Ecosystem Approach to Fisheries Management in the Barents Sea

by

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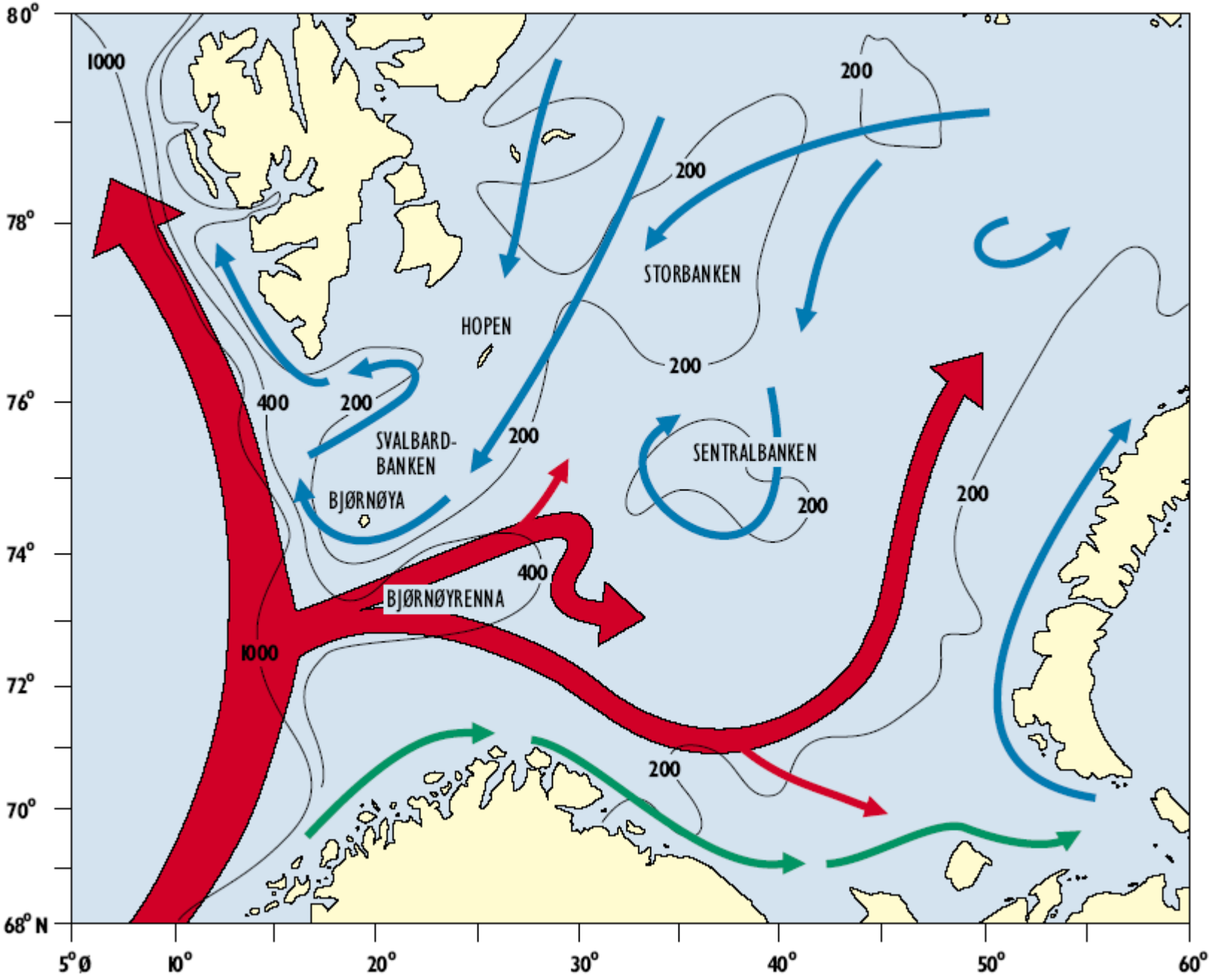
10th Norwegian-Russian Symposium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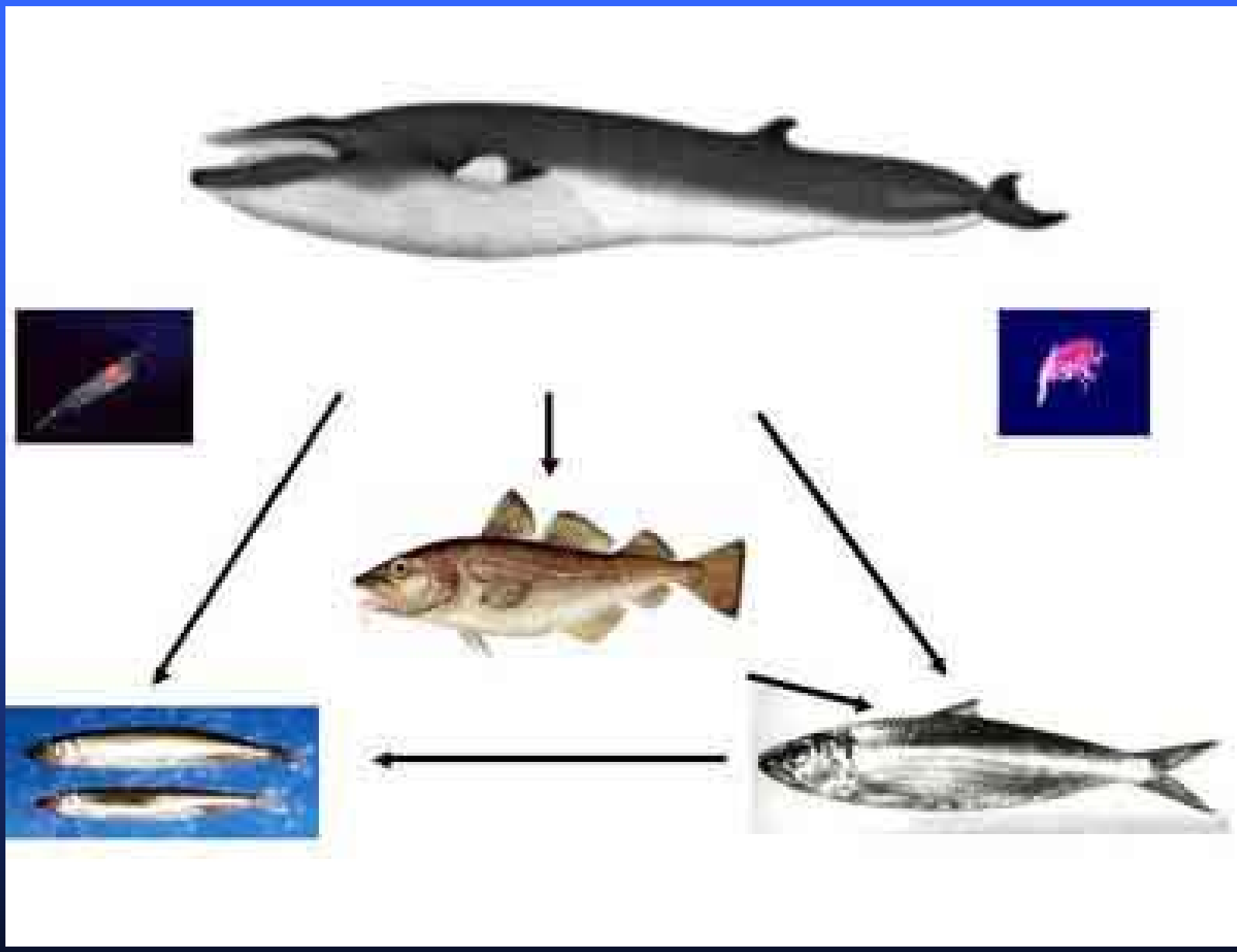
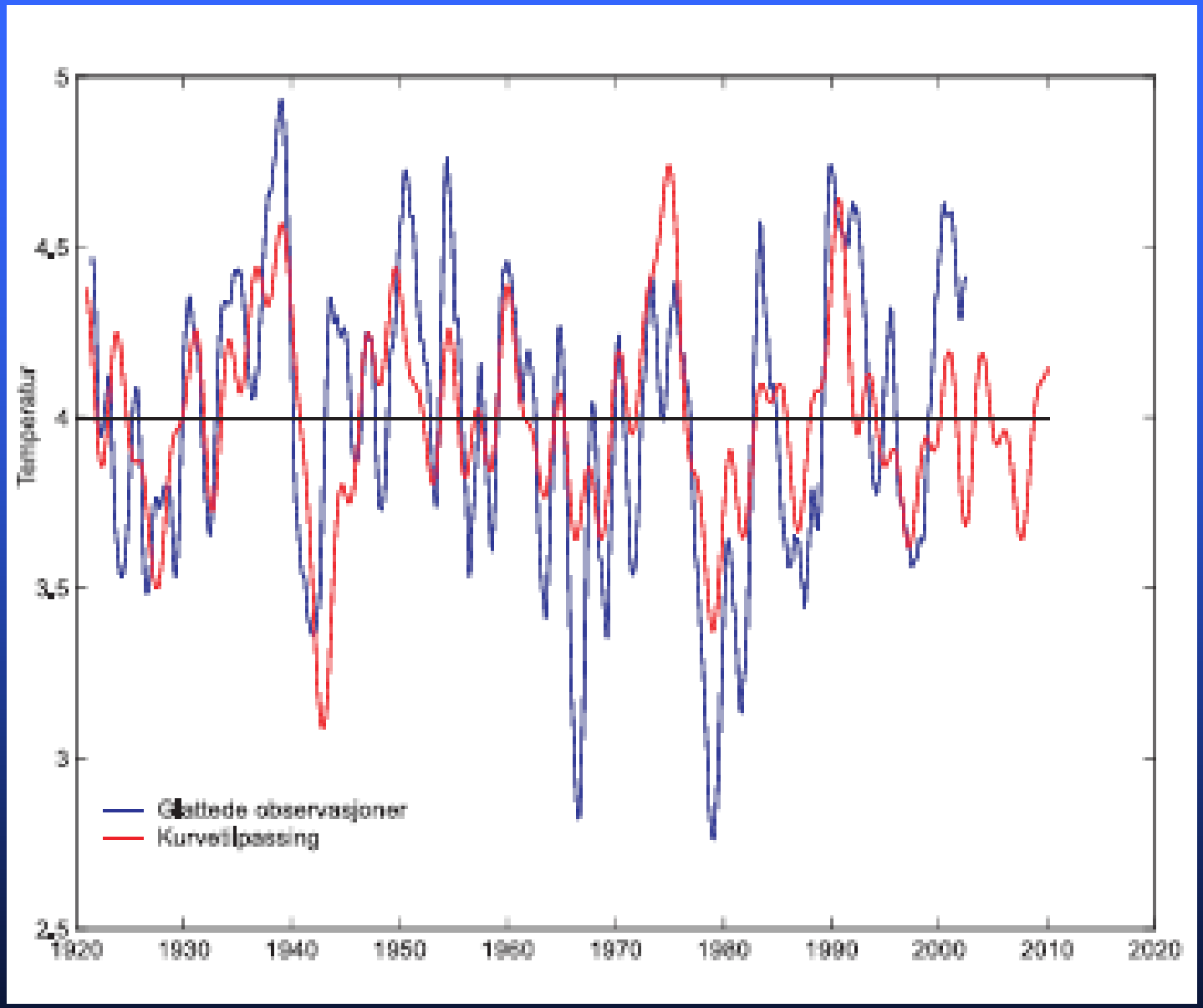


