

Les futurs possibles de la mer de Barents

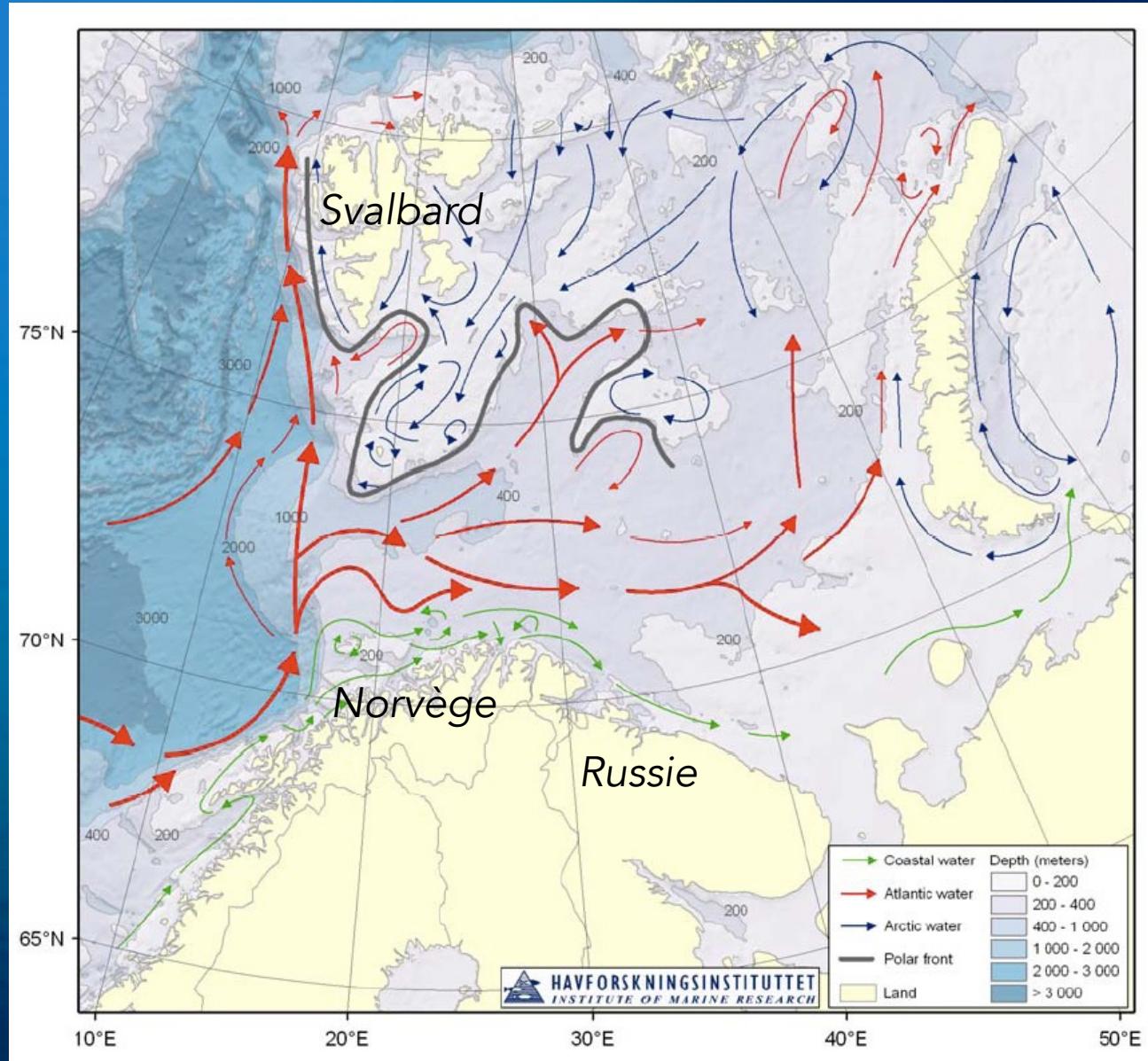
Benjamin Planque



Tromsø

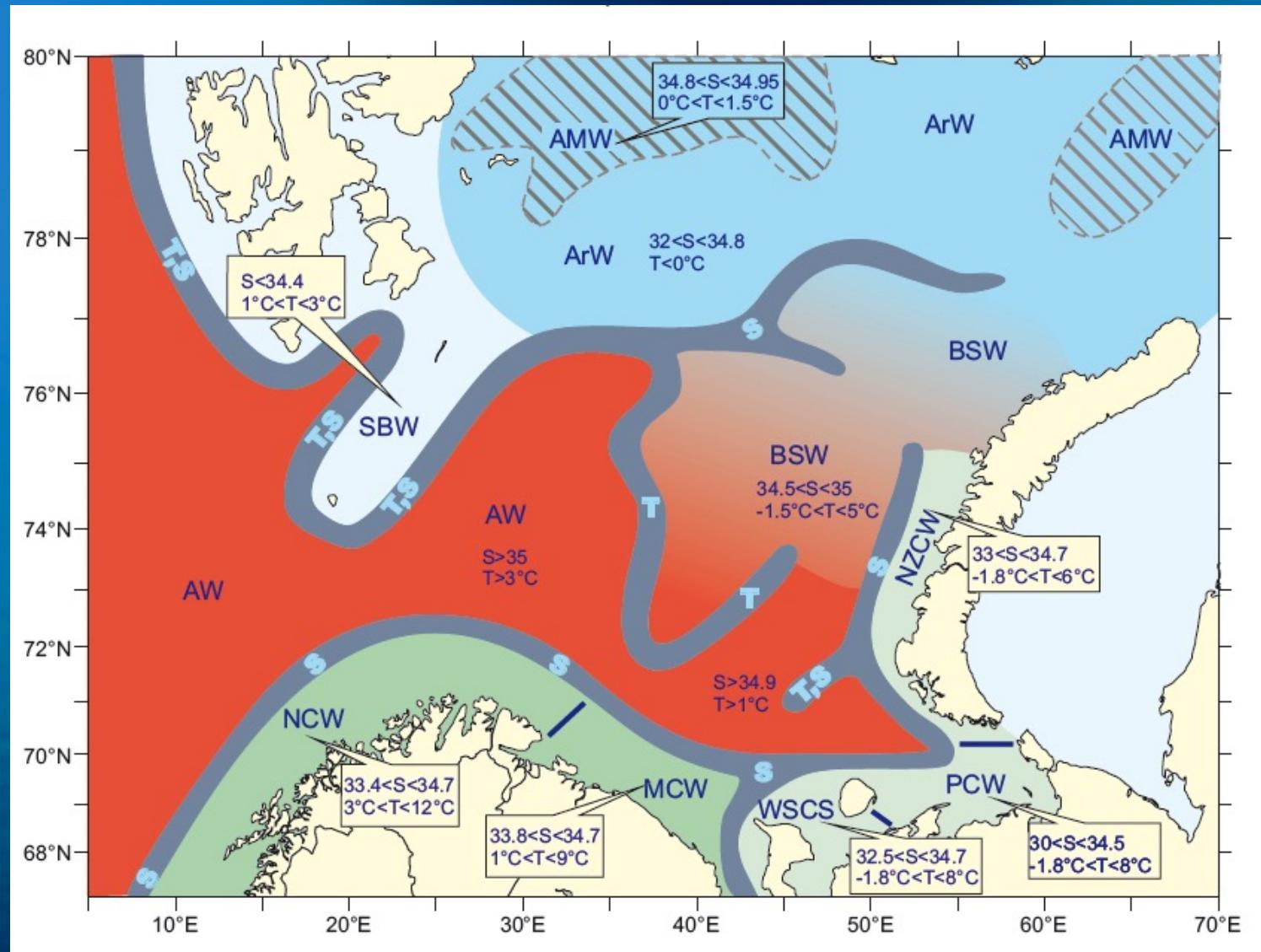
Géographie de la mer de Barents

Un plateau océanique profond au nord du cercle polaire

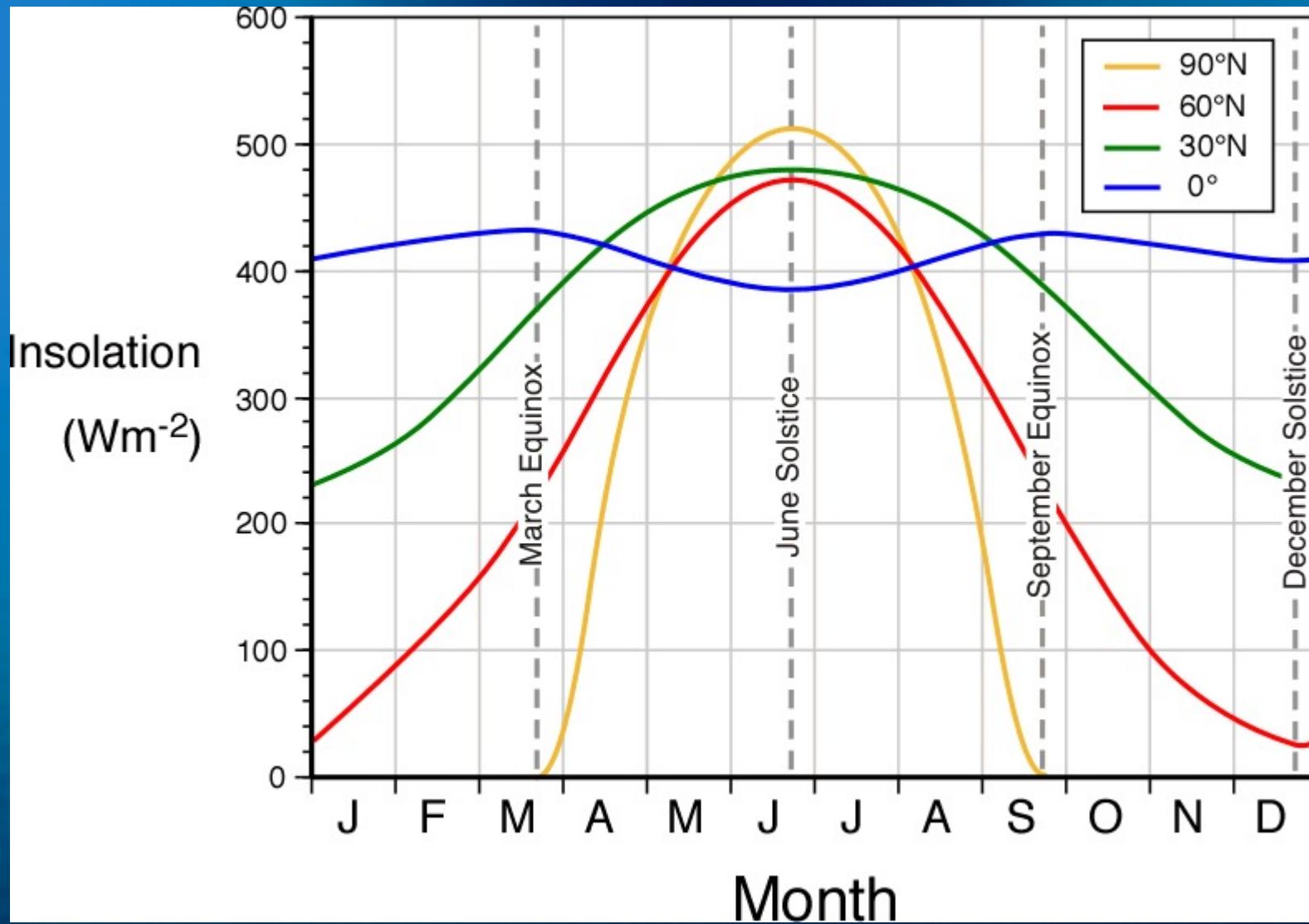


- 1.6 million km²
- Influences Atlantique et Arctique
- Basins versants minimaux
- Plateau profond (~ 230m)
- Haute latitude

