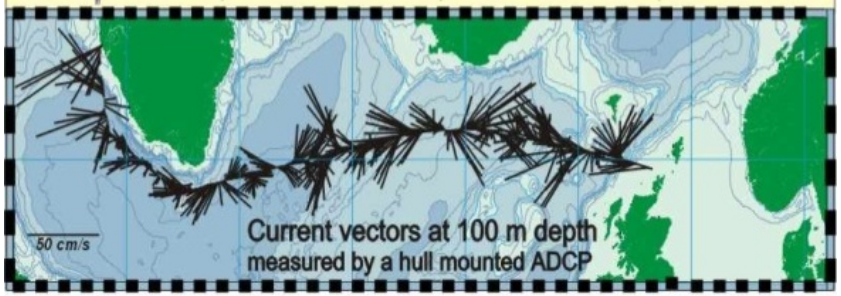




Re/Establish collaboration on the RAL Nuka Arktika

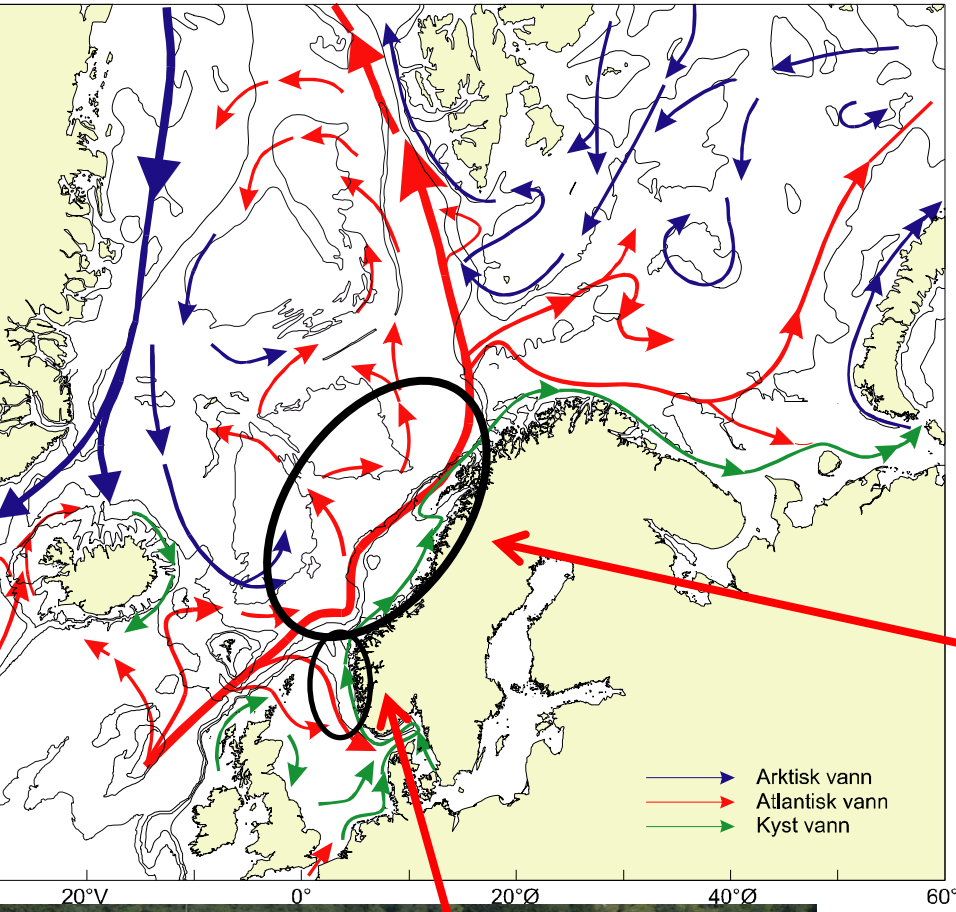
Purchaise of a new ADCP is in progress and the instrument will be delivered and installed in autumn/winter





Spatial and temporal variability of currents and transport of warm waters towards the Nordic Seas

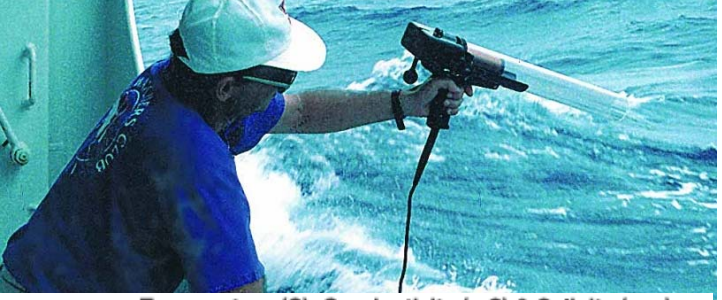
Under discussion: Installing Ferryboxes on Reference fleet Some boats are already equipped with ADCPs