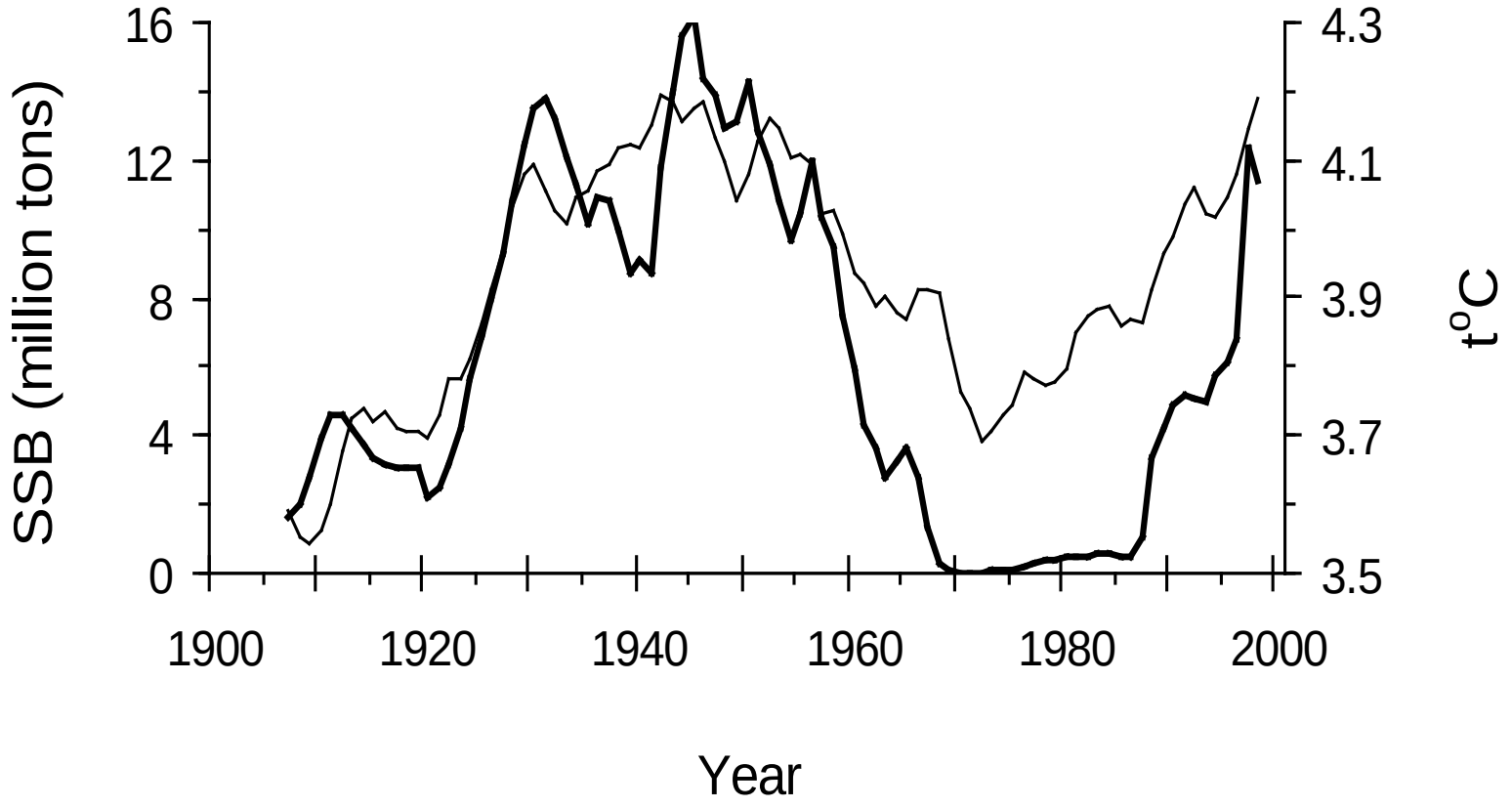
Ecosystem Approach to Fisheries Management (EAFM)