Une structure complexe des masses d'eau et de la glace

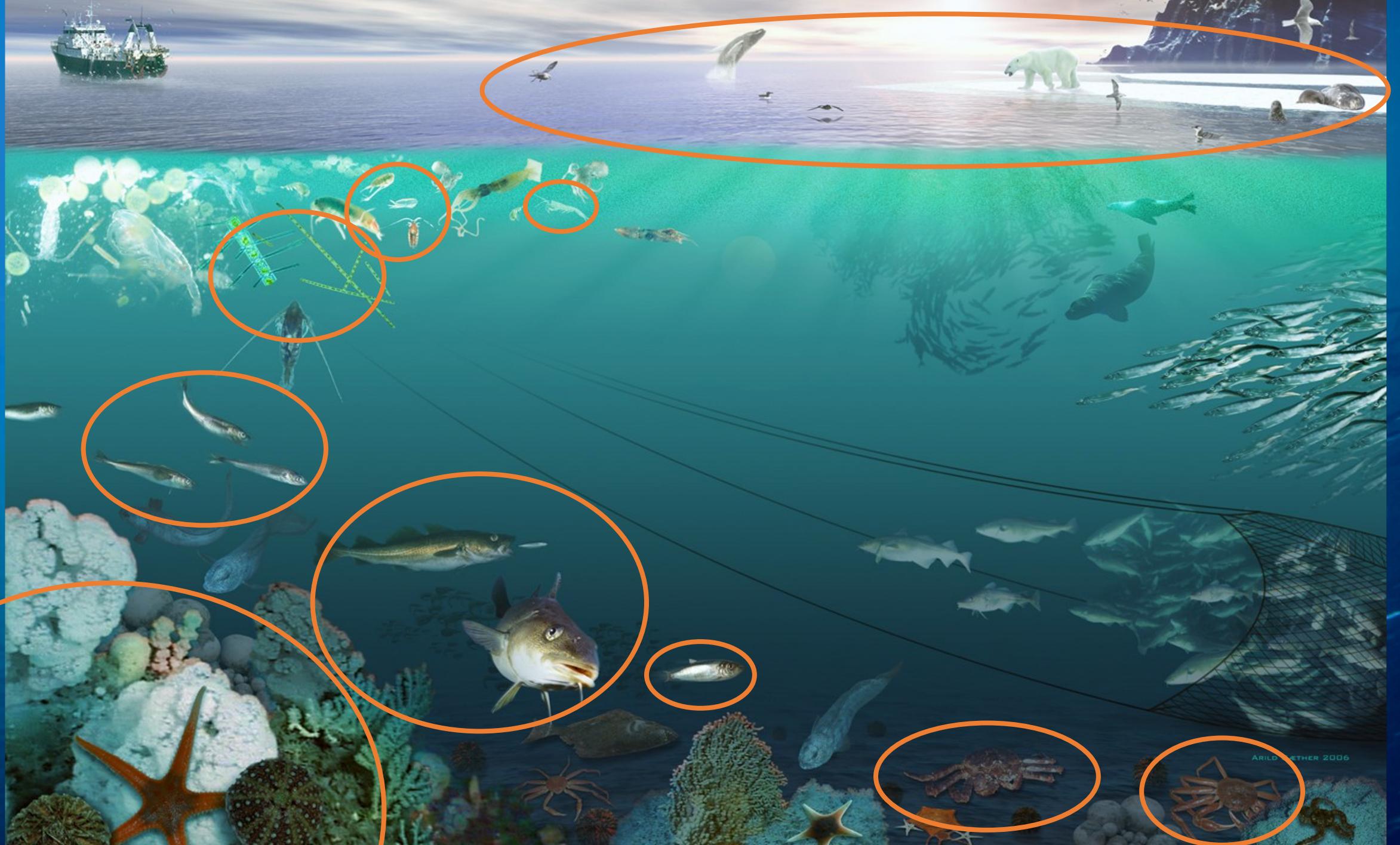


Un régime lumineux extrême

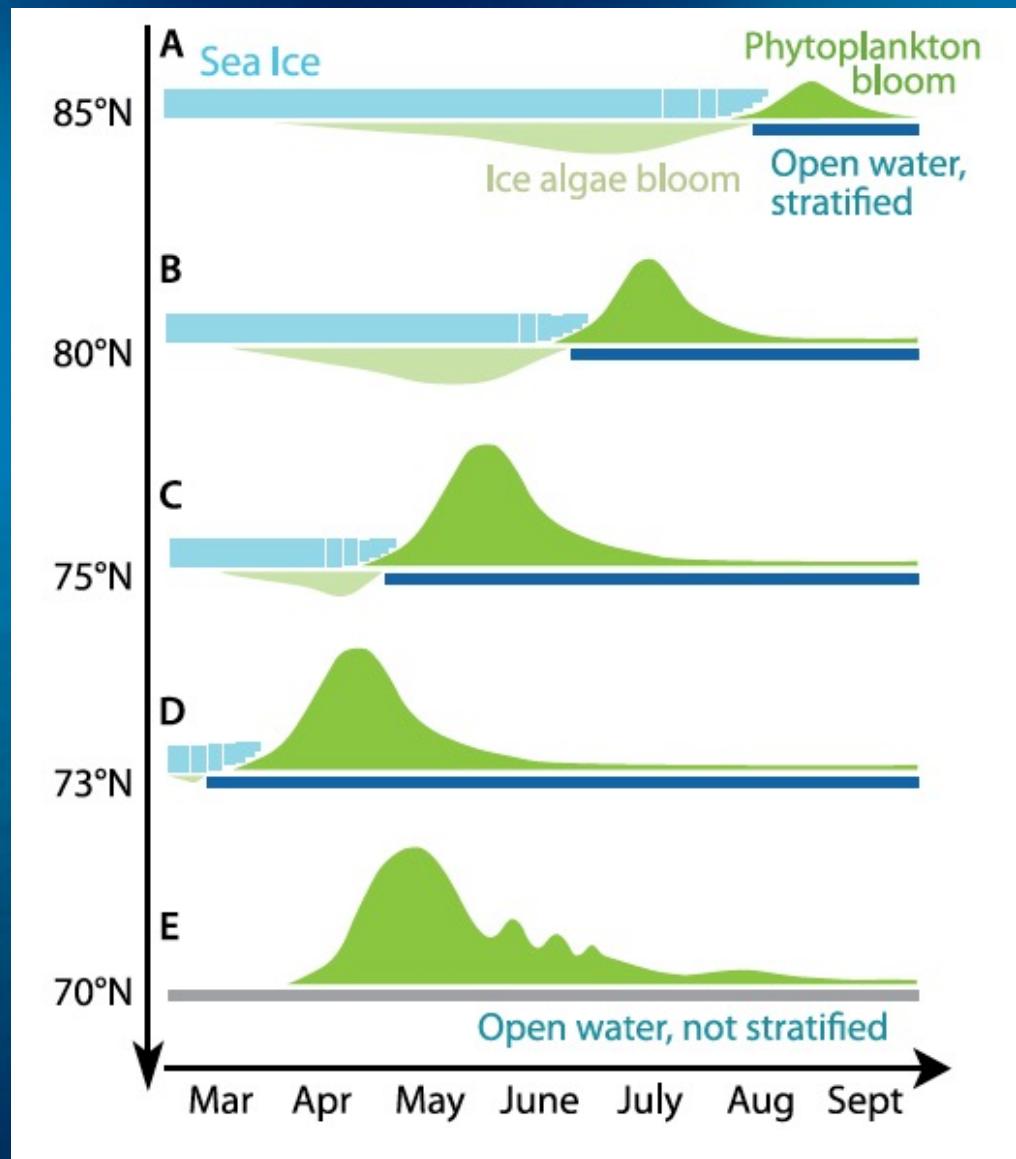


Biologie de la mer de Barents



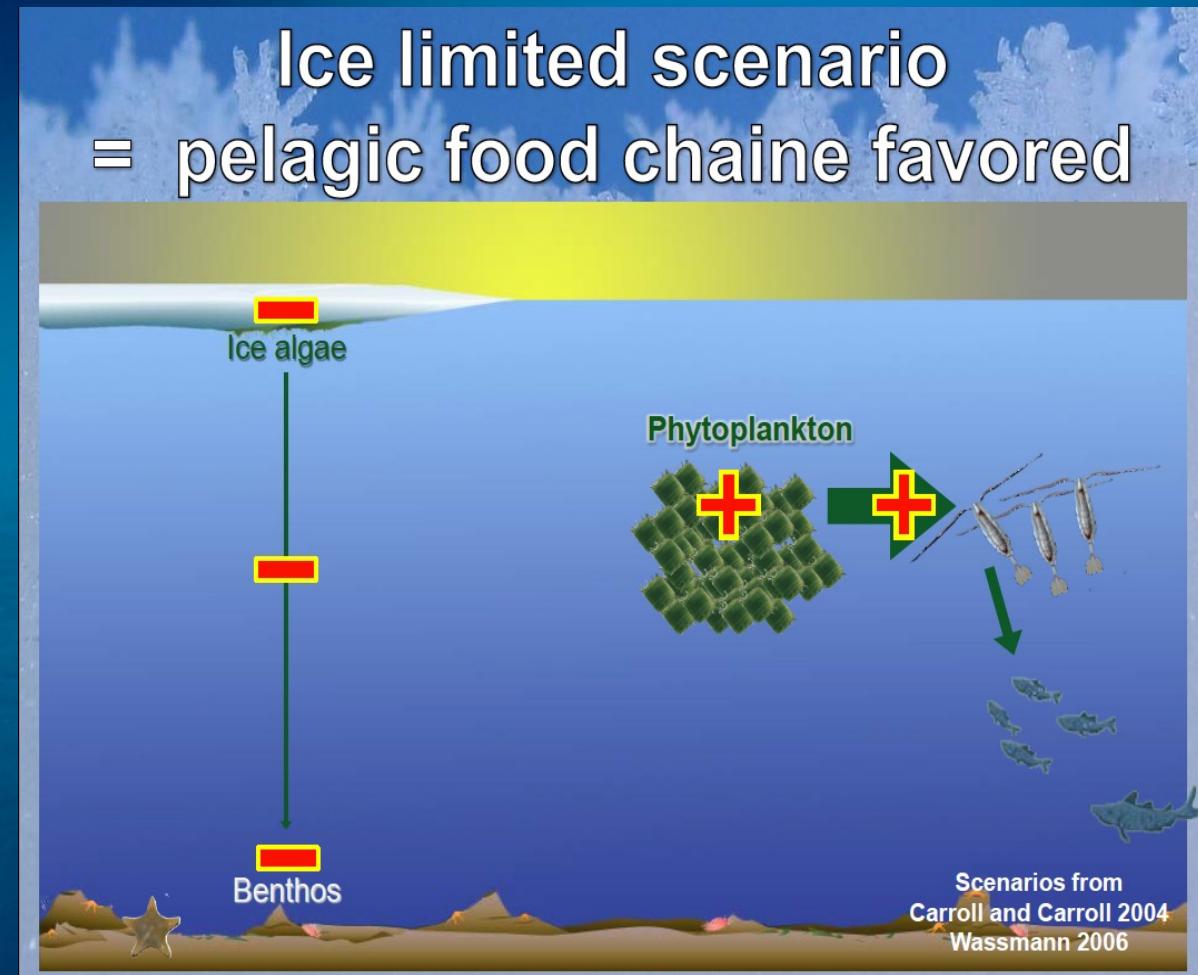
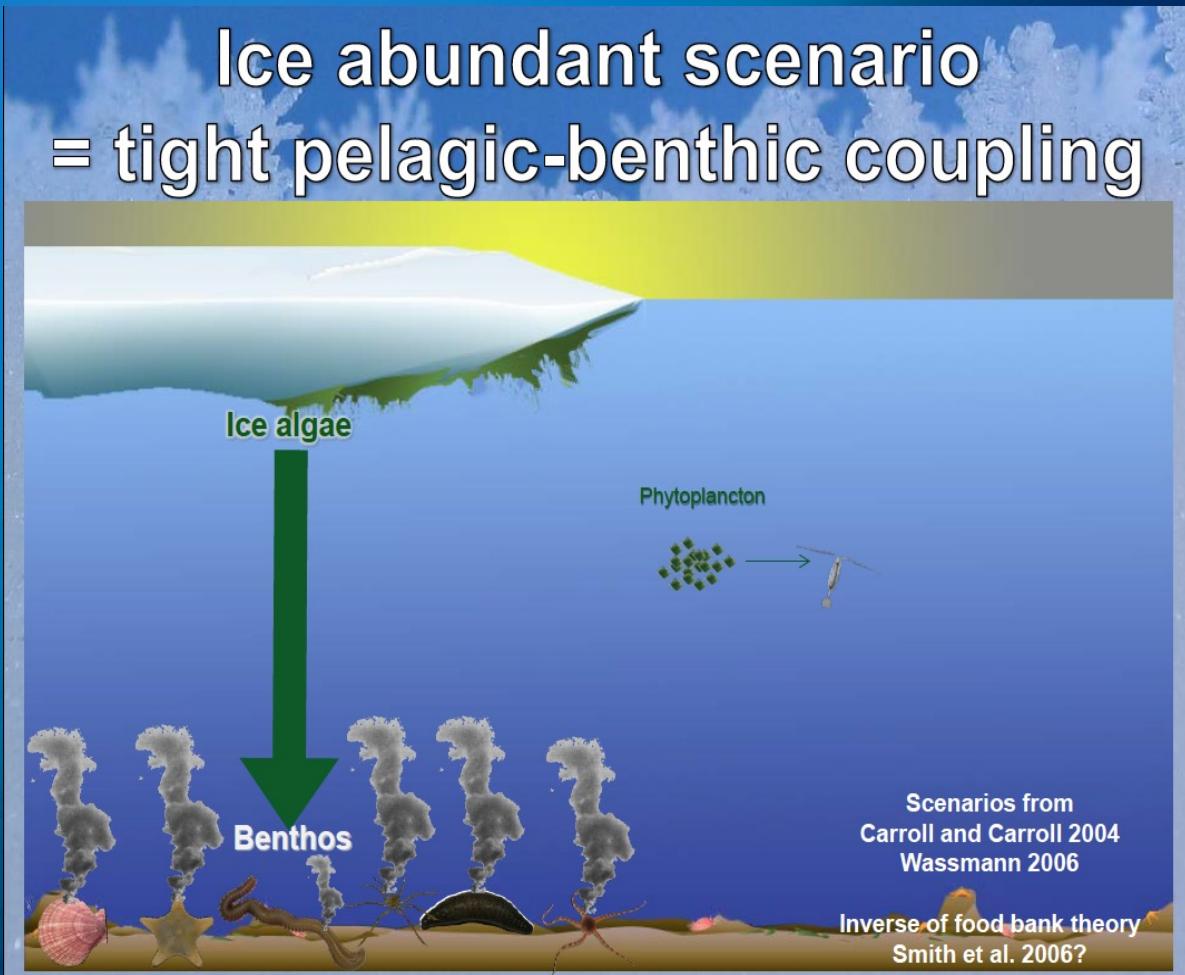


Dynamique de la production primaire



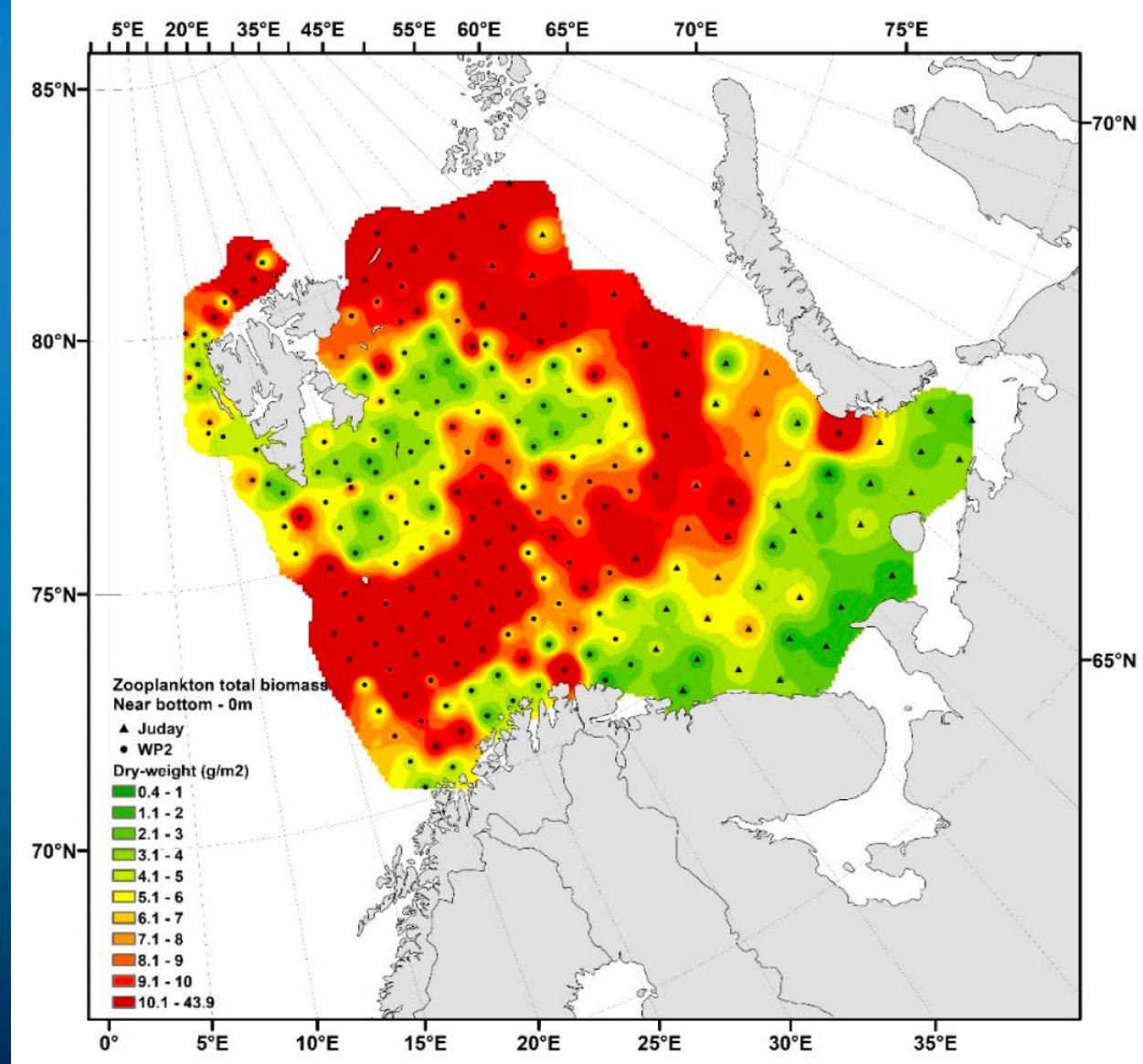
Leu et al (2011)

Couplage entre la production primaire et les systèmes benthiques et pélagique



Morata (2015)