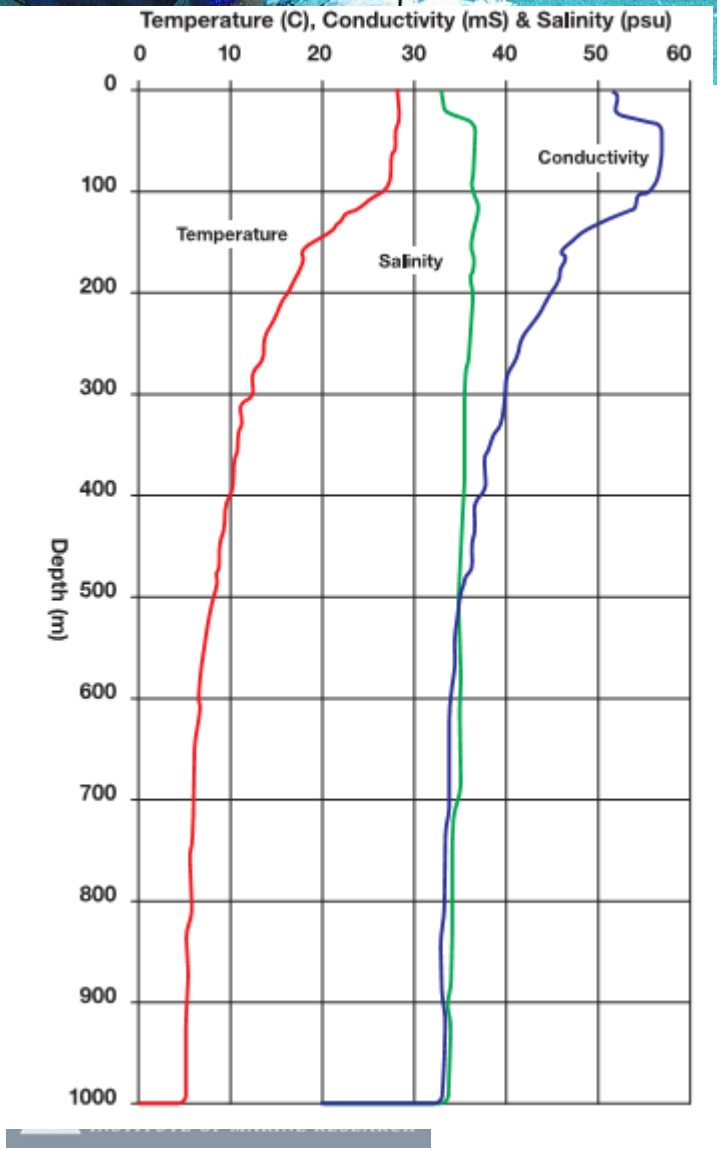
KV Tor

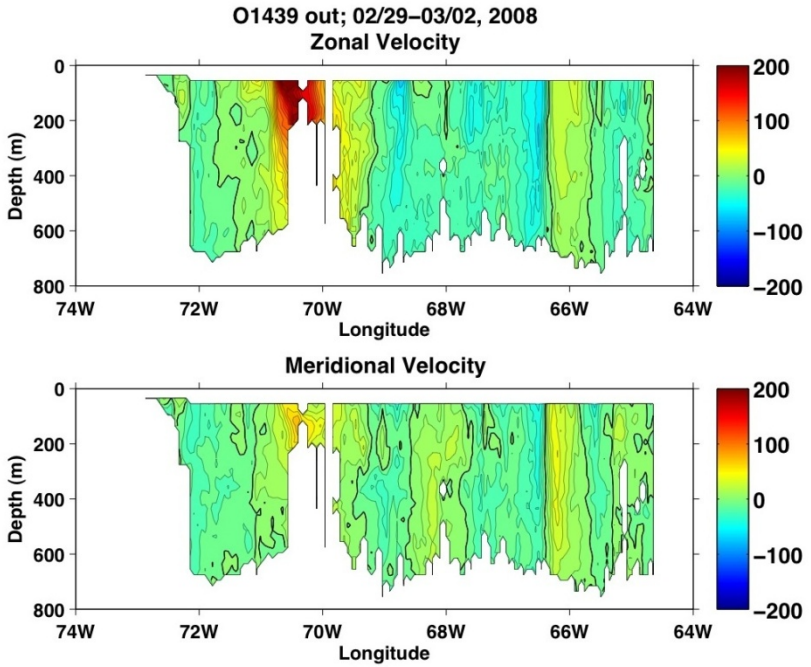
Since Spring 2011

under testing

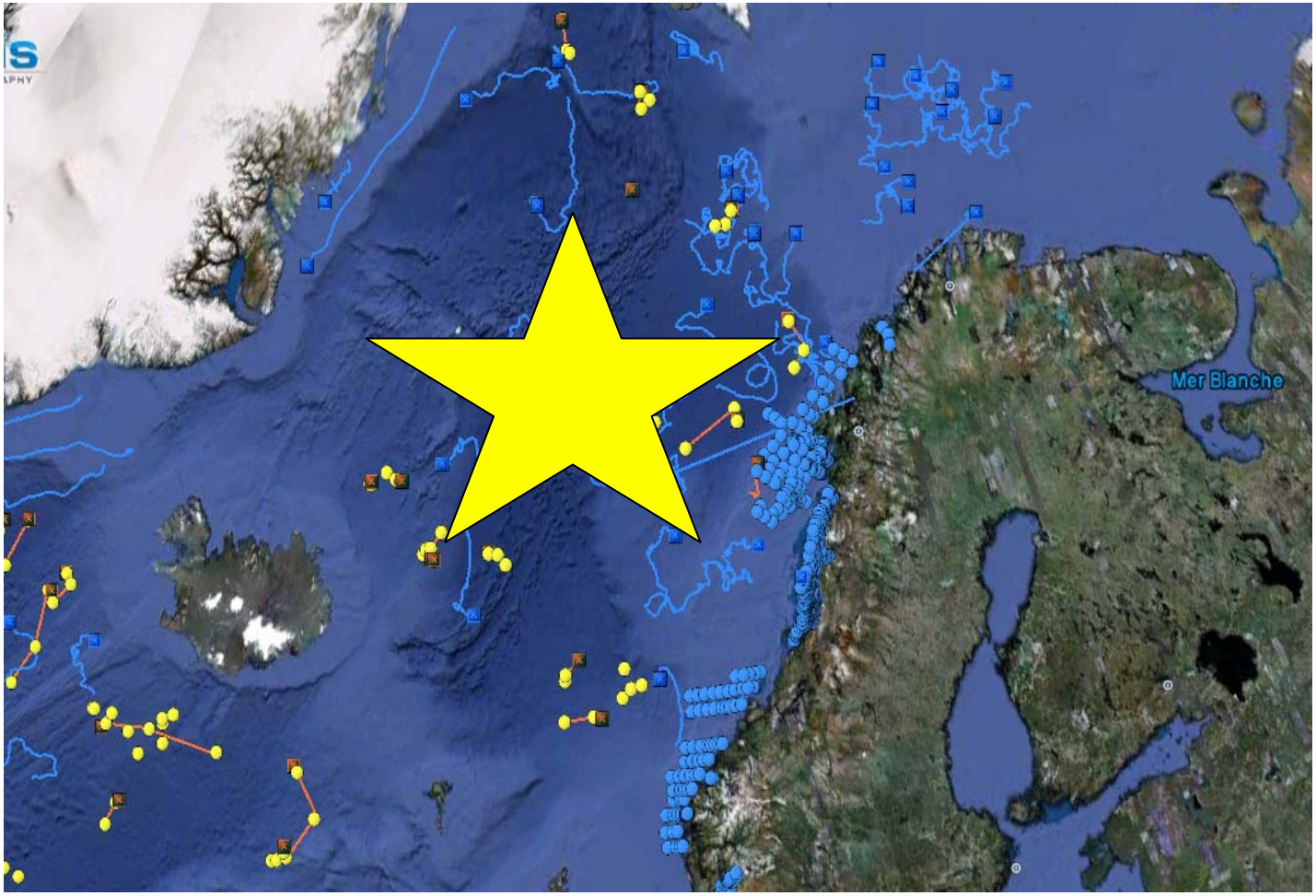


Combining the Ferrybox data with the application of XBTs and ADCP for getting knowledge on the deeper water





InSitu Observations:




Thanks for listening