- Nothing new !
- We don’t start from scratch !
- BUT: represents new direction and focus for marine research and fisheries management

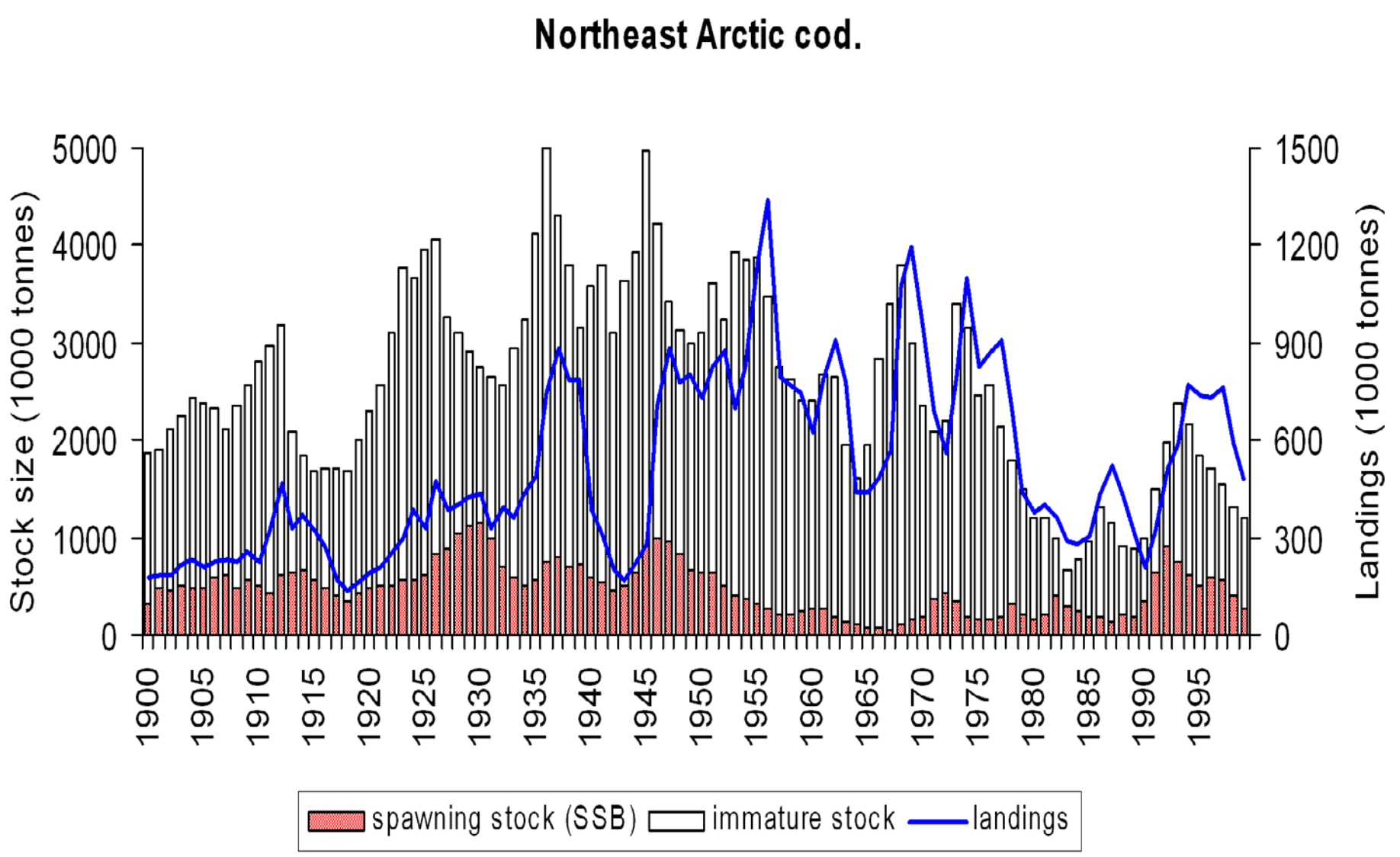
Status for EAFM

- Long time series , environment/biology
- Multispecies
- Precautionary approach to harvest rates
- Numerous management measures (legal size, mesh size, gids, closed areas – for target species, but effect also on non t.dp.)
- Protected areas (e.g deep water corals)
- Models (physical, plankton, single species, multispecies, ecosystem.....)
- + + + + +