Mesozooplankton



Espèces commerciales



Capelan: 1 850 000 tonnes



Cabillaud: 1 000 000 tonnes

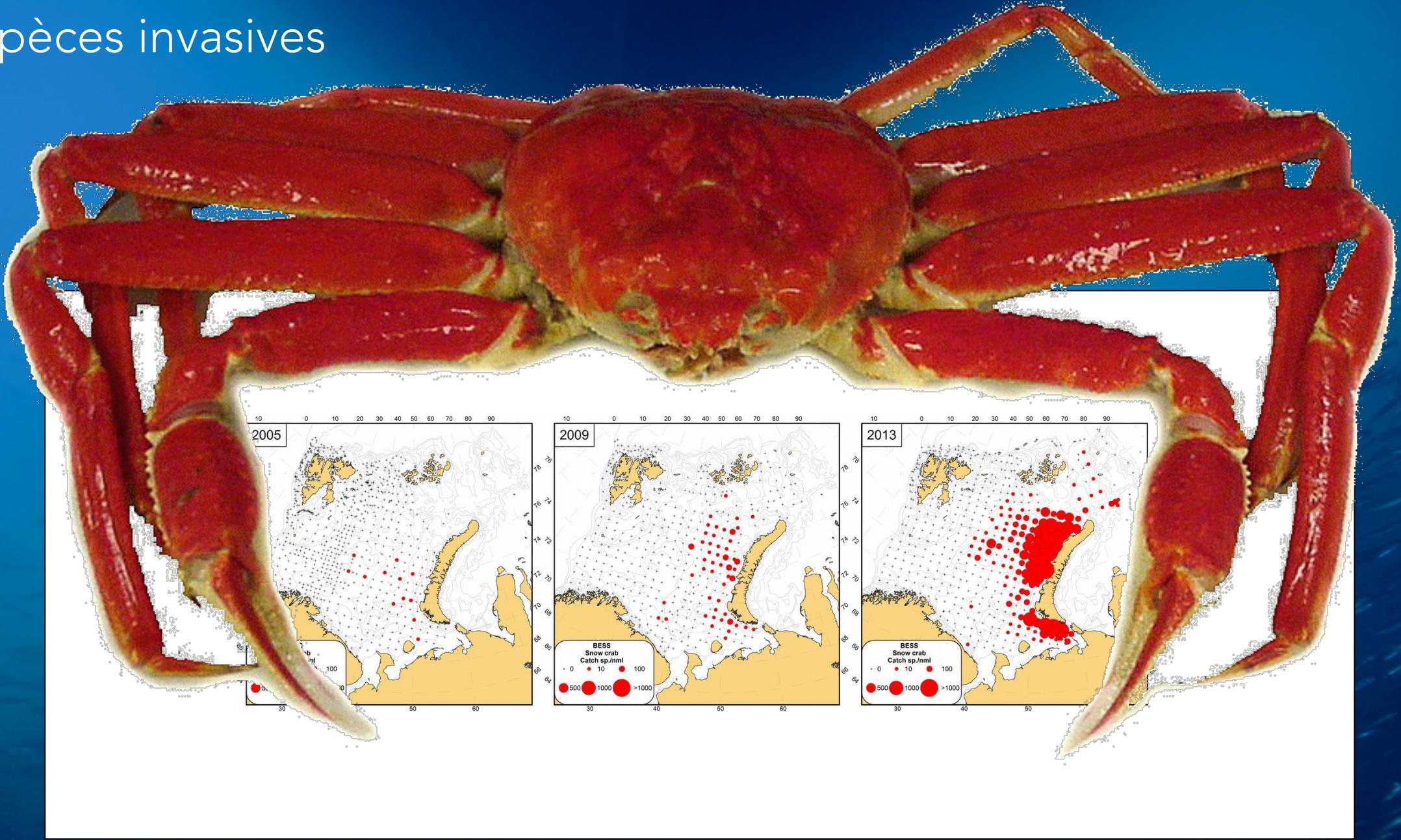


Lieu noir: 560 000 tonnes



Aiglefin: 204 000 tonnes

Espèces invasives



Les activités humaines dans la mer de Barents

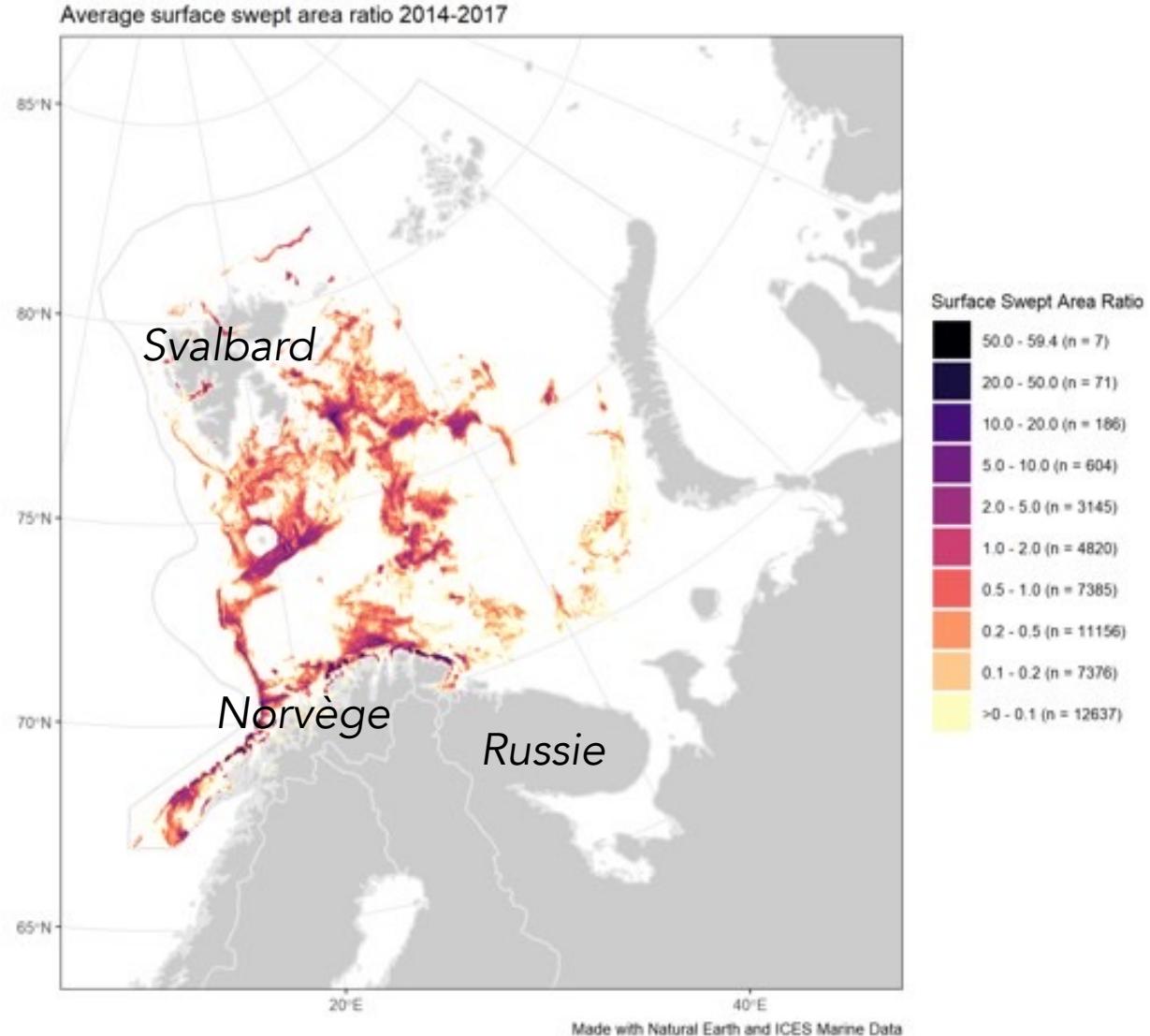
pêche – tourisme – pétrole - traffic

Pêche



Pêche

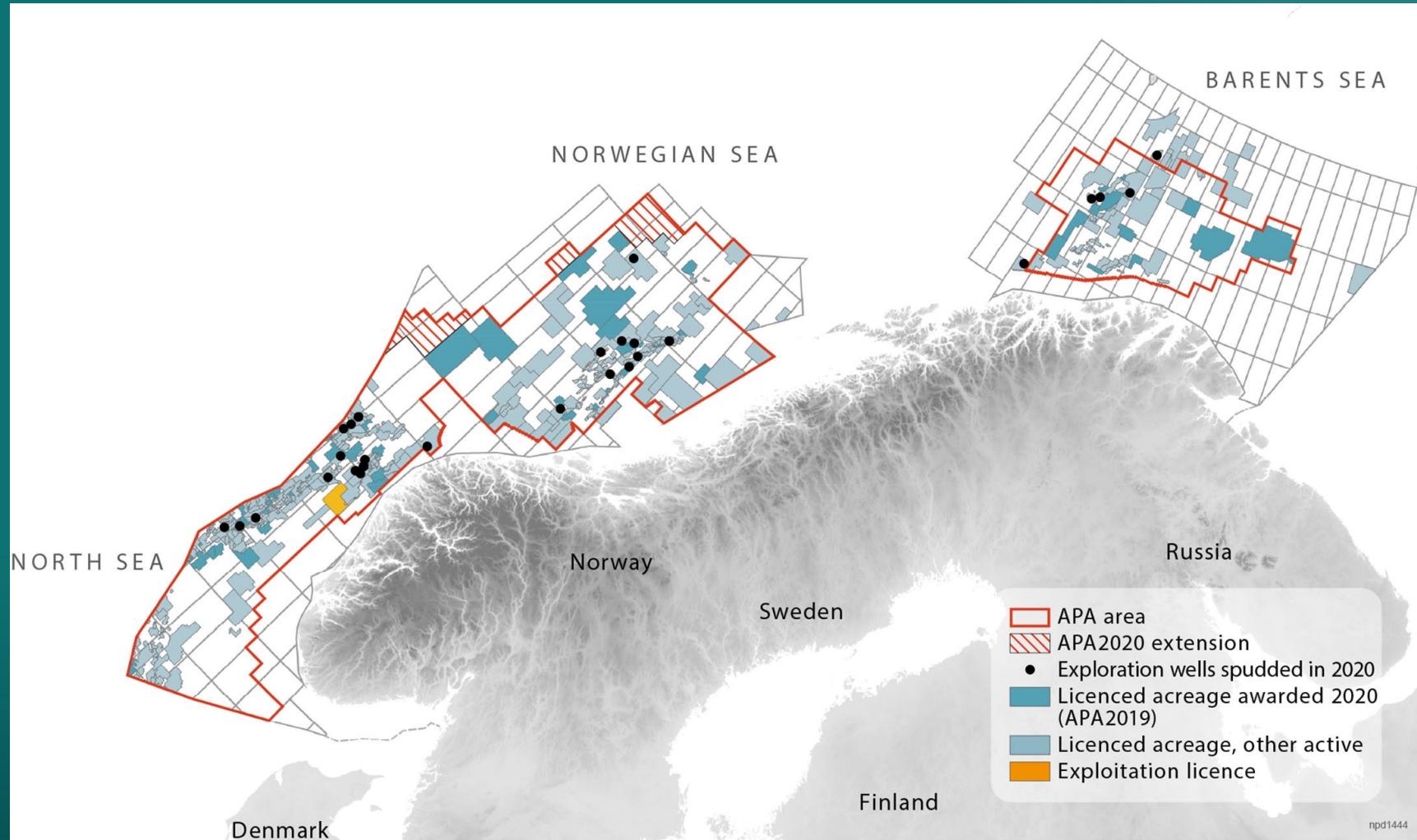
Surfaces chalutées (2014-2017, sans la Russie)



Tourisme

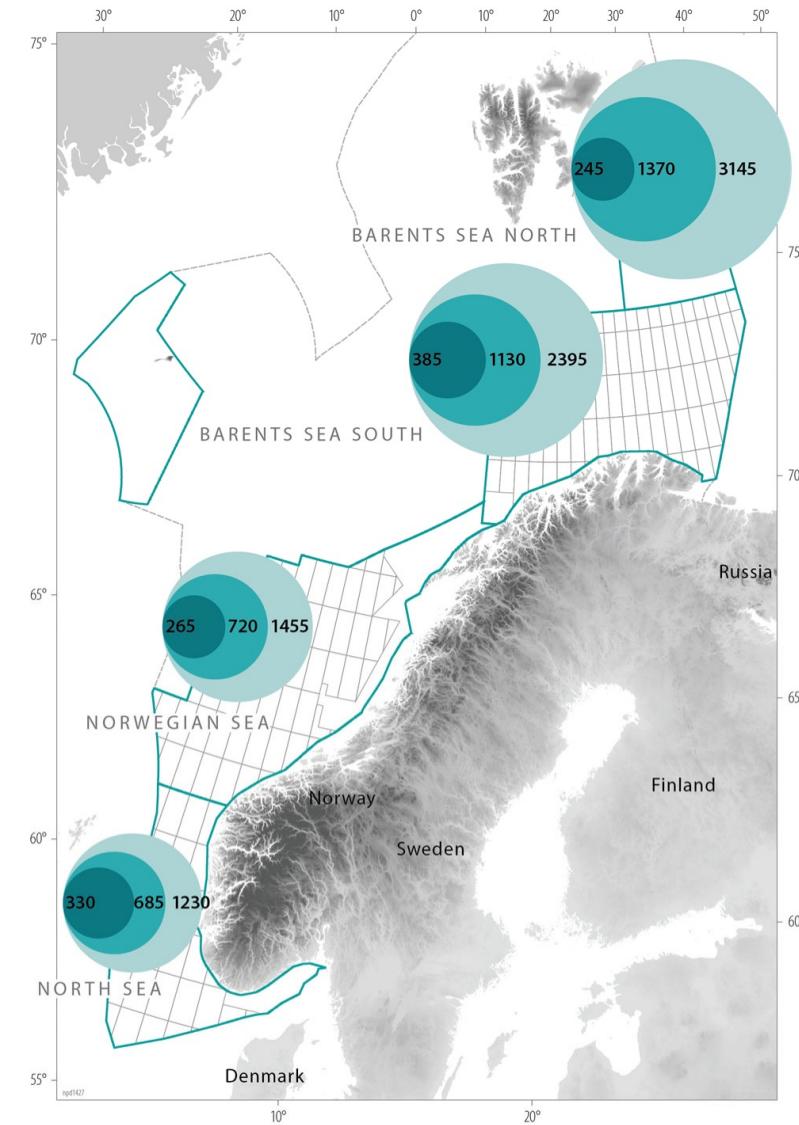
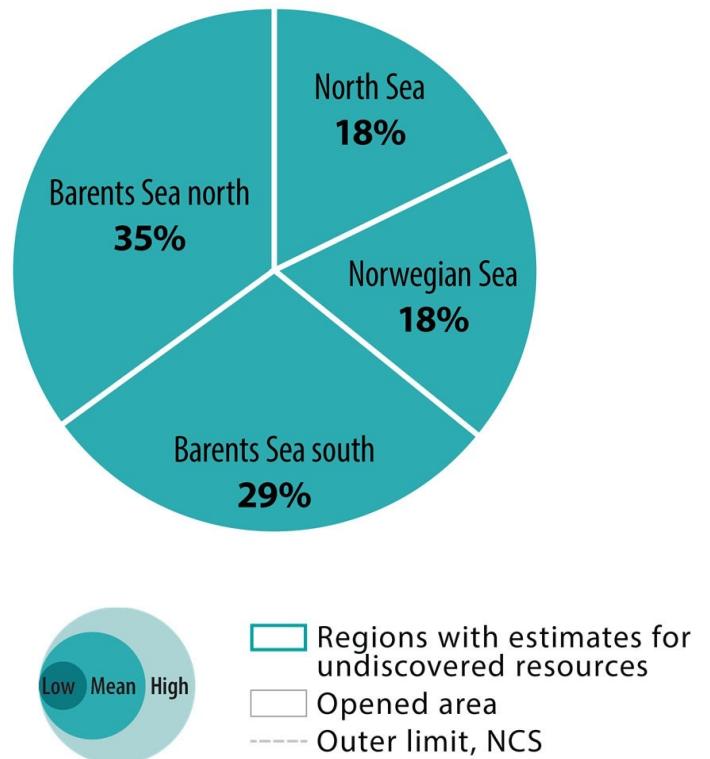


Exploitation pétrolière



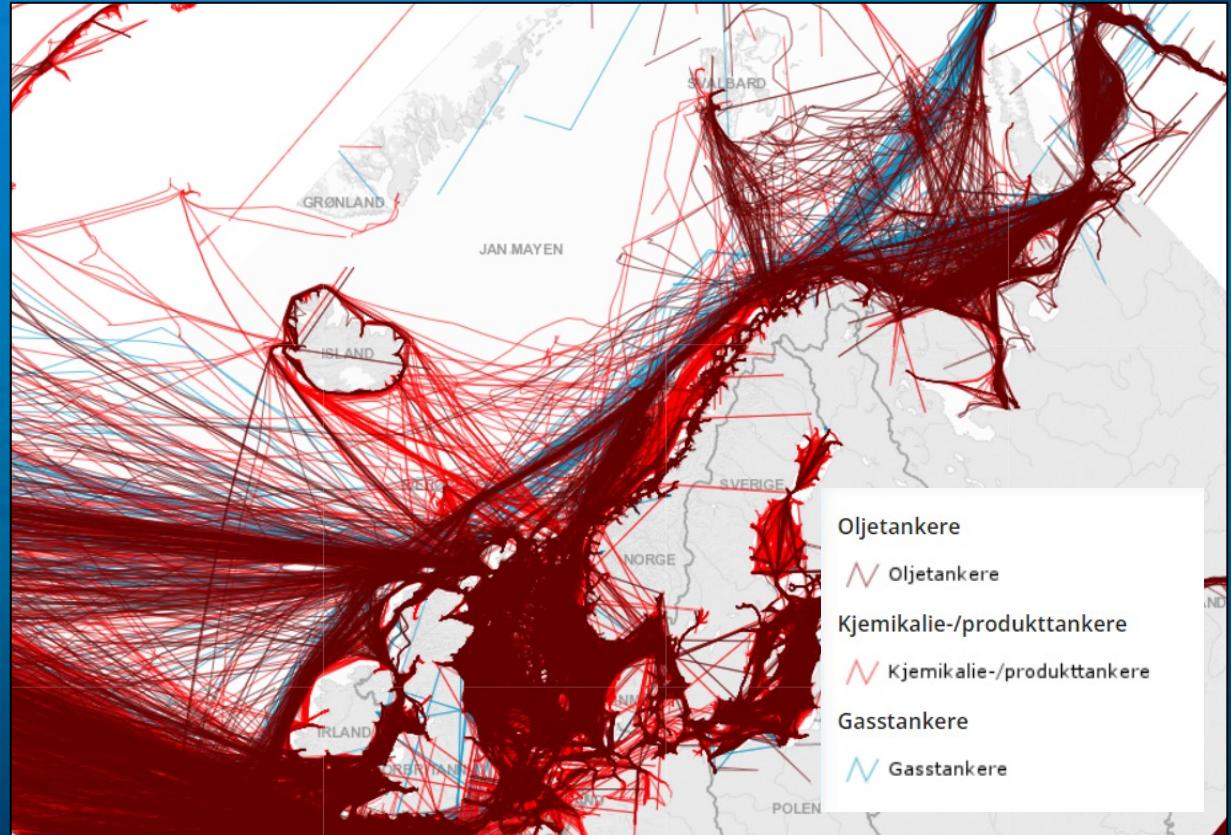
Exploitation pétrolière: les réserves potentielles