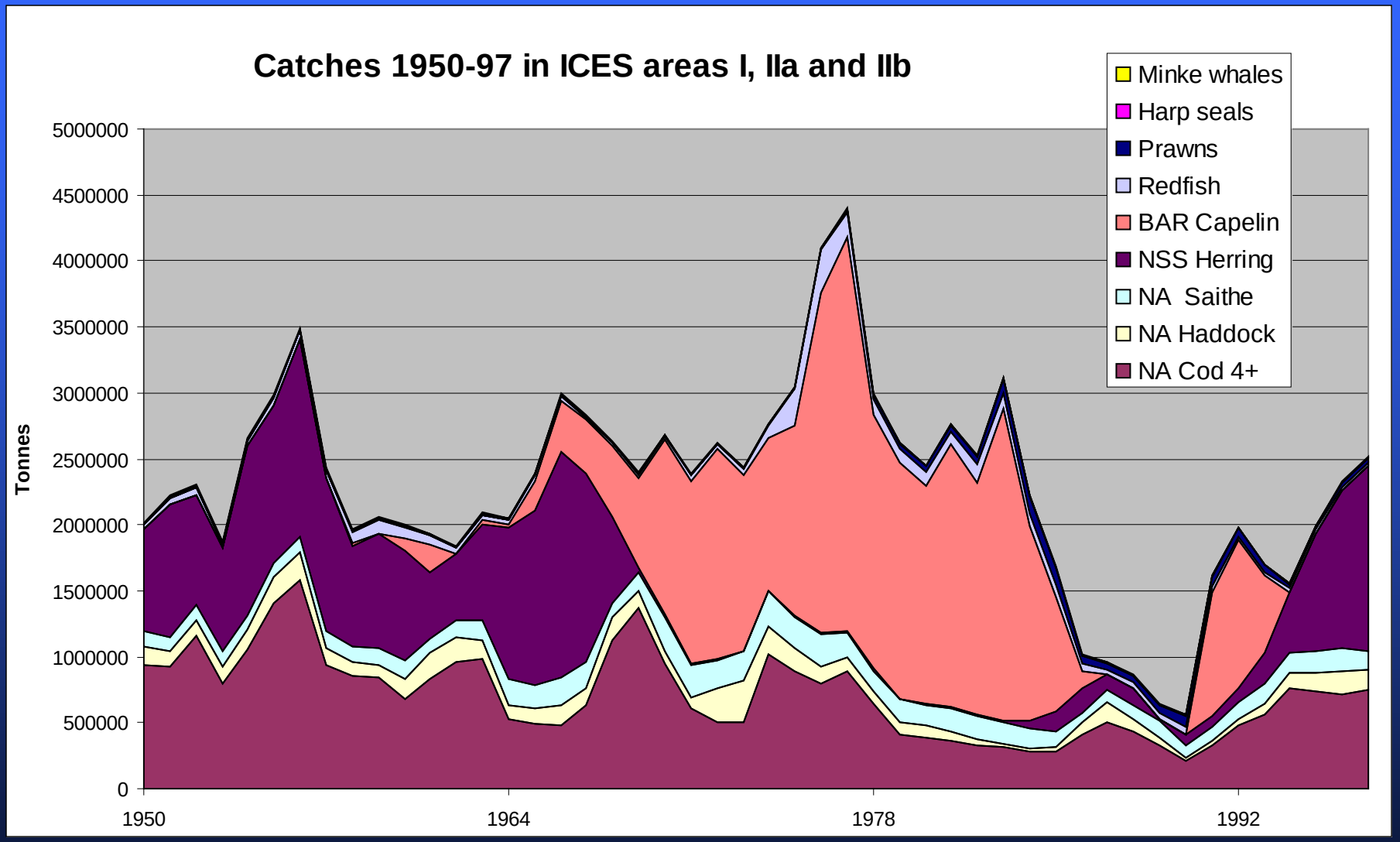

5
4.5
4
3.5
3
2.5
Temperatur
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
2020
Glattede observasjoner
Kurvetilpassing

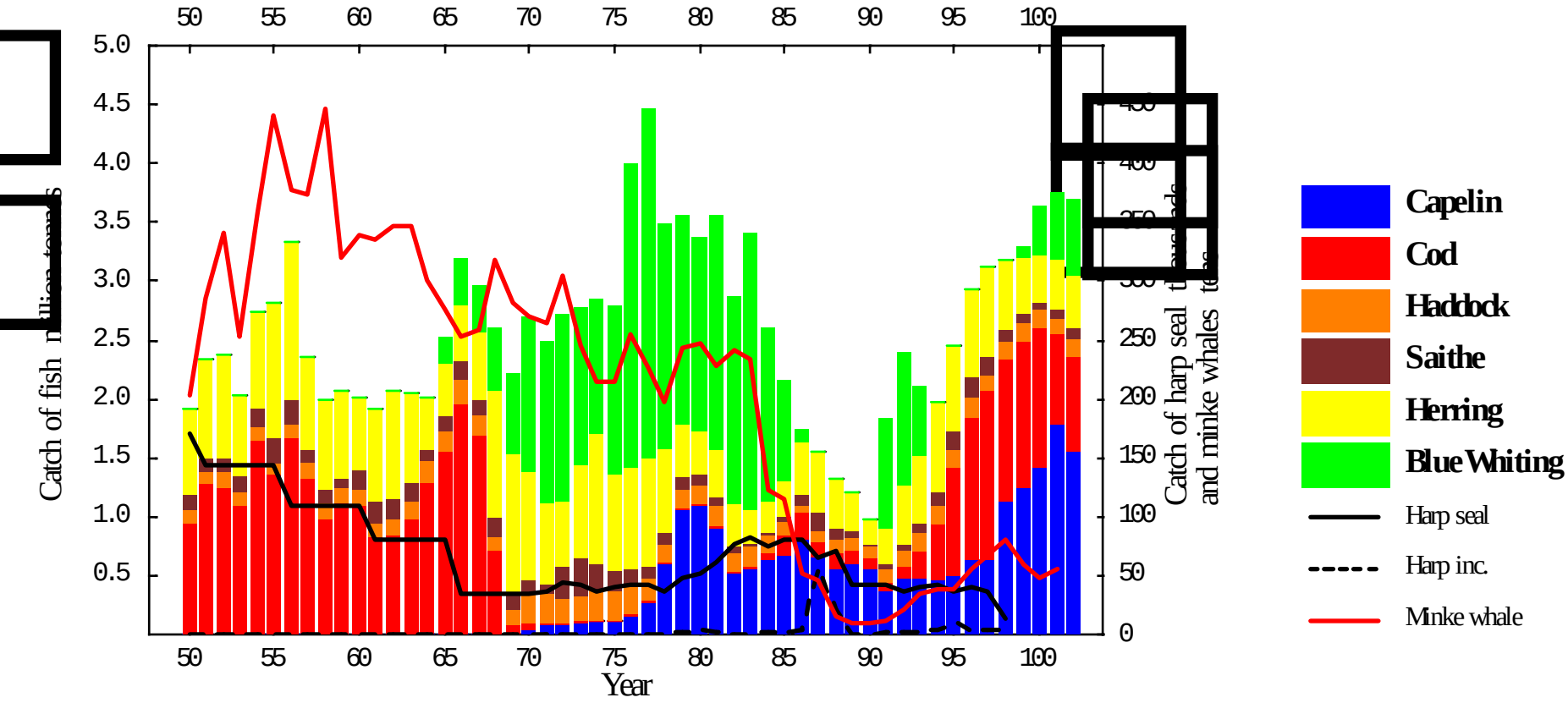


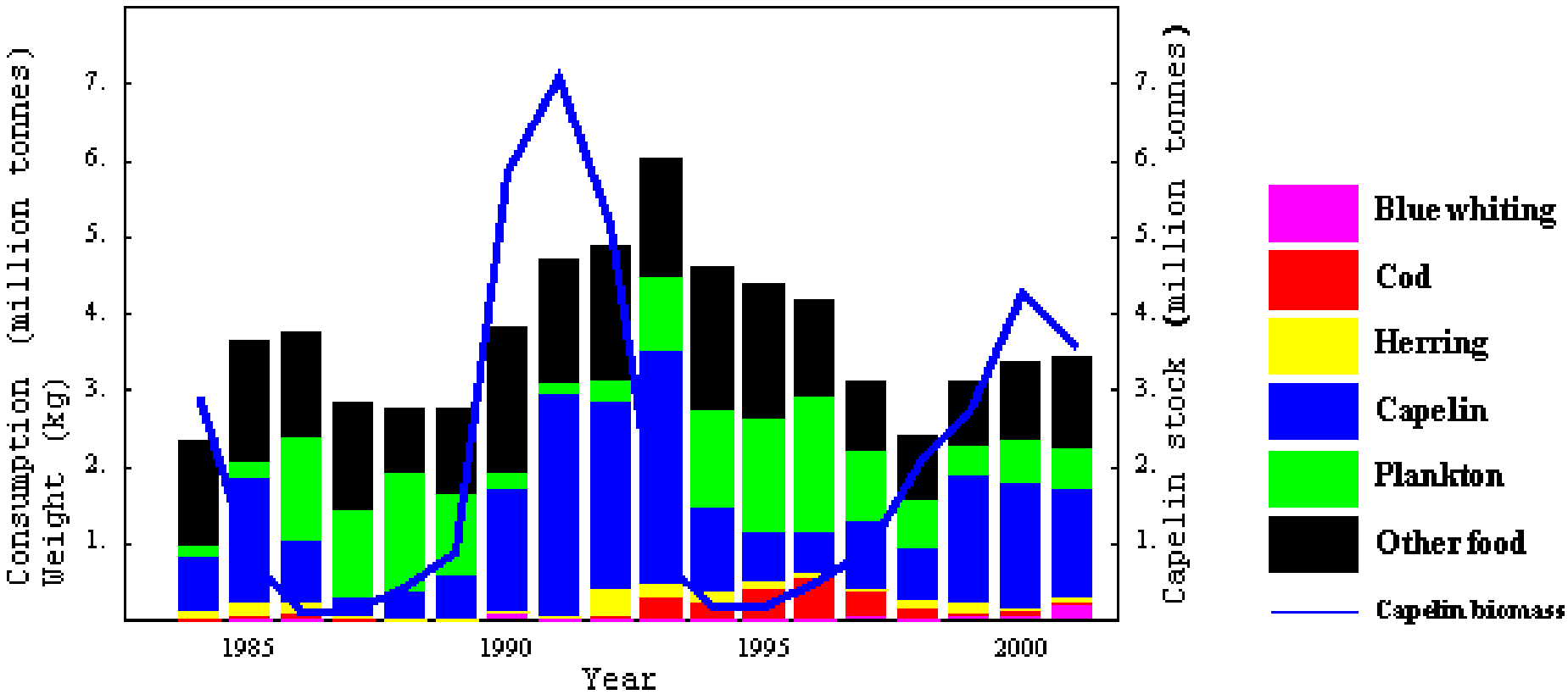
Toresen and Østvedt 2000. Fish and Fisheries 2000, 1, 231-256.



ref. Hylen, A. 2000. Variation in abundance of Arcto-Norwegian cod during the twentieth century. ICES-symposium, Helsinki 1-3 Aug. 2000


Catches 1950-97 in ICES areas I, IIa and IIb
Tonnes
5000000
4500000
4000000
3500000
3000000
2500000
2000000
1500000
1000000
500000
0
1950
1964
1978
1992
Minke whales
Harp seals
Prawns
Redfish
BAR Capelin
NSS Herring
NA Saithe
NA Haddock
NA Cod 4+


50
55
60
65
70
75
80
85
90
95
100
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
Year
Catch of fish
Catch of harp seal
and minke whales
250
200
150
100
50
0
Capelin
Cod
Haddock
Saithe
Herring
Blue Whiting
Harp seal
Harp inc.
Minke whale


Consumption (million tonnes)
Weight (kg)
Capelin stock (million tonnes)
1.
2.
3.
4.
5.
6.
7.
1985
1990
1995
2000
Year
Blue whiting
Cod
Herring
Capelin
Plankton
Other food
Capelin biomass

Models for management advice in the Barents Sea

- Cod, single-species models
  - XSA
  - Fleksibest
- Herring, single-species model
  - SeaStar, ISVPA
- Capelin, predation from cod taken into account
  - Bifrost

CHALLENGE: to link ”basic models” to ”operational models”

The road towards ecosystem based management:
Can be made very complicated –
or relatively simple, but still demanding

Ecosystem based fisheries management: main elements

- A: improved knowledge and understanding of ecosystem dynamics - for controlled harvest levels of single species/stocks
- B: improved fish capture techniques for low adverse ecosystem effects
- C: indicators of ”ecosystem health” – to monitor effects of fishing and other human activities on the marine ecosystem

A: Improved knowledge and understanding of the ecosystem

- Improved management oriented, operational models – utilising multispecies and ecosystem dynamics data and information
- DEMAND for huge increase in ecosystem data (in time and space) and effective data handling systems

Increased data supply by use of improved and new ”platforms”

- Research vessels /state of the art technology
- The fishing fleet (catch and ecosystem data)
- Airborne and sattelite platforms
- Buoys
- Tags (DST, acoustic...)
- AUVs / ROVs /HUBs
- Ships, offshore installations

The fishing fleet as data platform

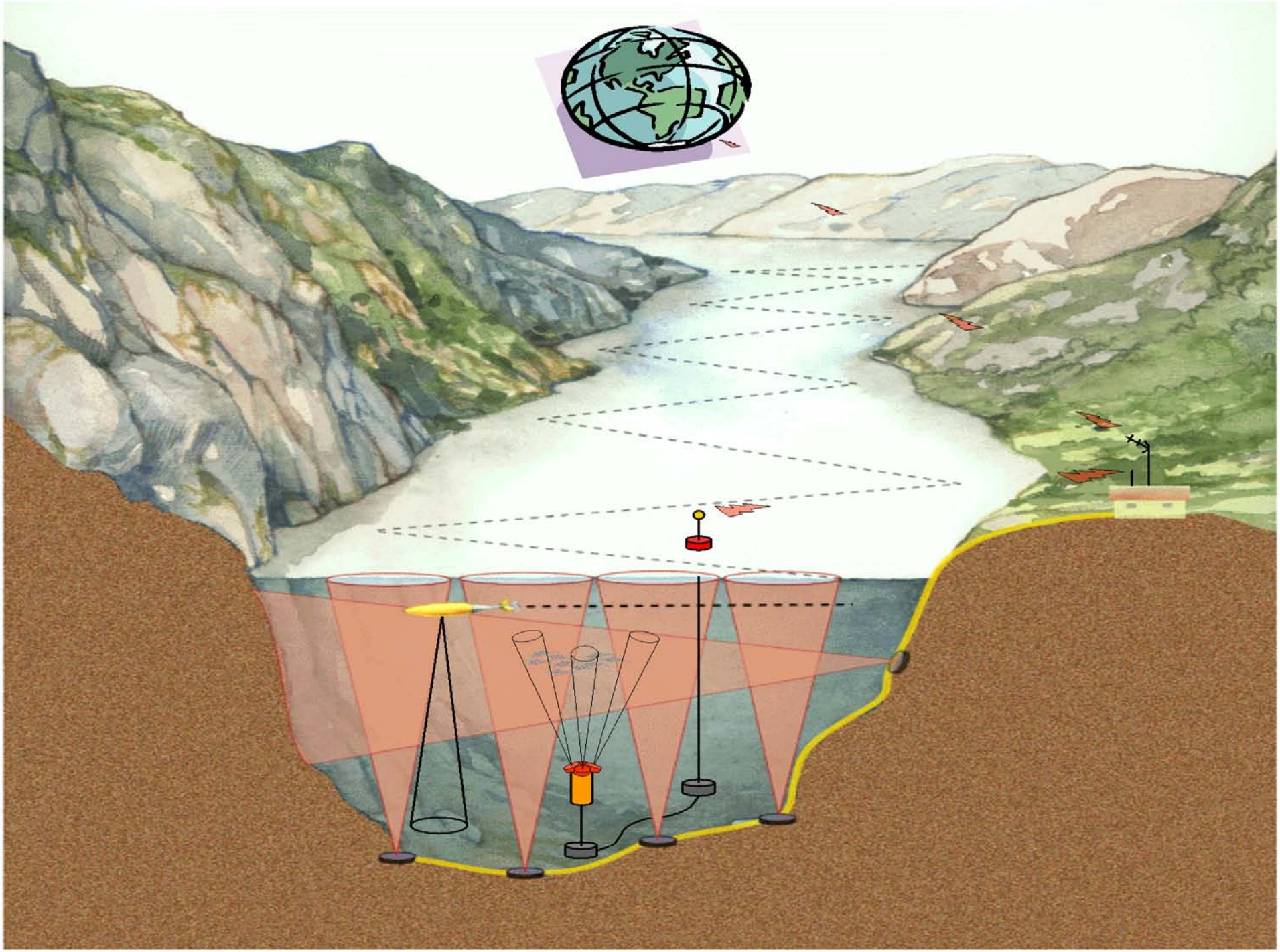
- Russia: long tradition for obtaining data from the fishing fleet
- Norway: developing, e.g. Reference fleet of different vessels in the demersal fisheries supplying electronic catch, effort and biological data