Estimation des réserves potentielles dans les eaux norvégiennes

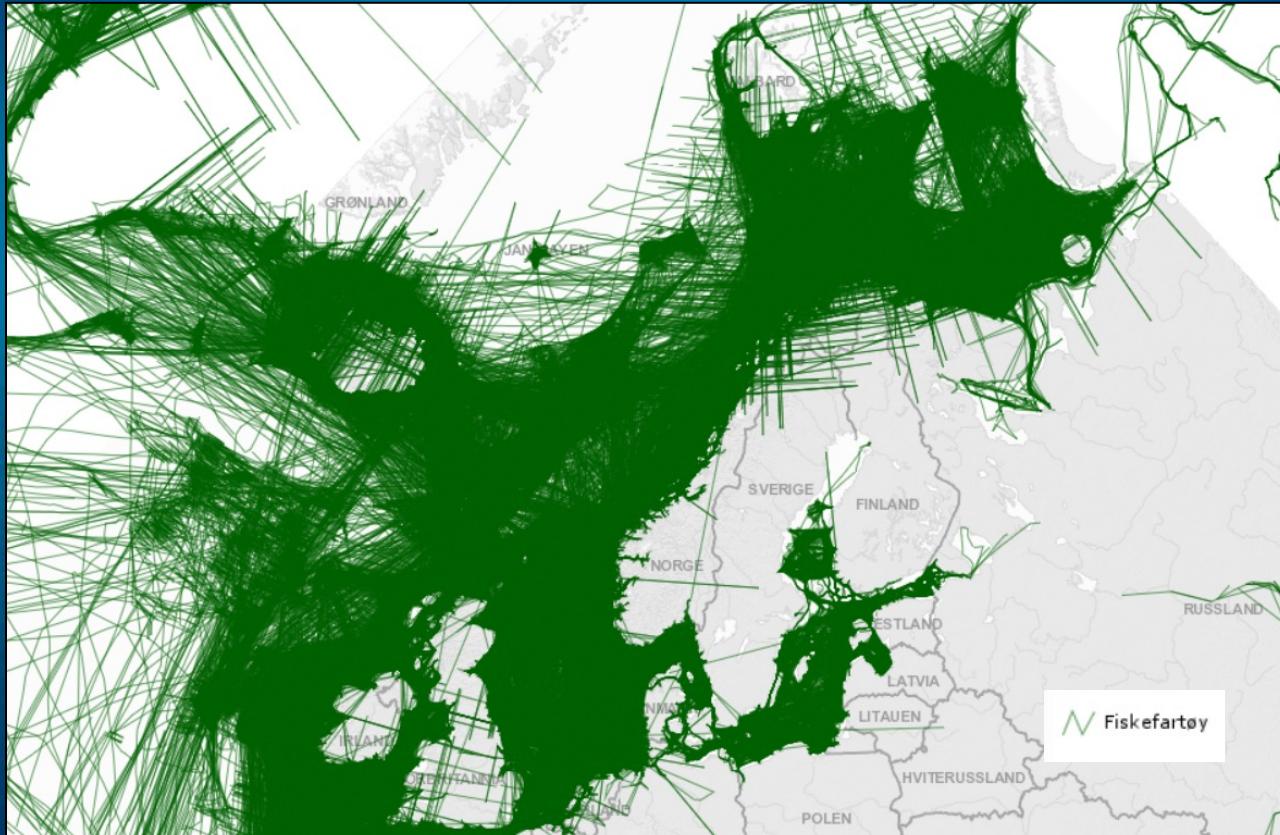


Traffic maritime

cargo



pêche

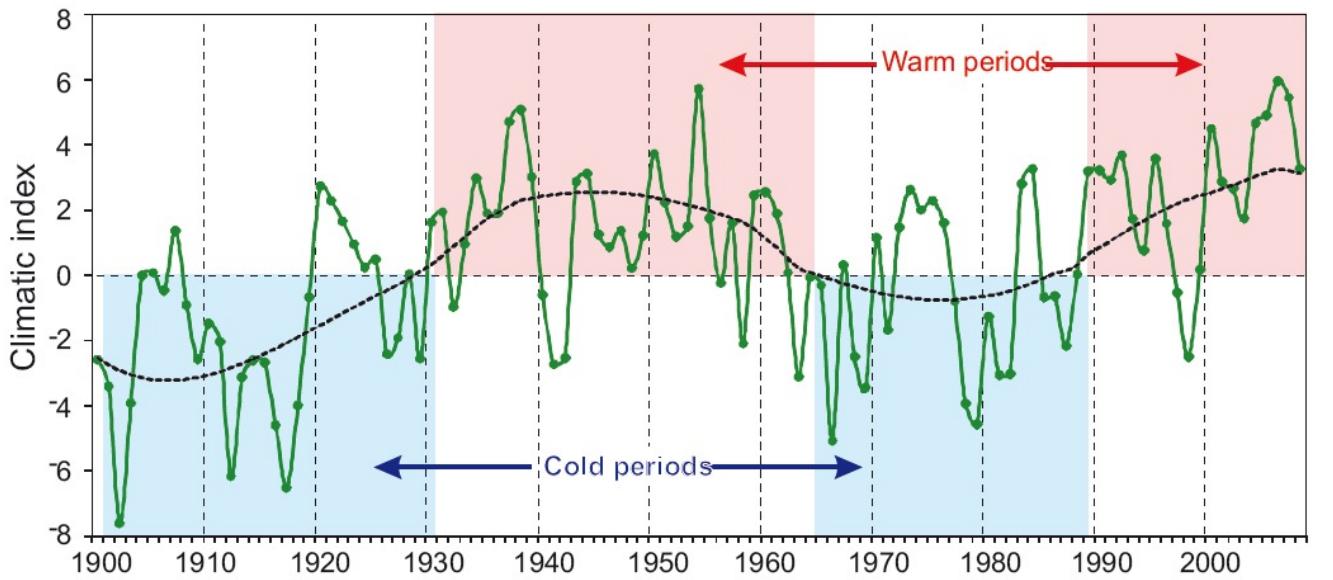


2019

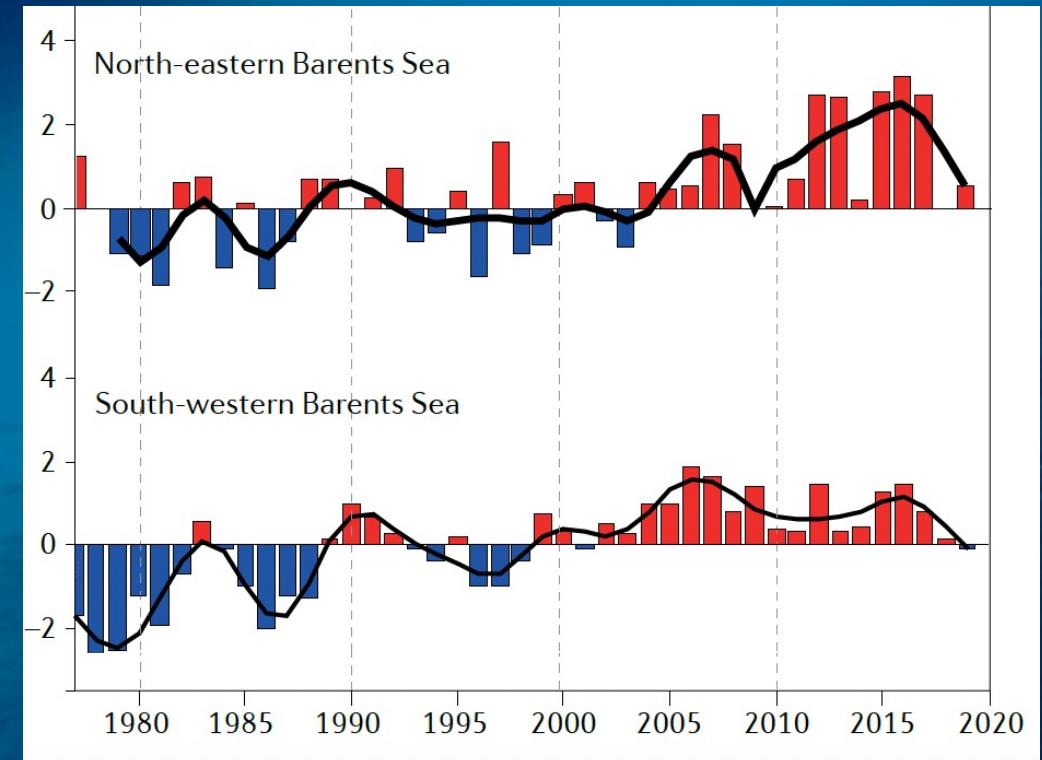
Havbase.no

Les changements récents

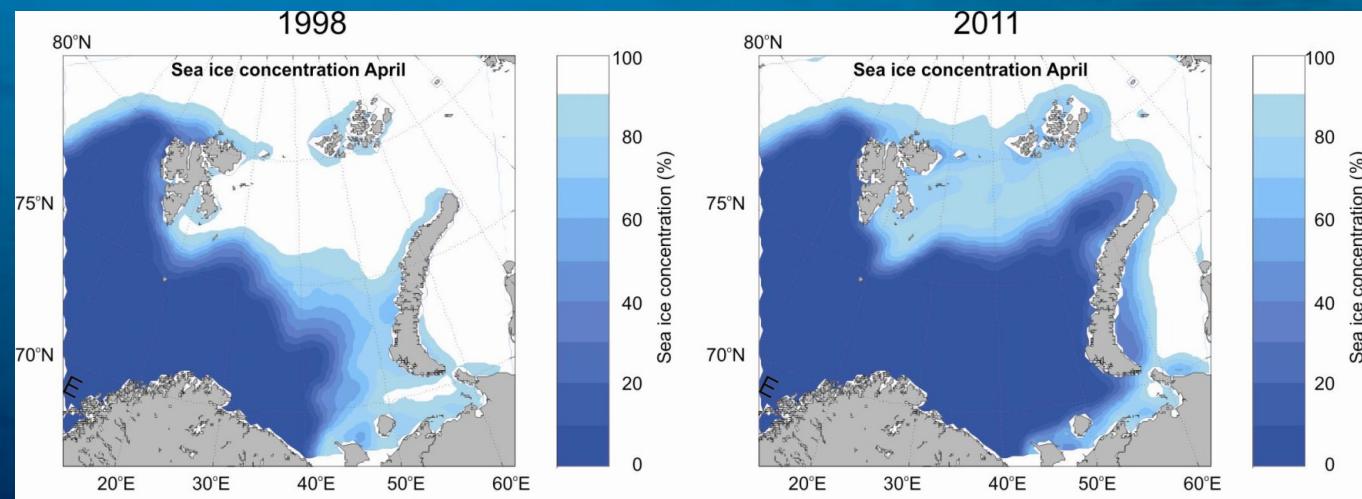
Climat



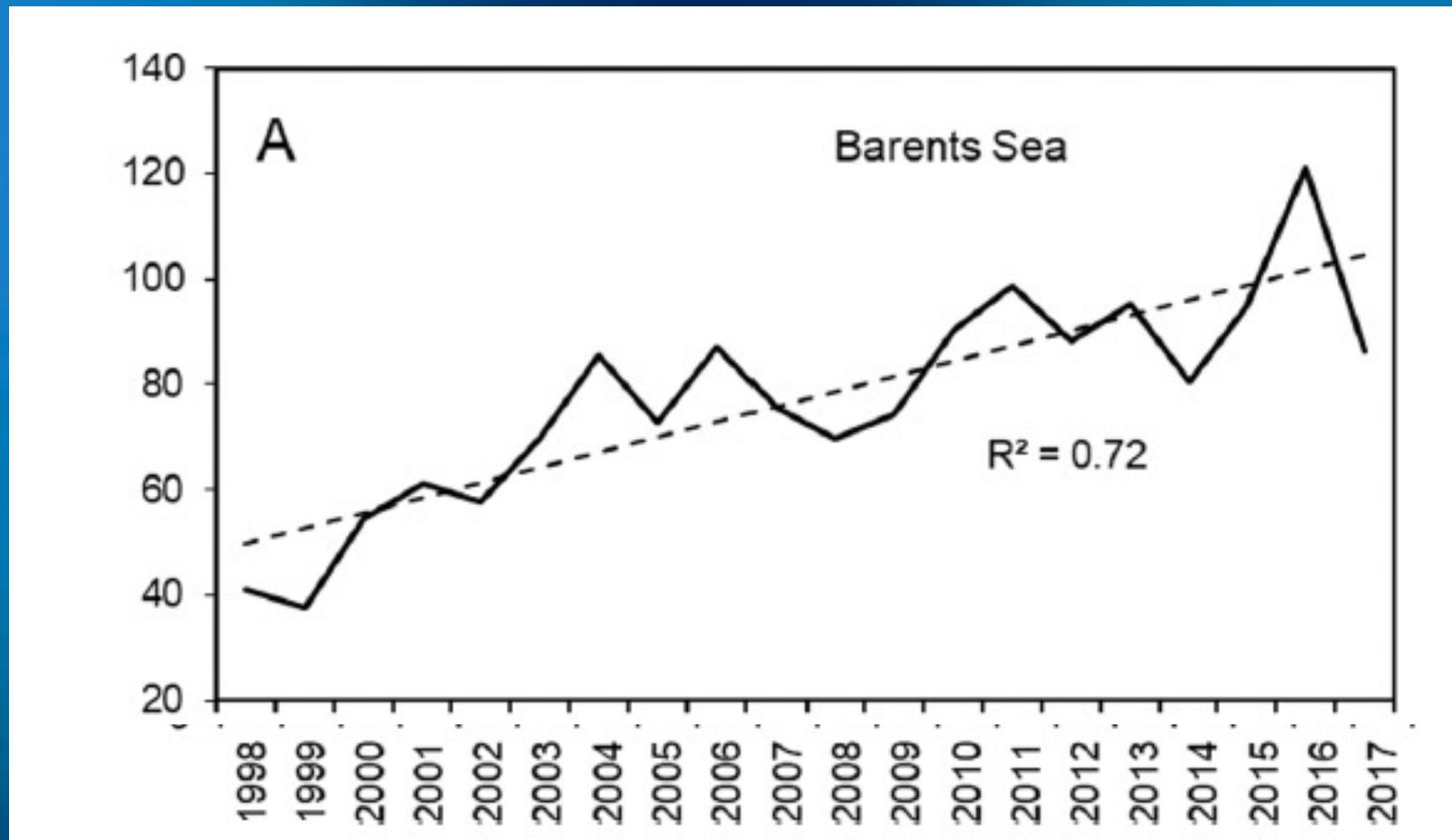
Anomalies de température



Ingvaldsen et al. (2021)

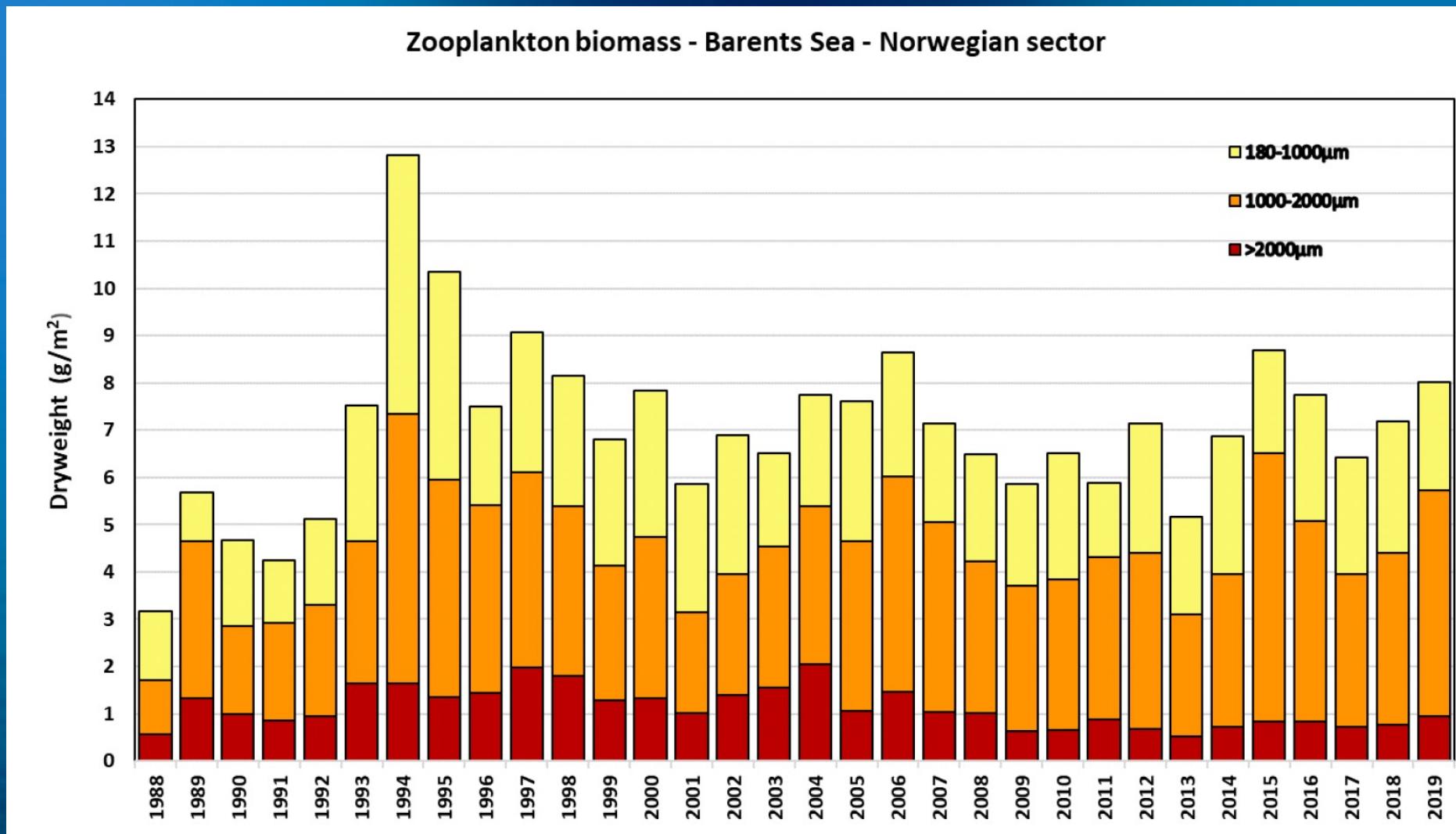


Production primaire (satellite)

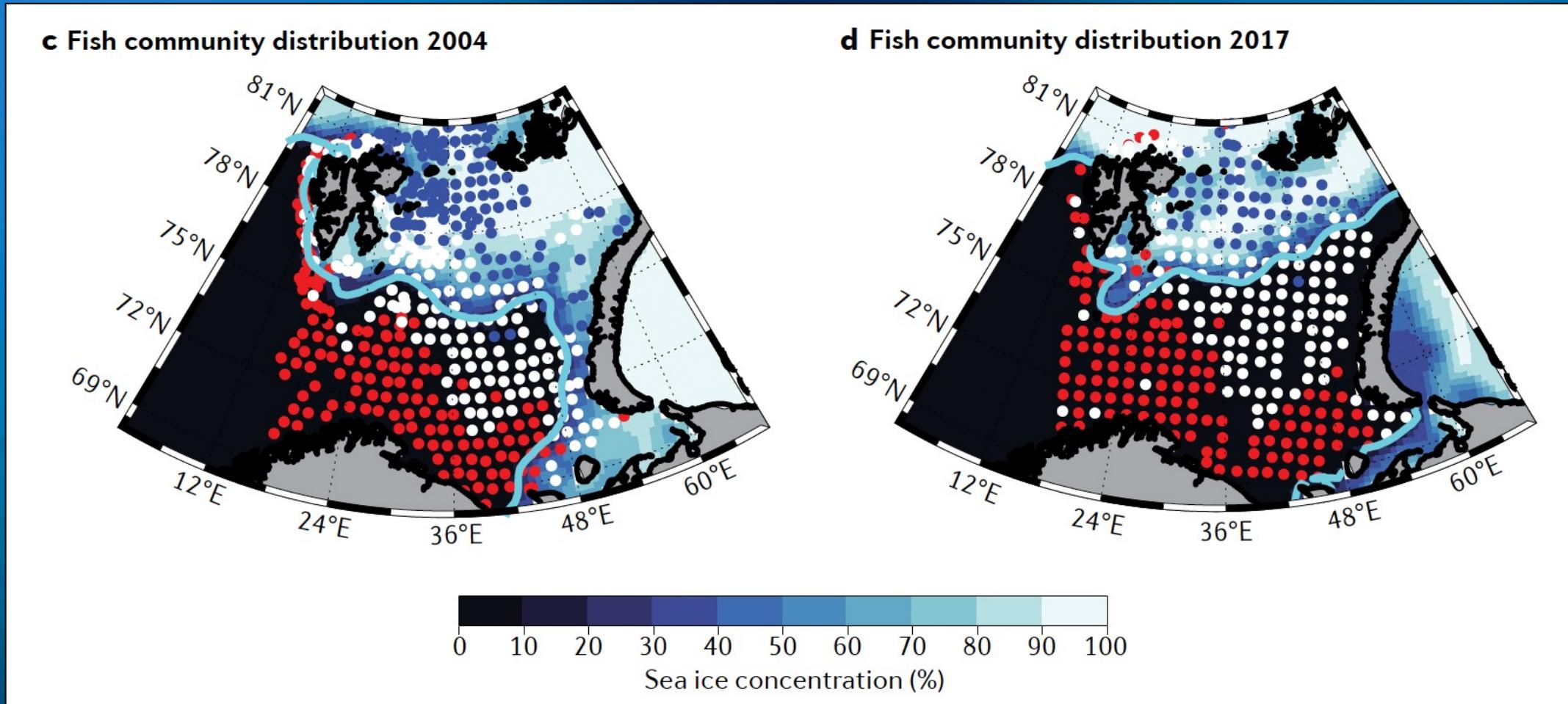


Dalpadado et al. (2020)

Mesozooplankton



Atlantification: les communautés biologiques se déplacent



Ingvaldsen et al. (2021)

Comment les poissons répondent aux fluctuations environnementales

Espèces sensibles



1. Morue polaire (*Boreogadus saida*)



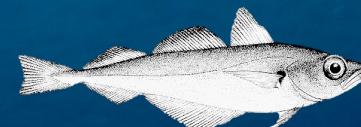
2. aiglefin (*Melanogrammus aeglefinus*)



3. *Triglops nybelini*



4. Merlan bleu (*Micromesistius poutassou*)



5. *Trisopterus esmarkii*



26. Cabillaud (*Gadus morhua*)



27. Raie arctique (*Amblyraja. hyperborean*)



28. hareng (*Clupea harengus*)