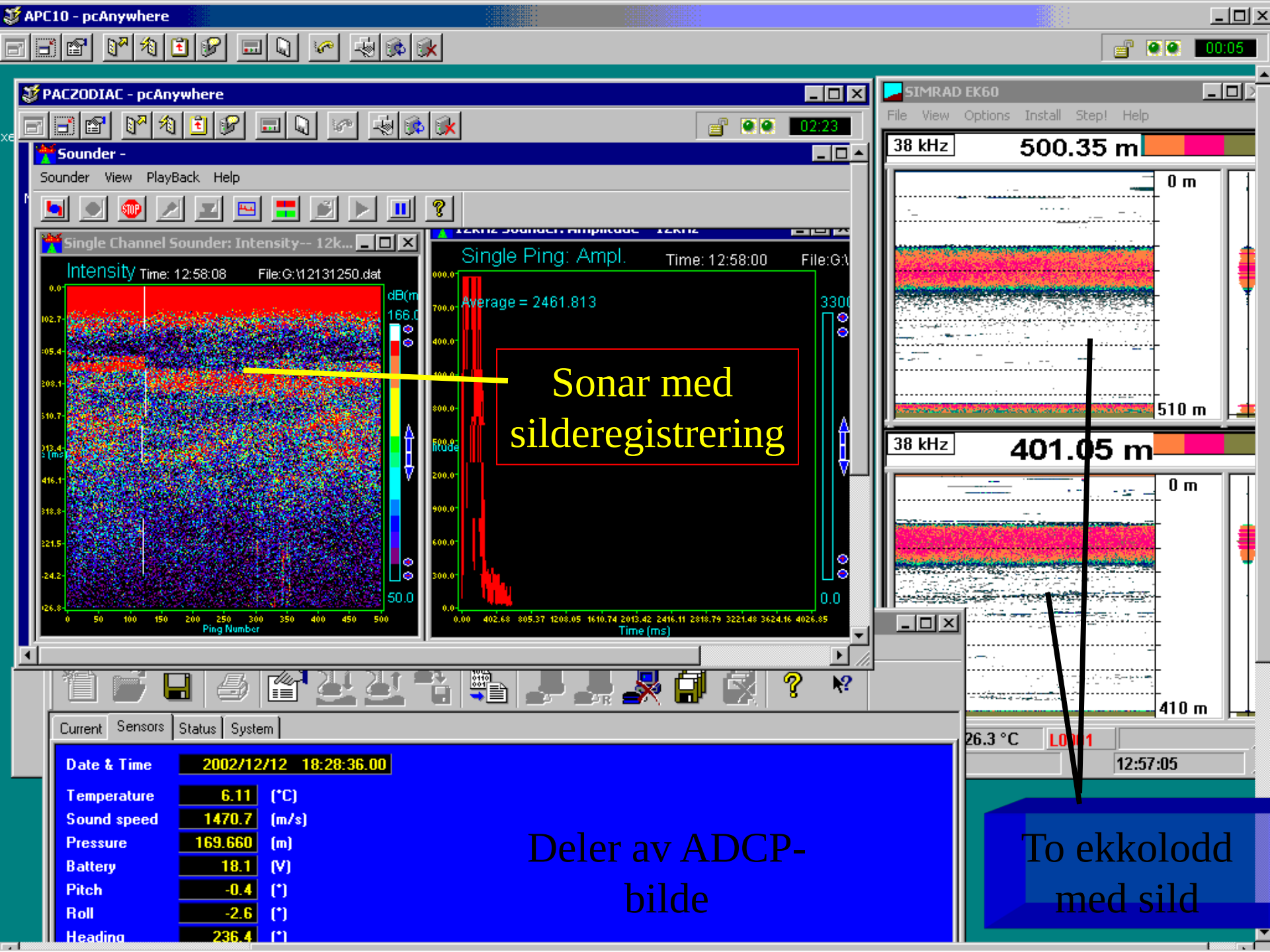
The reference fleet

UTFLESA

No. length measured 2002 – species

SPECIES	1. Quart	2.Quart	3.Quart	4.Quart	TOTAL
GREENL. HALIB.	1216	9487	3638	1746	16087
BLUE LING	2	3608	435	81	4126
BL. WOLFFISH	2057	122	591	741	3511
MONKFISH			1	2	
TUSK	2305	796	10822	2021	15944
SP. WOLFFISH	1357	82	380	206	2025
GR. WOLFFISH	172	161	14	5	352
HAVMUSER		600	0	0	600
HADDOCK	22451	7726	4787	11725	46689
ISGALT			160	81	
LING	932	546	2917	1196	5591
POLLOCK	964	113	0	0	1077
MORA		7348	1508	0	8856
PLAICE			80	0	80
SAITHE	20386	3892	2520	7837	34635
REDFISH (Ment)	1869	717	0	107	2693
COD	25296	10562	6720	15607	58185
REDFISH (Mar)	6207	2988	2835	2202	14232
TOTAL	85214	48748	37408	43557	214927