29. Loup arctique (*Anarhichas lupus*)

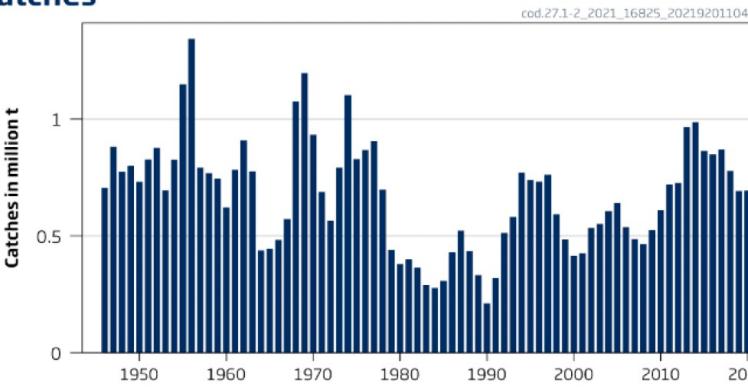


30. Loup atlantique (*Anarhichas minor*)

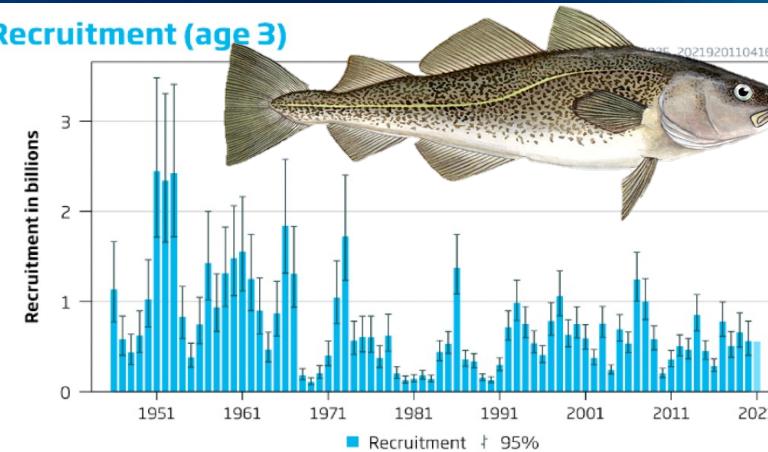
Espèces peu sensibles

Poissons & Pêche

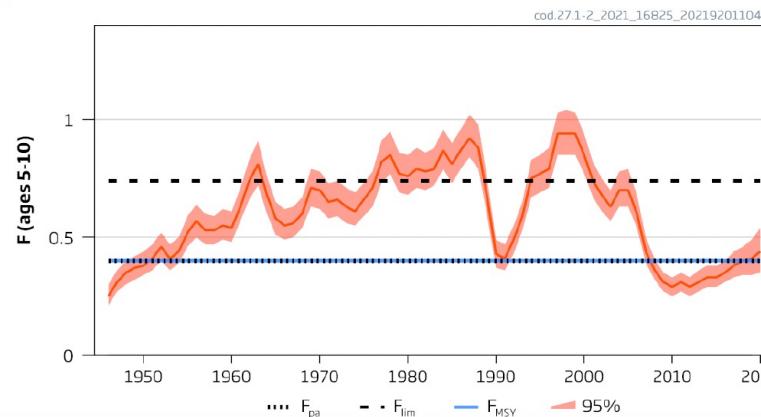
Catches



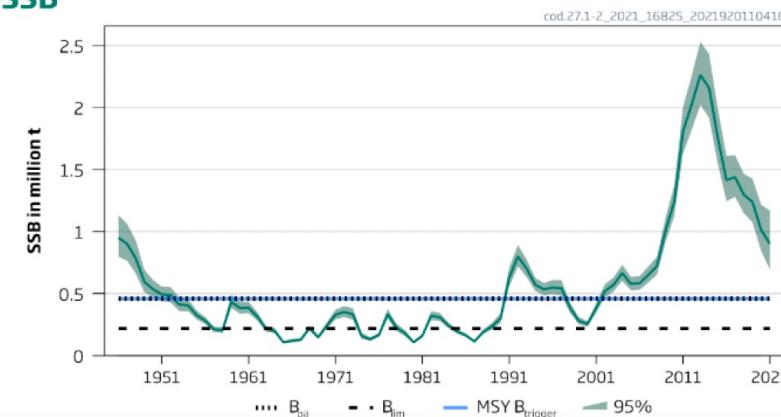
Recruitment (age 3)



F

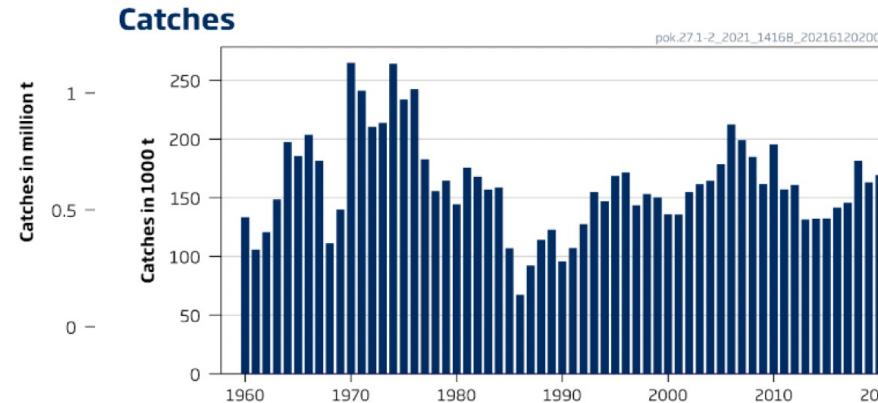


SSB

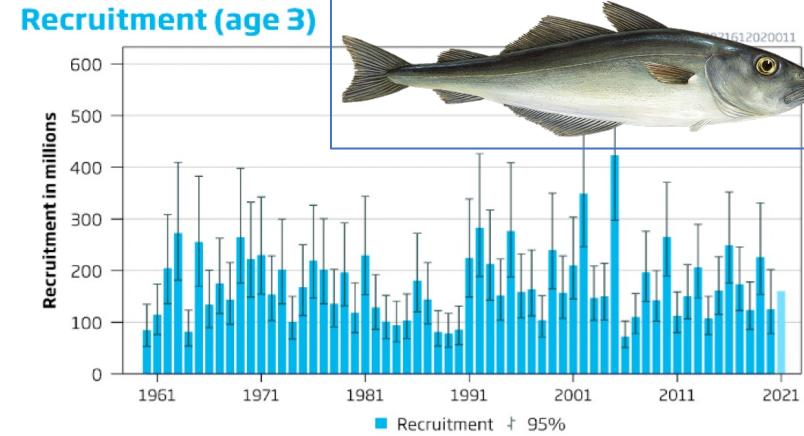


Poissons & Pêche

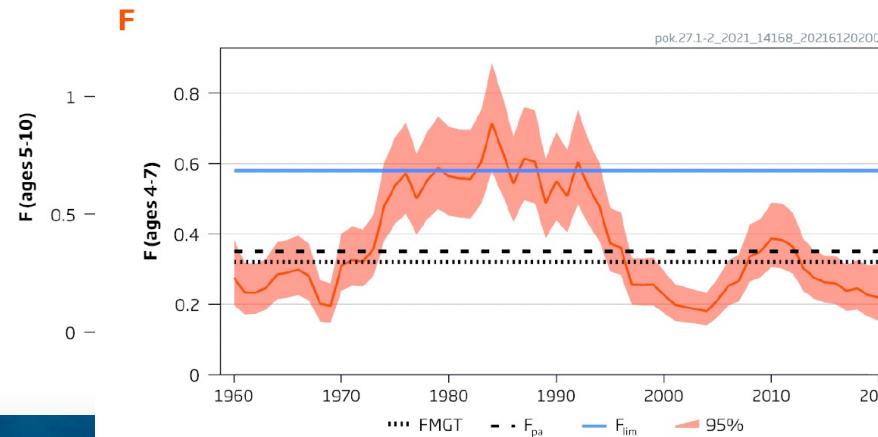
Catches



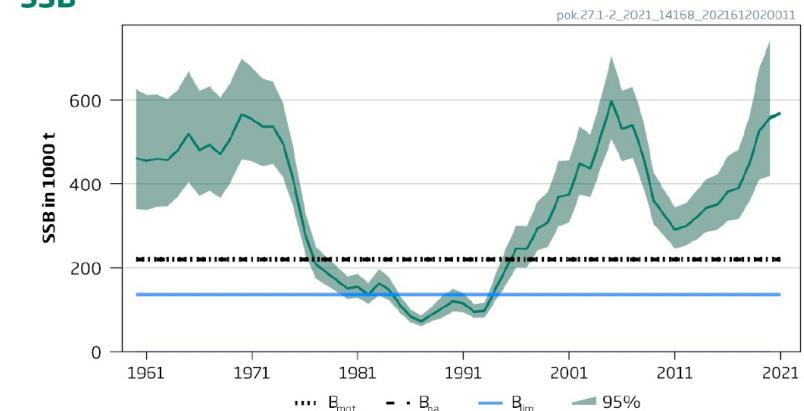
Recruitment (age 3)



F



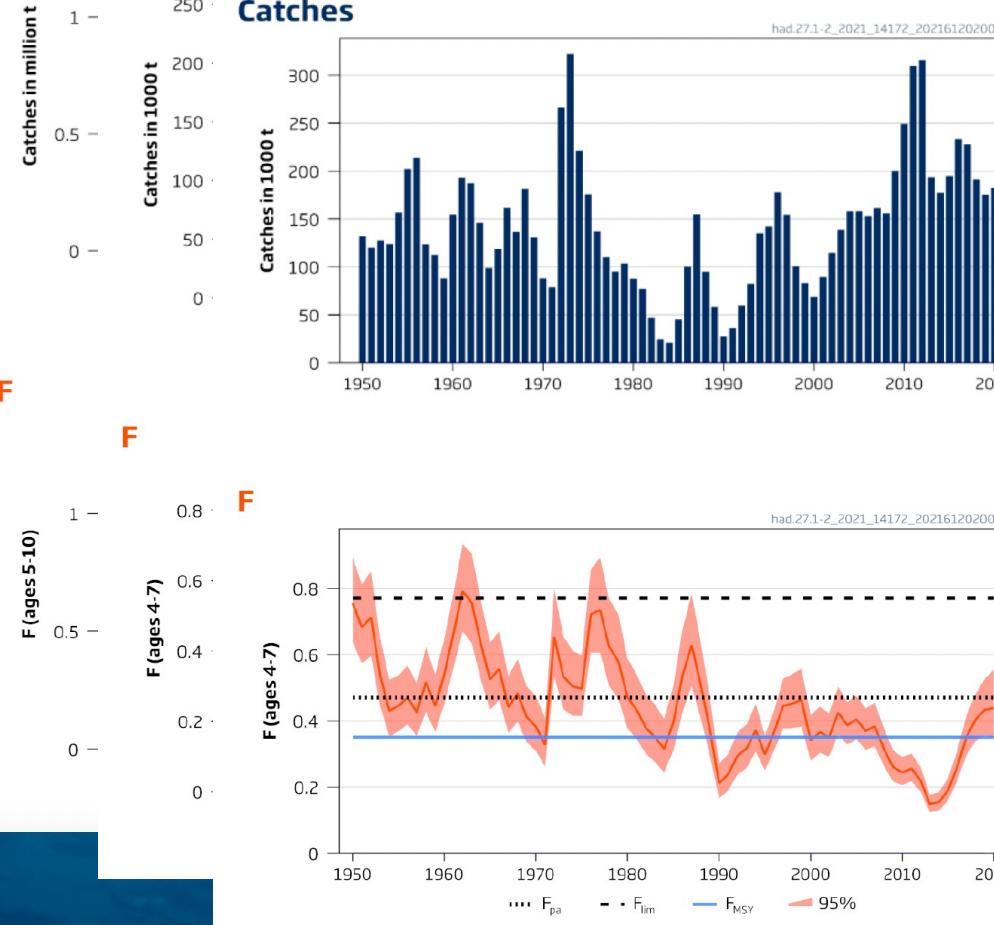
SSB



Poissons & Pêche

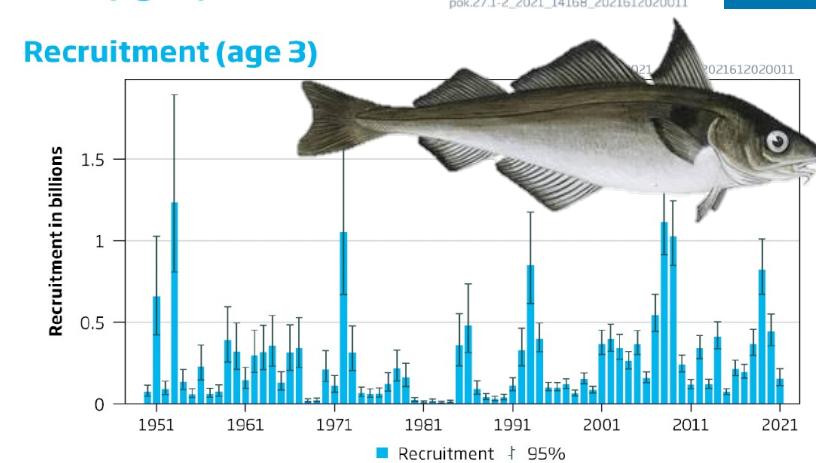
Catches

Catches

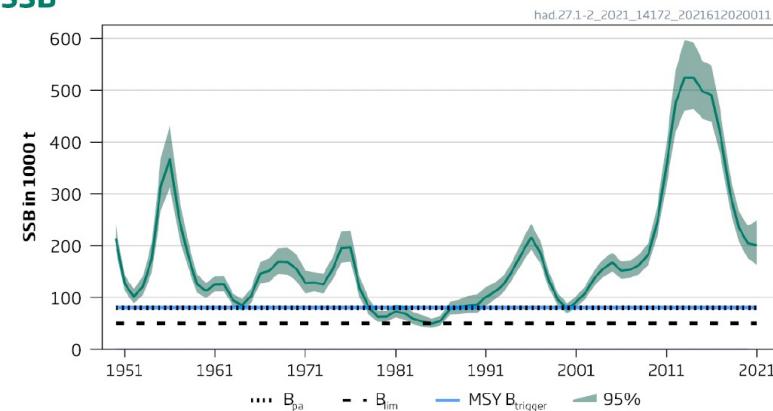


Recruitment (age 3)

Recruitment (age 3)



SSB



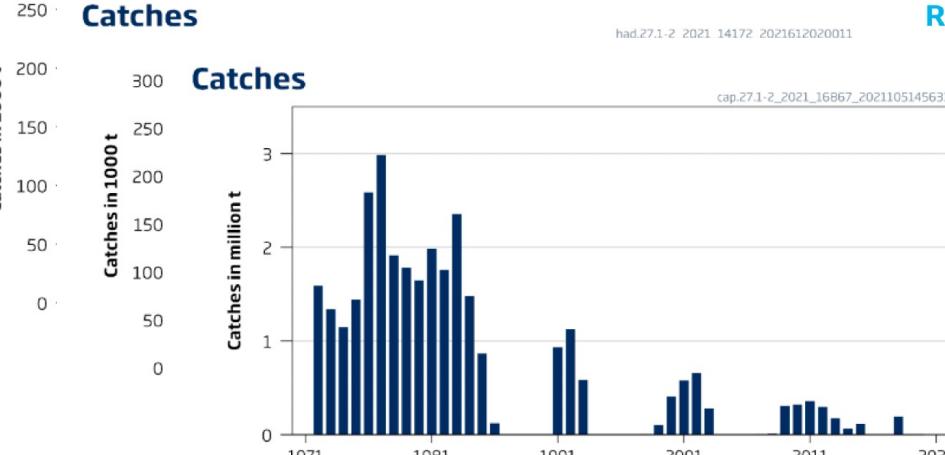
Poissons & Pêche

Catches

Catches

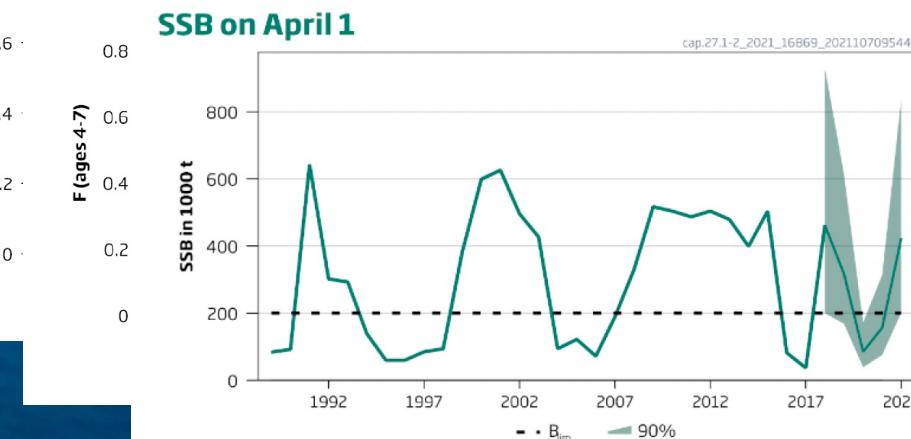
F
F
F

Catches



F (ages 5-10)
F
F

SSB on April 1



Recruitment (age 3)

Recruitment (age 3)

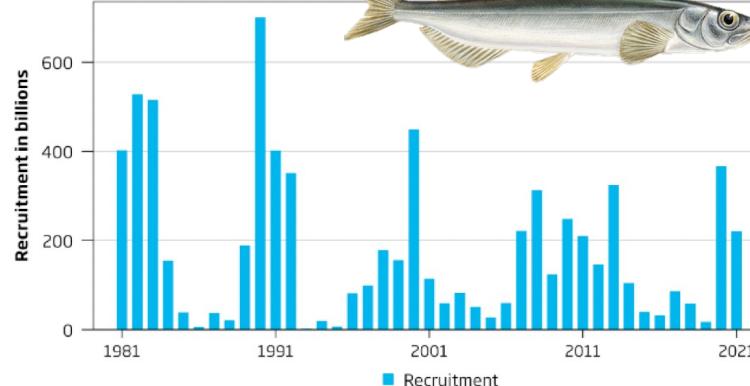
pok.27.1-2_2021_14168_2021612020011

Recruitment (age 3)

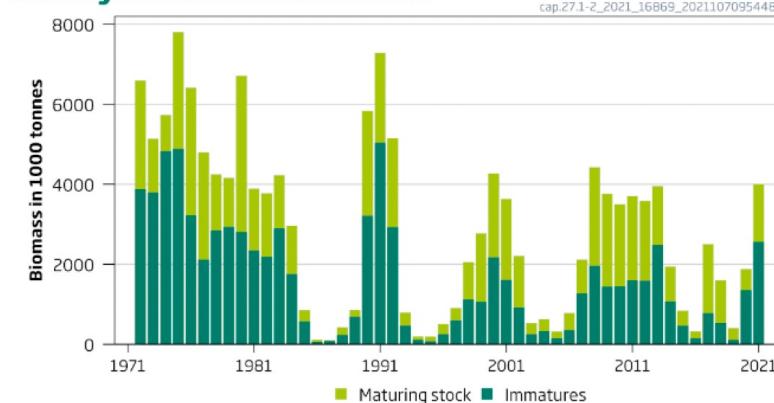
had.27.1-2_2021_14172_2021612020011

Recruitment (age 1)

had.27.1-2_2021_14172_2021612020011



Survey biomass on October 1



Poissons & Pêche

Catches

Catches

Catches in million t

250
200
150
100
50
0

Catches

Catches in 1000t
300
250
200
150
100
50
0

F

F

F

F (ages 5-10)

0.8
0.6
0.4
0.2
0

SSB on

F (ages 4-7)

F (ages 4-7)

SSB in 1000 t

0
200
400
600
800
1000
1200
1400
1600

16 000 000
14 000 000
12 000 000
10 000 000
8 000 000
6 000 000
4 000 000
2 000 000
0

1985 1990 1995 2000 2005 2010 2015 2020

Recruitment (age 3)

Recruitment (age 3)

pok.27.1-2_2021_14168_2021612020011

had.27.1-2_2021_14172_2021612020011

pok.27.1-2_2021_14168_2021612020011

had.27.1-2_2021_14172_2021612020011

Recruitment (age 3)

Recruitment (age 3)

Recruitment (age 1)

cap.27.1-2_2021_16867_2021105145631

cap.27.1-2_2021_16867_2021105145631

Value of catch (in 2020-values) of all groundfish species (incl. crustaceans and molluscs). 1985-2020. 1000 NOK.

Catches in million t

ns

600

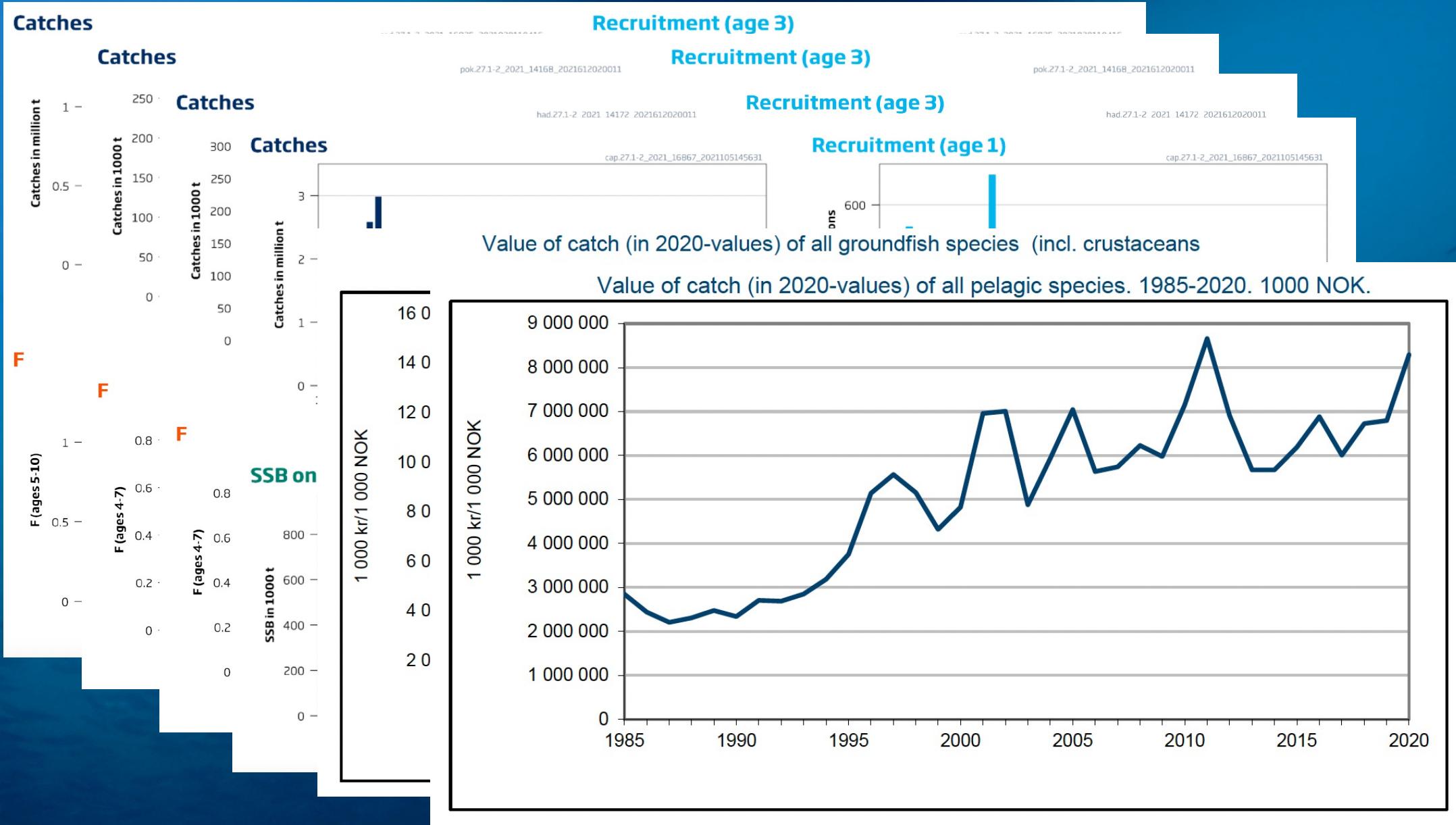
21

48

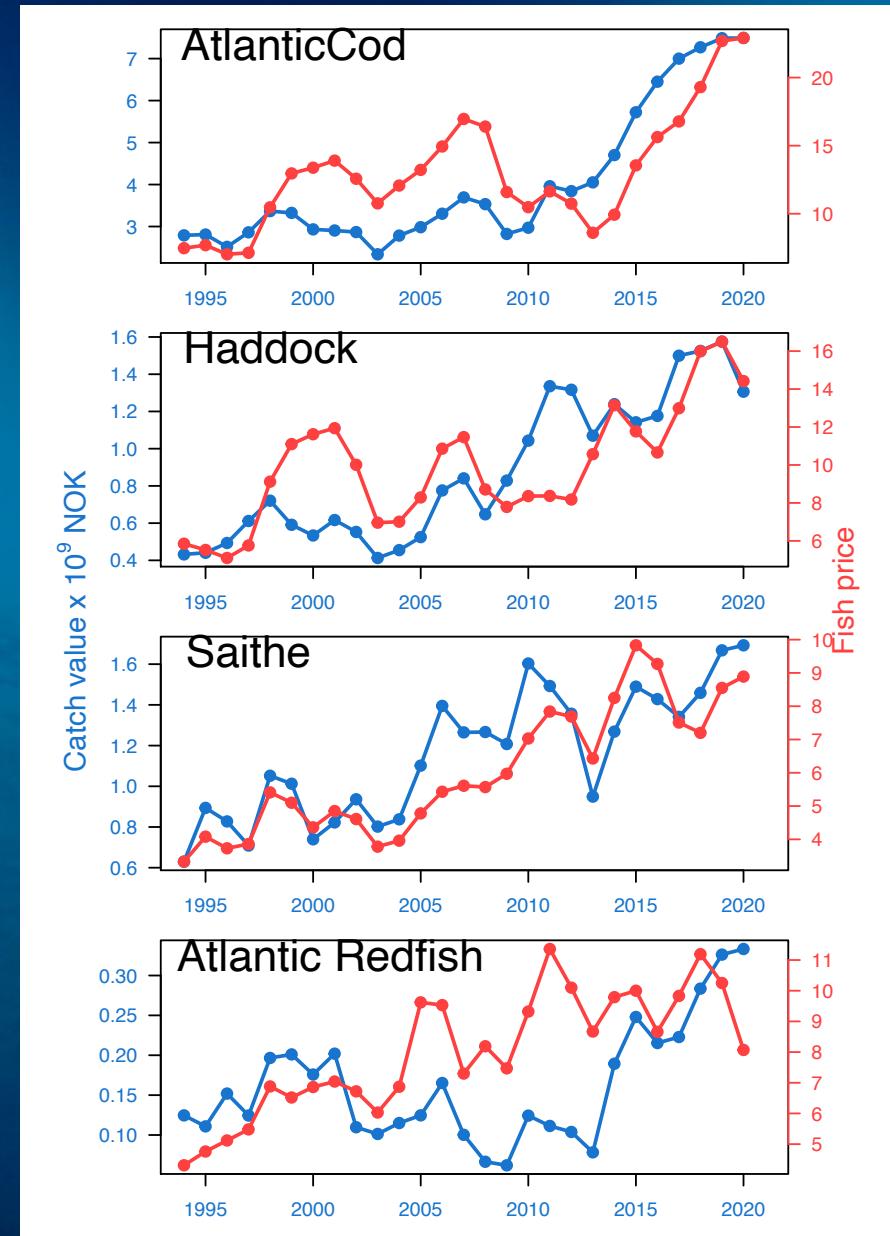
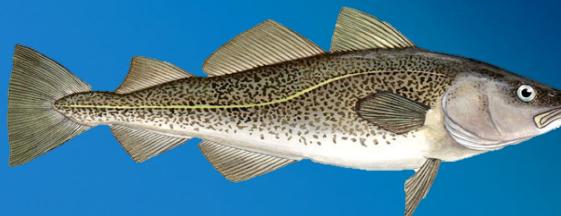
21