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PACZODIAC - pcAnywhere
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Single Channel Sounder: Intensity-- 12k...
Intensity Time: 12:58:08 File:G:\12131250.dat
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Single Ping: Ampl. Time: 12:58:00 File:G:\
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38 kHz 401.05 m
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Deler av ADCP-bilde
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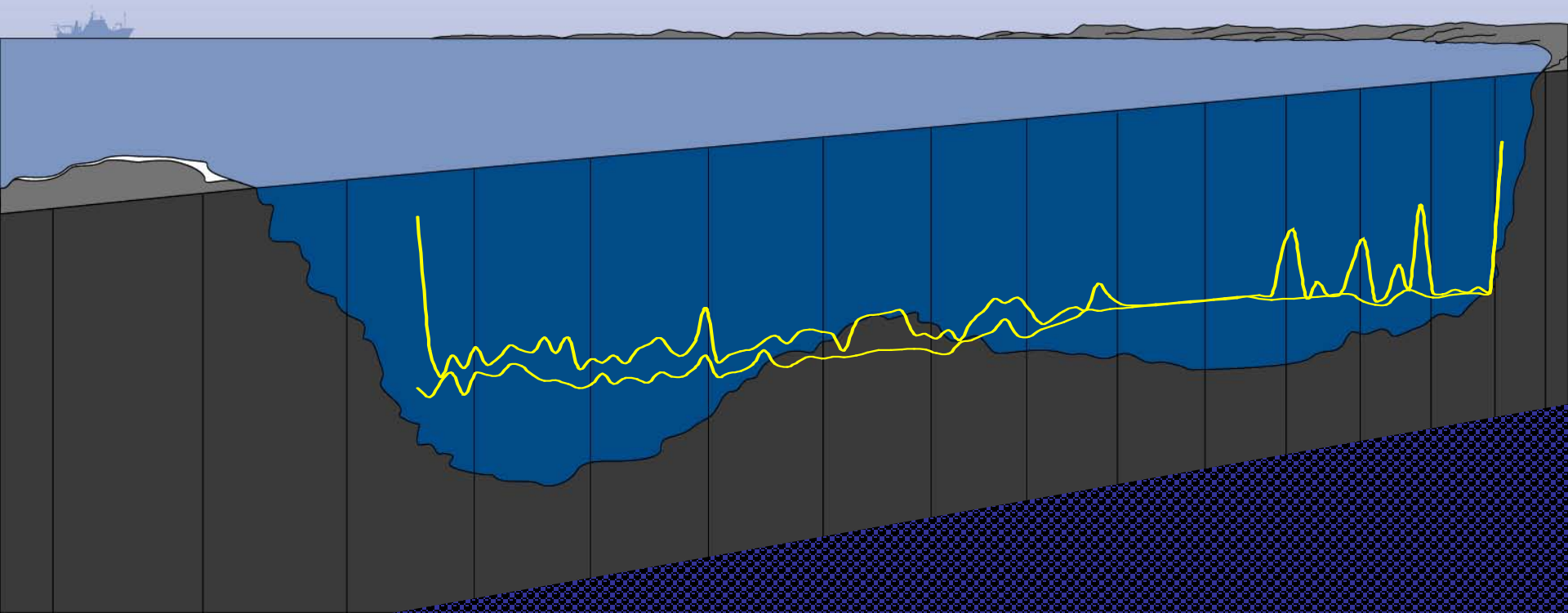
DST being attached to cod

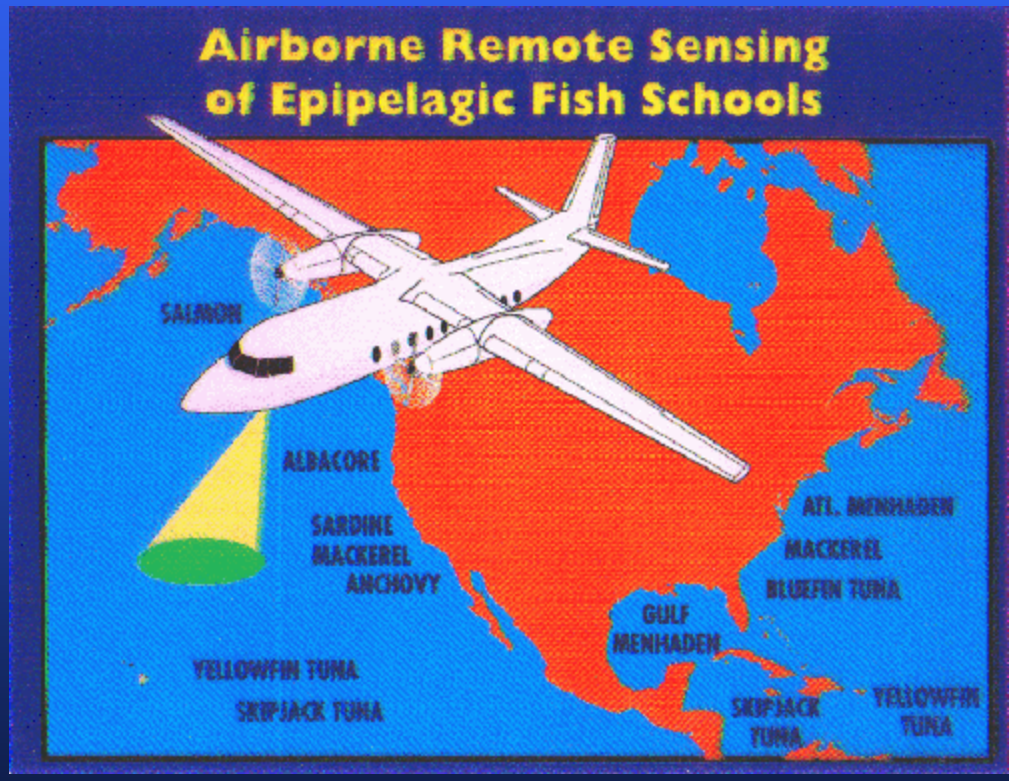
Measure
- Temperature
- depth
- tilt angle
- time

North Cape - Bear Island in 90 days



LIDAR (lasesr) observations from airplanes

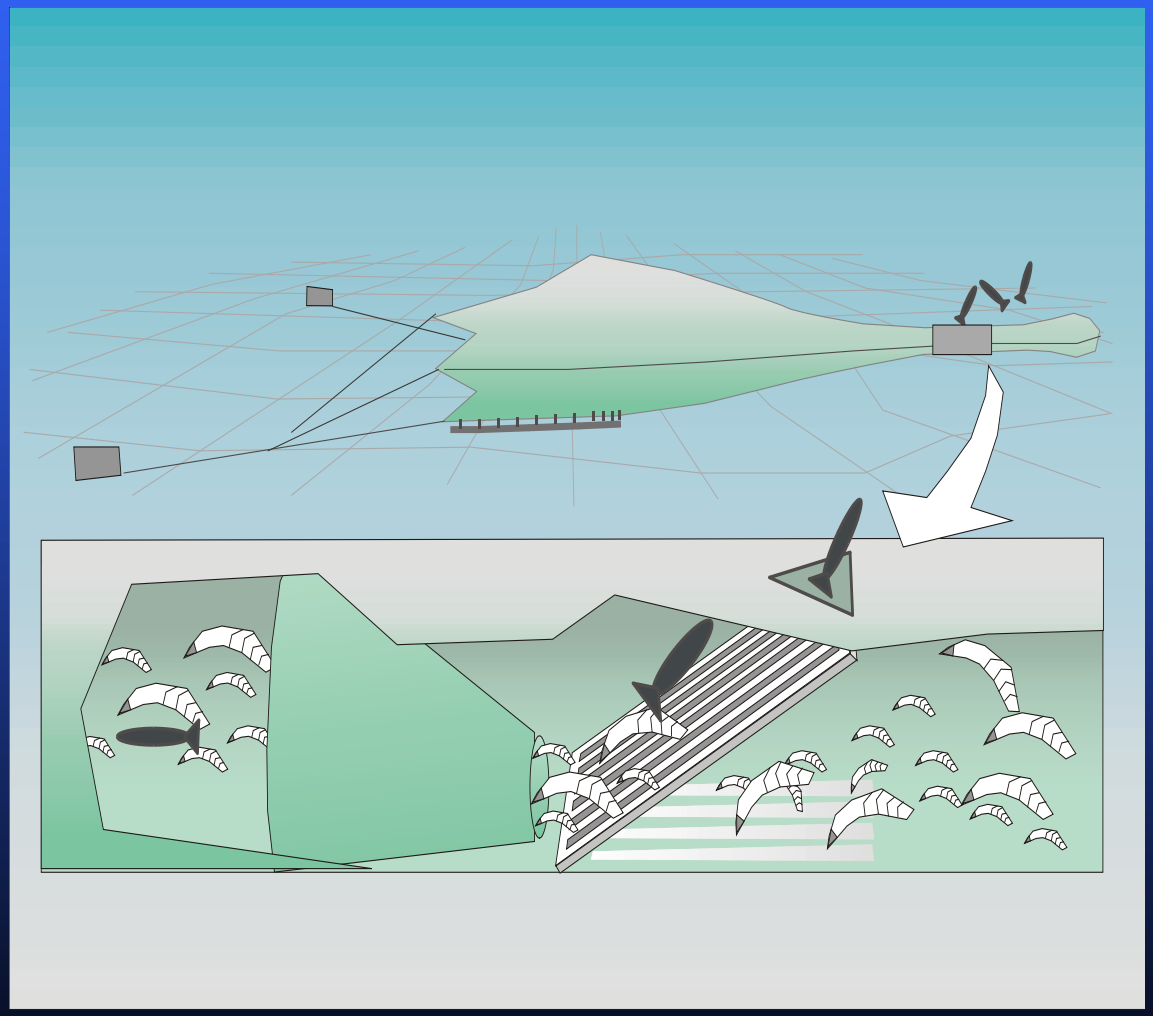
- Mackerel – migration and distribution
- Seal-capelin interactions in the Barents Sea



B: ”ecosystem friendly” fish capture techniques

- Promote a shift to best practises regarding fishing methods – and further development for: species- and size selectivity, minimal effects on bottom habitats, low fuel consumption and pollution per unit catch, improved catch quality, low ”hidden” mortality (e.g. ”ghost fishing”)

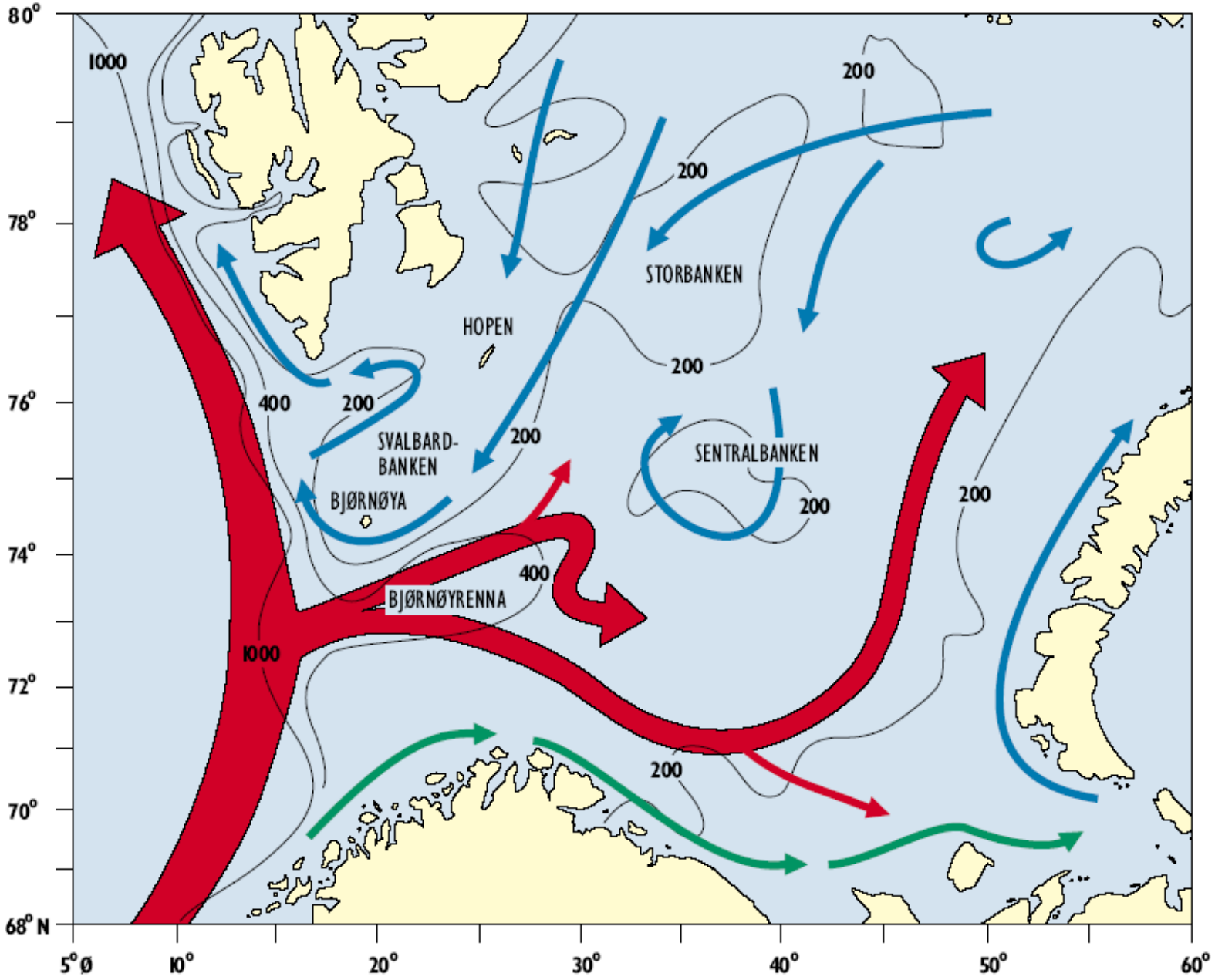
Sorting grid: separating fish and shrimp



- Keep shrimp
- Release fish
- Improved catch quality
- Reduced labour/ on deck sorting
- Compulsory use in shrimp fisheries world wide

C: indicators of ”ecosyst. health”

- Indicator species ?
- Indicator areas (e.g. In the Barents Sea): basic inventory of species/ abundance + regular monitoring of community changes – related to human and/or environmental effects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Ecosystem Approach to Fisheries Management

- The concept should imply management strategies for balanced harvest of living marine resources – including all trophic levels from plankton to top predators

Ecosystem organized research

- 2003 IMR-PINRO ecosystem surveys in the Barents Sea
- 2004 IMR from dicipline - to ecosystem based organization

Ecosystem based fisheries management: challenge

- From slogan to operational reality
- From ”political talking point” as disguise of obvious unpopular actions (e.g. decomissioning of fleet capacity) – to real investment in ecosystem dynamics knowledge and understanding
- THE END – THANK YOU FOR LISTENING