21

Poissons & Pêche

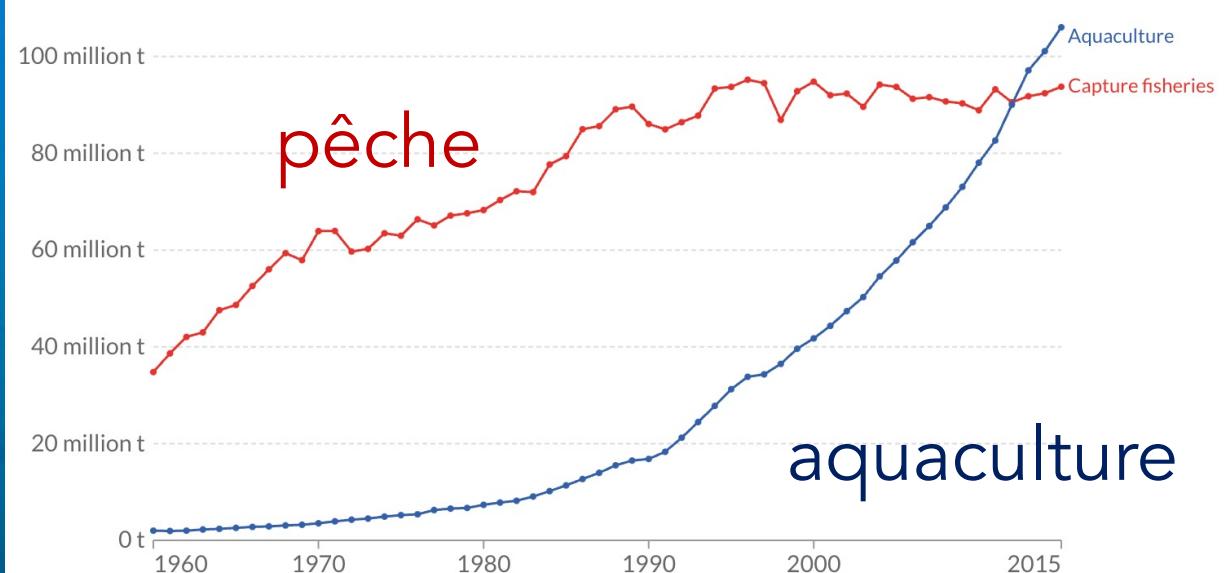


Valeurs par espèces

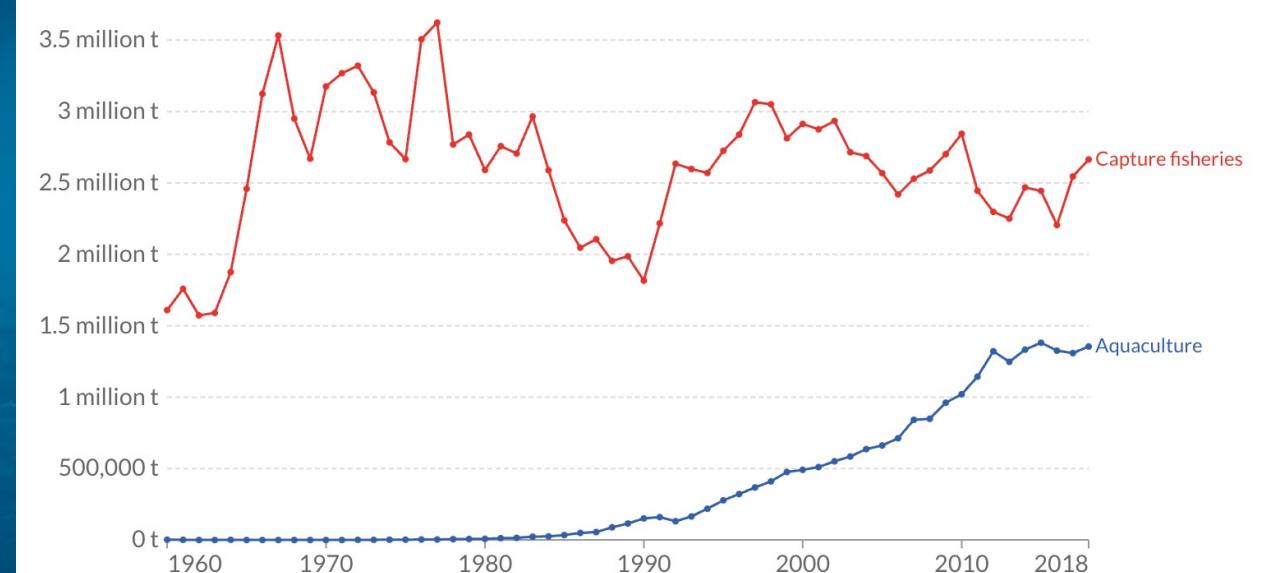


Pêche vs. aquaculture

Global

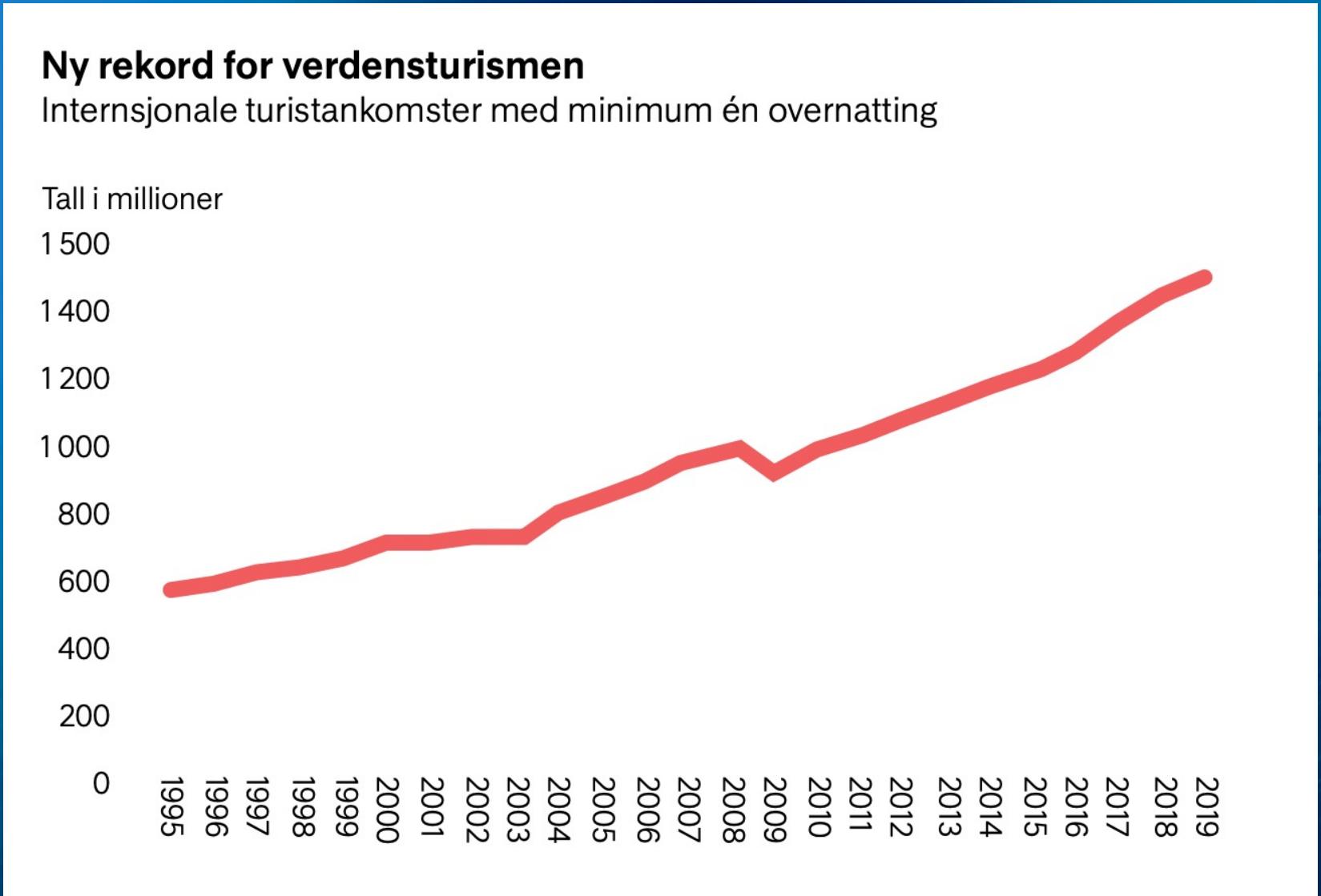


Norvège



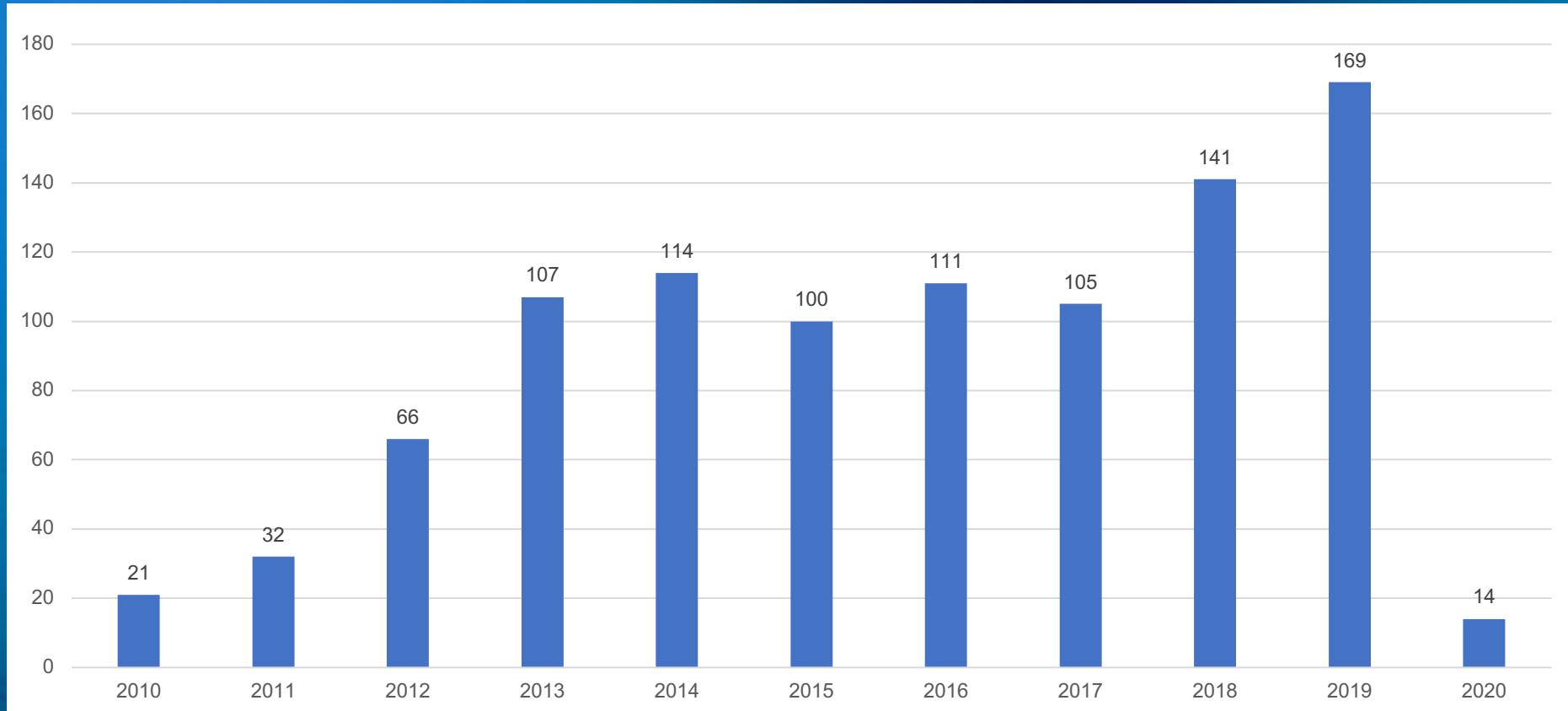
Source: *our world in data*

Tourisme: entrées sur le territoire norvégien



Source: Innovasjon Norge

Tourisme: bateaux de croisière au Svalbard



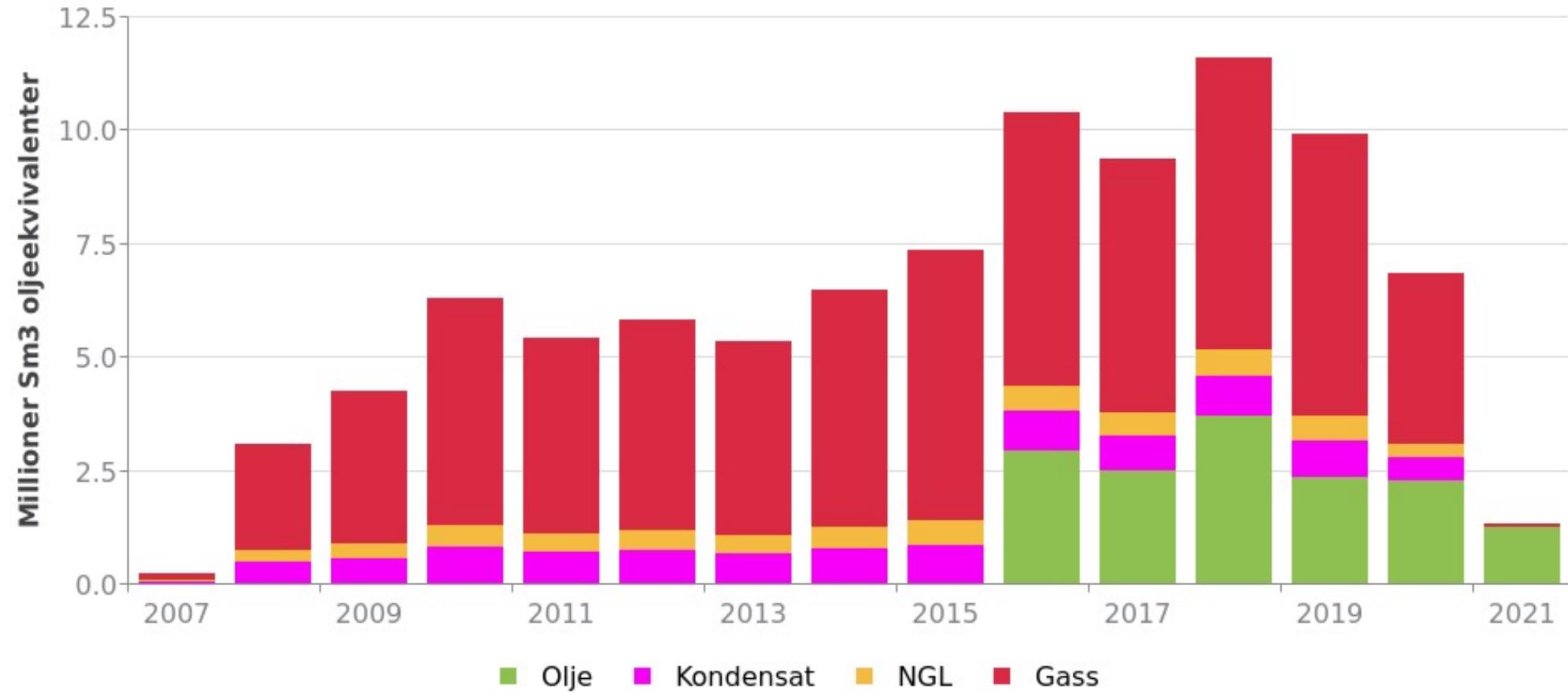
2010-2020

98 unique vessels
980 harbour calls

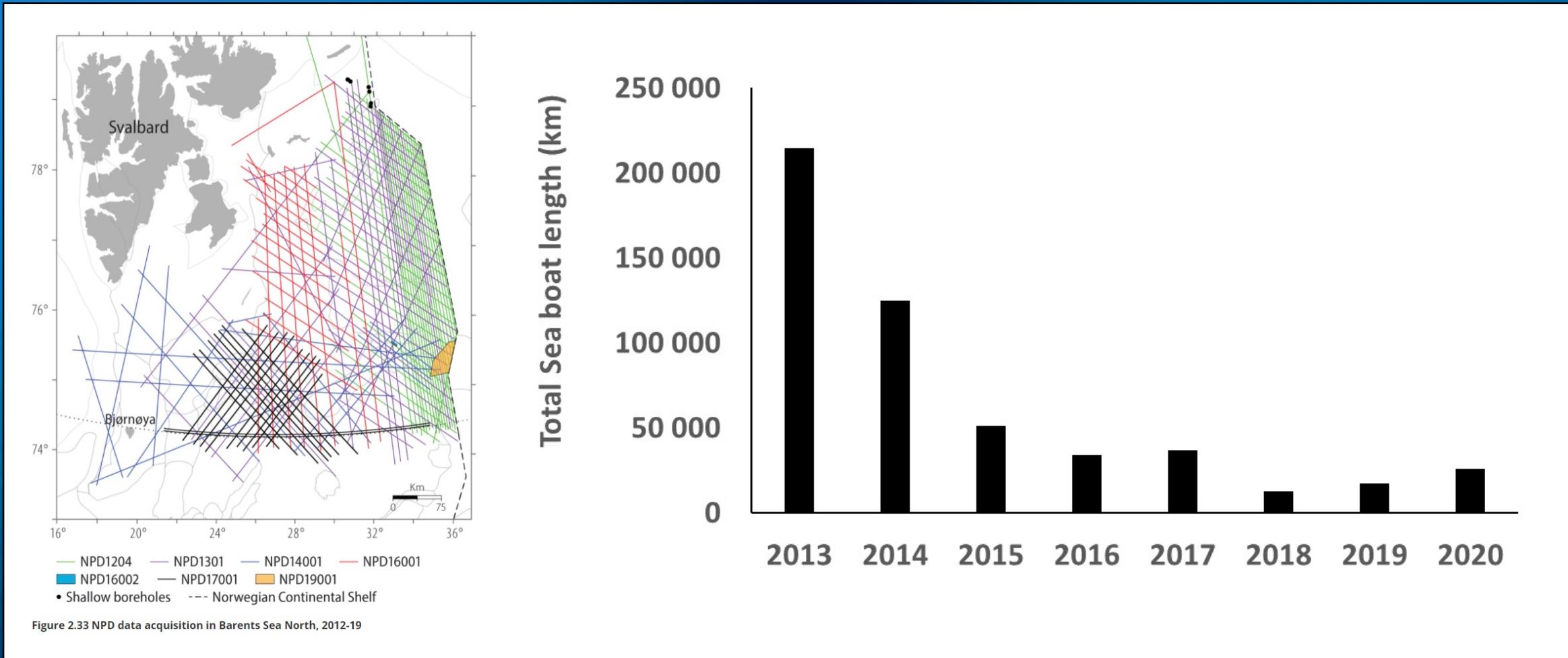
Source: Norwegian Coastal Administration <https://kystdatahuset.no/cruise>

Exploitation pétrolière

Production annuelle dans la mer de Barents

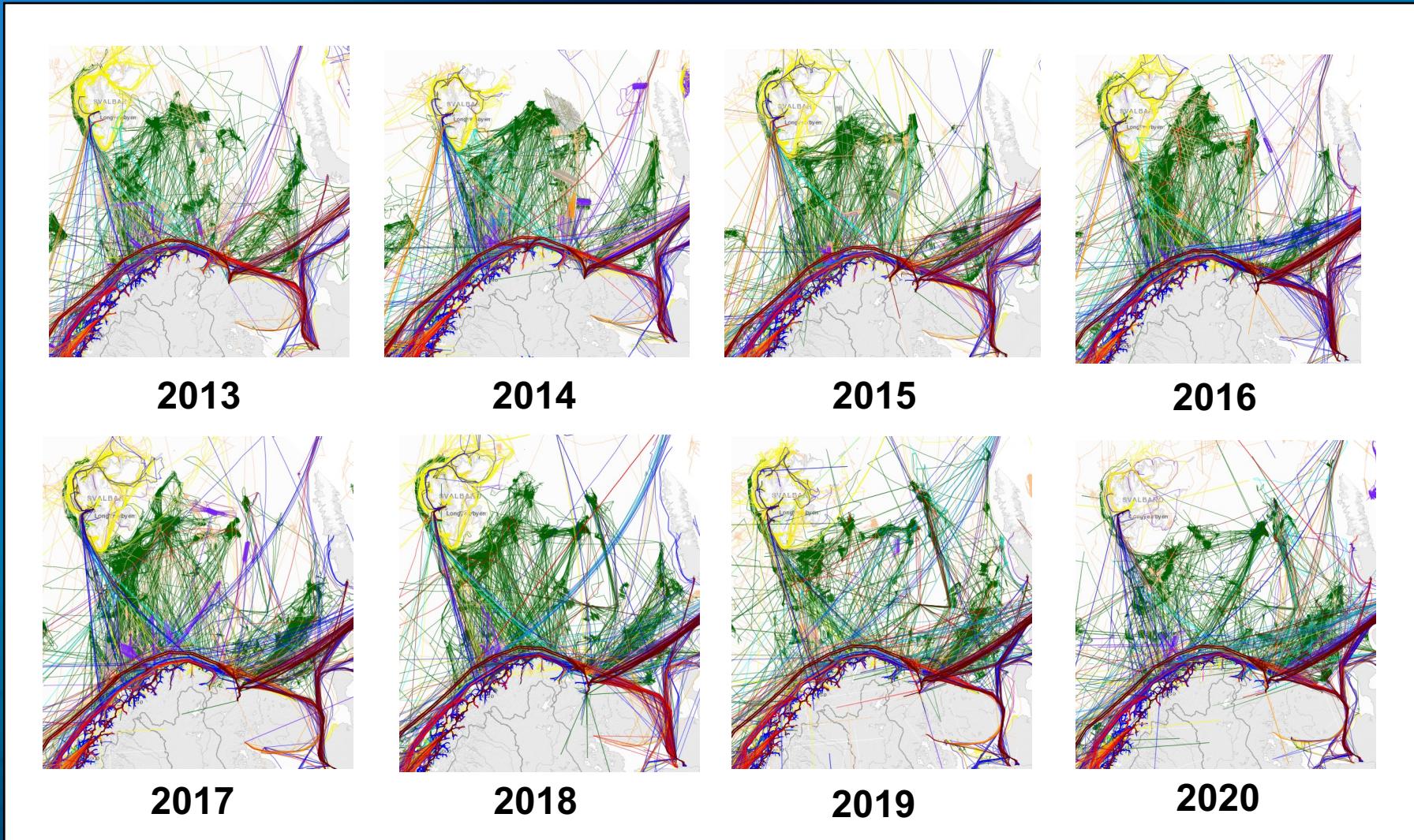


Exploitation pétrolière: exploration/sismique



Source; Norwegian Petroleum Directorate, Fact pages

Transport maritime



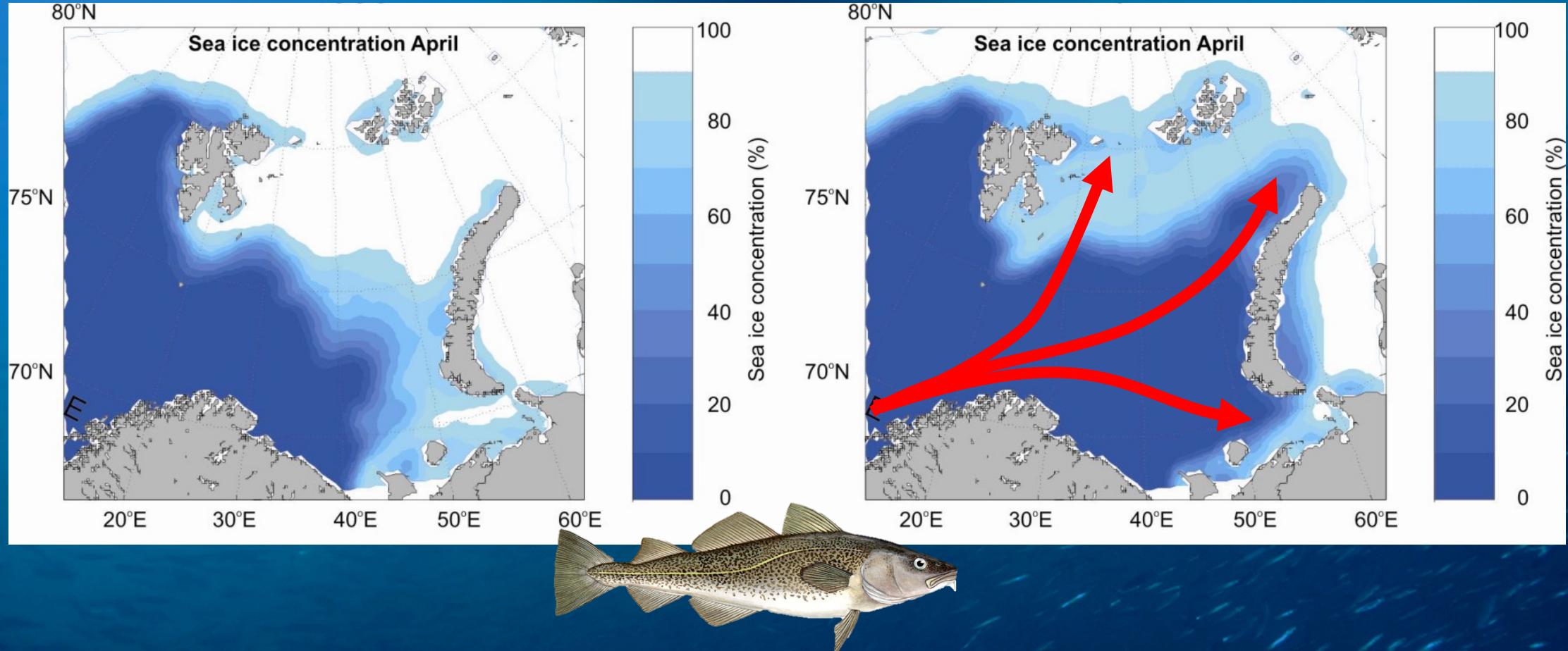
Vessel density August 2013-2020.
Source Havbase, Norwegian Coastal Administration

Transport maritime

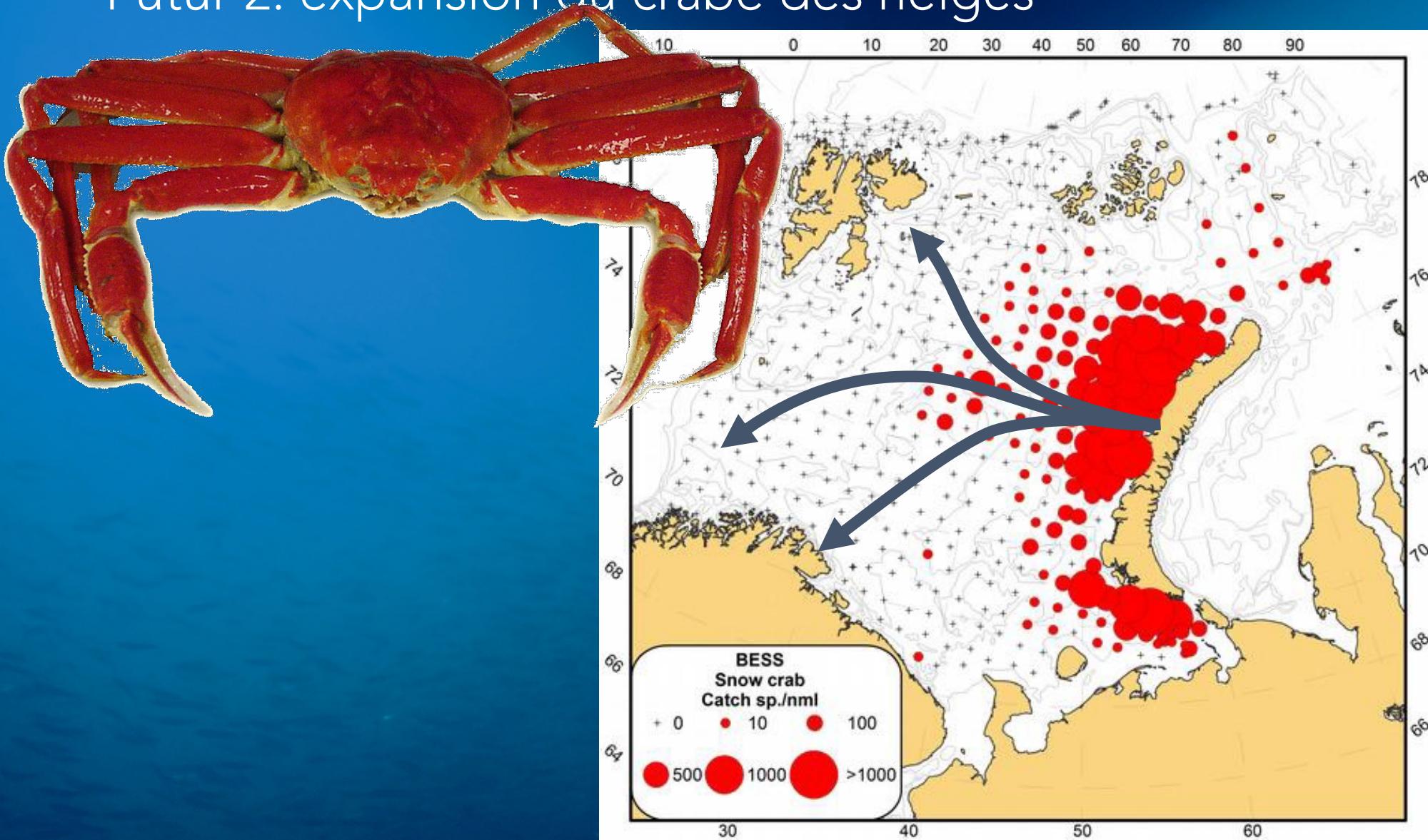


Les futures possibles

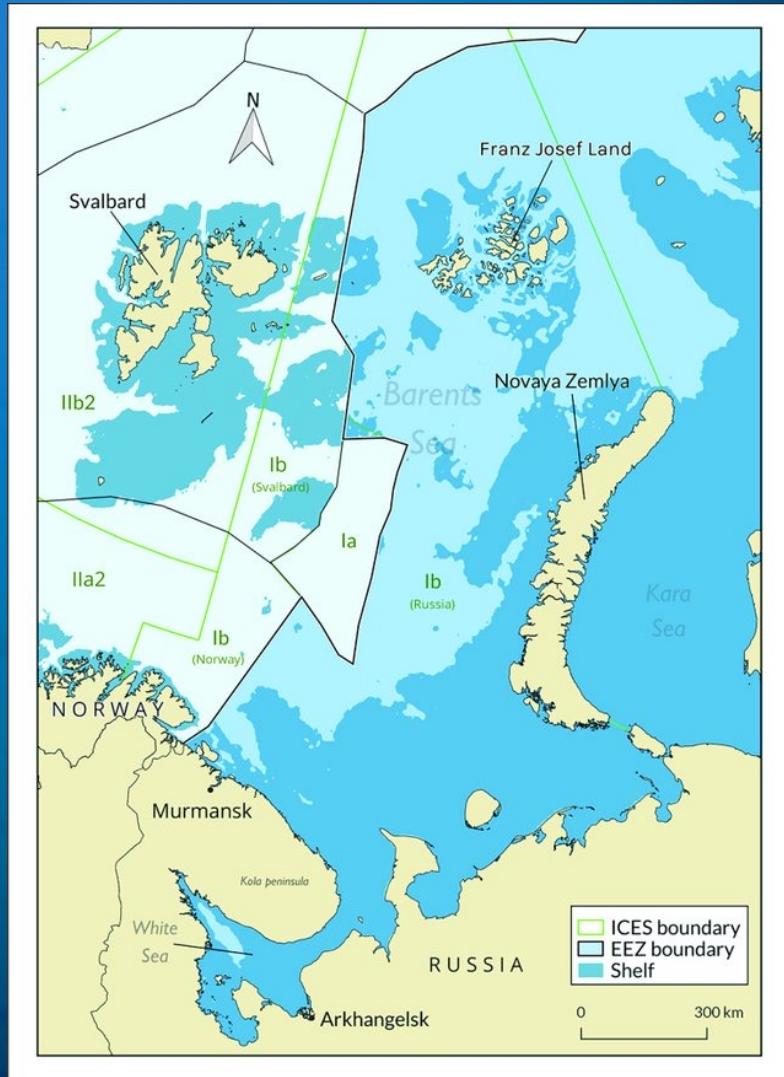
Futur 1: expansion de la morue et productivité accrue de la pêche



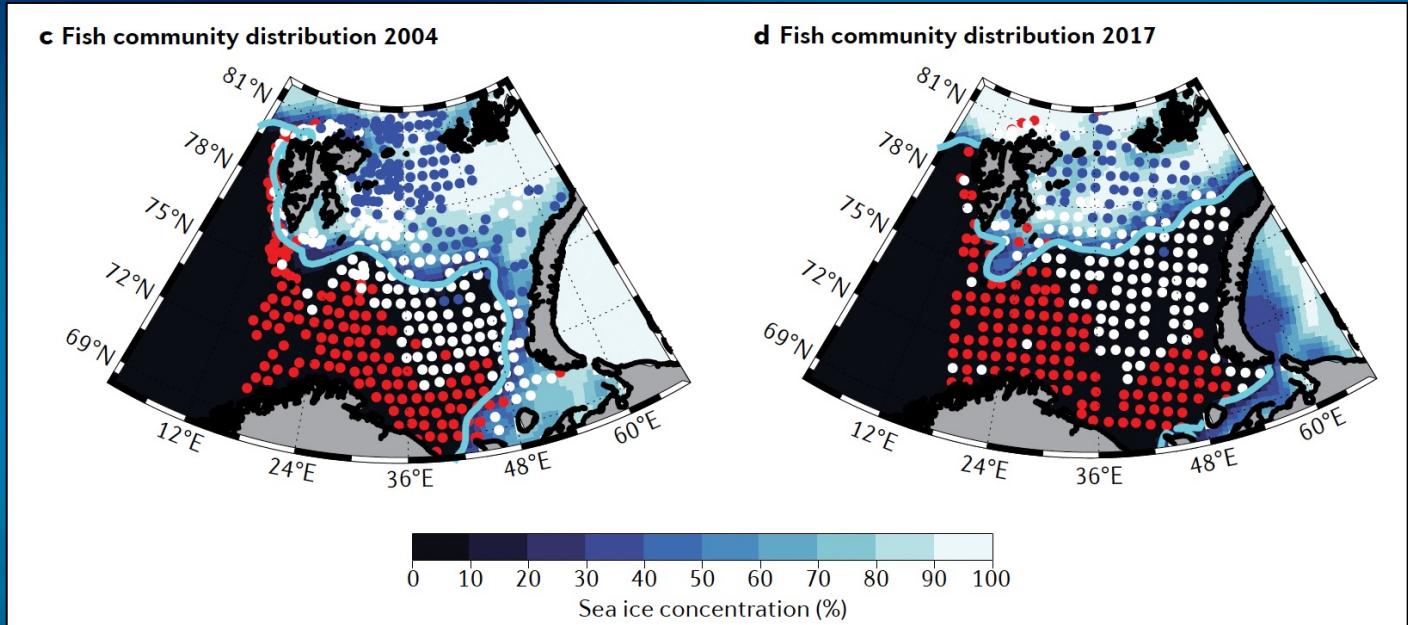
Futur 2: expansion du crabe des neiges



Futur 3: conflits transfrontaliers liés au déplacement géographique des espèces

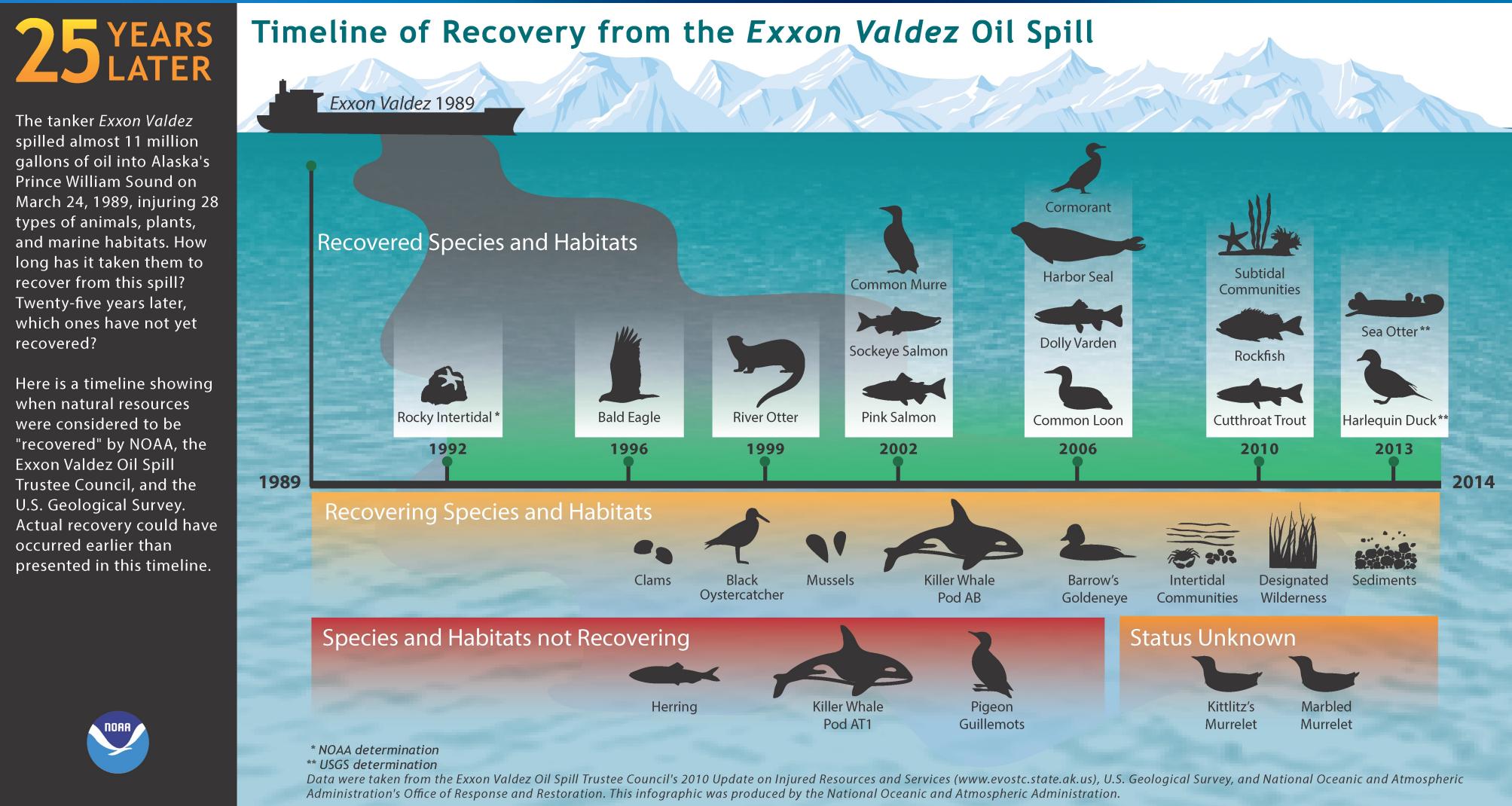


Popov and Zeller (2018)



Ingvaldsen et al. (2021)

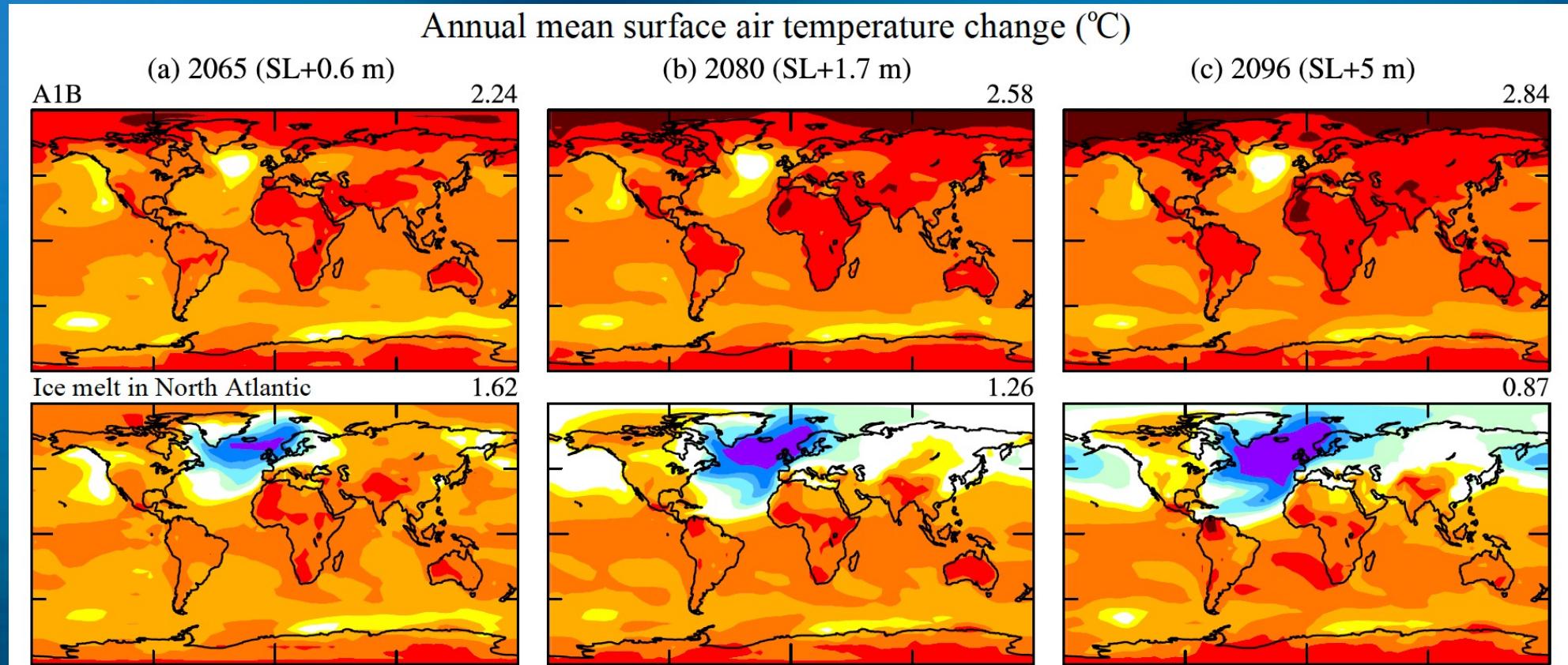
Futur 4: Accident pétrolier majeur



NOAA (2020)

Futur 5: Basculement de la circulation oceanique

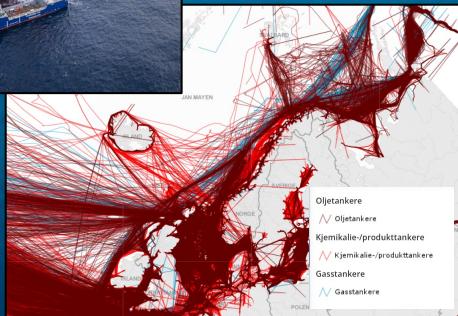
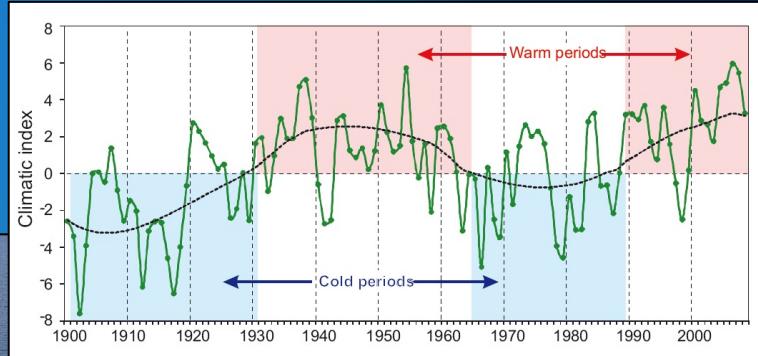
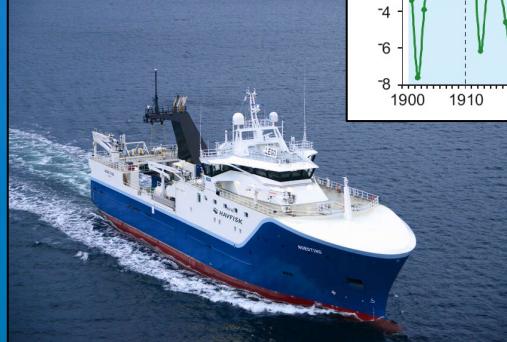
Fonte "normale"



Fonte "accélérée"

Hansen et al. (2016)

Futur 6: Accumulations des pressions sur l'ecosystème



Plan de gestion intégré présenté au parlement

Conclusions

- La mer de Barents est une mer productive
- Les activités humaines y sont développées
- Cet écosystème change rapidement sous la pression du changement climatique et des activités humaines
- Les futurs possibles sont multiples et dépendront pour une large part des décisions aux échelles régionale et globale.