ALFRED-WEGENER-INSTITUT
HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG

Universität Hamburg
DER FORSCHUNG | DER LEHRE | DER BILDUNG

IMARES
WAGENINGEN UR

The Surface and Under-Ice Trawl (SUIT)

Hauke Flores,
Jan Andries van Franeker,
Michiel van Dorssen,
André Meijboom, Benjamin Lange,
Carmen David, Fokje Schaafsma,
Doreen Kohlbach, Giulia Castellani,
Martina Vortkamp

GEO / Illuteam43

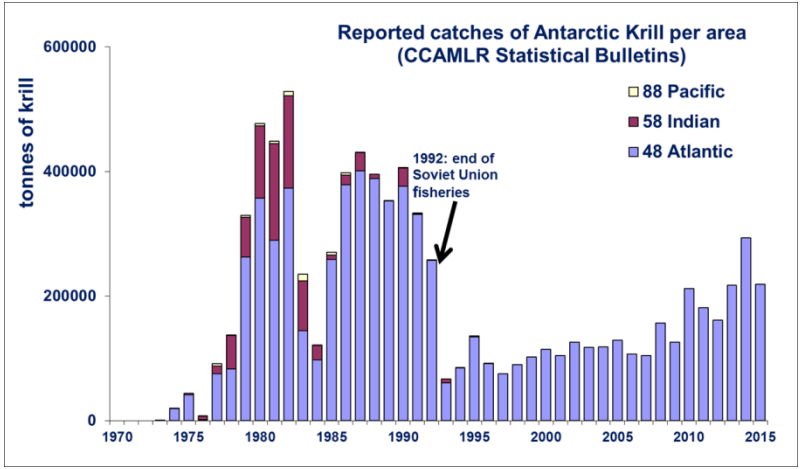
Background

CCAMLR

Resource sustainability

Ecosystem health

CCAMLR (2015)



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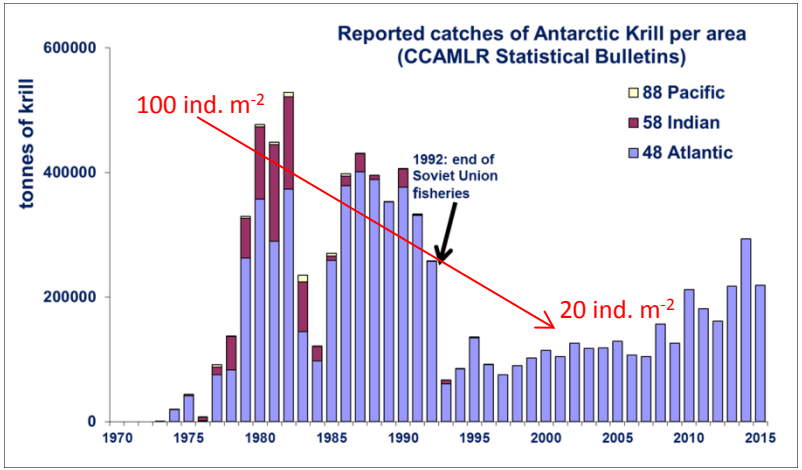
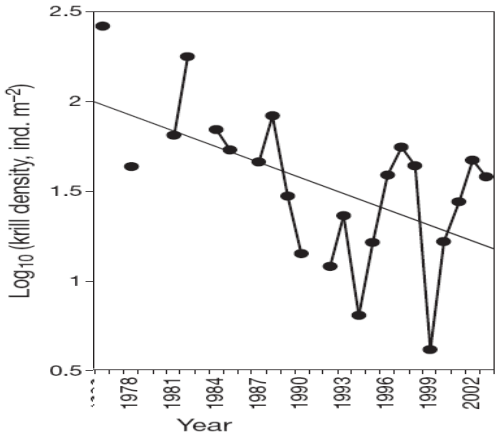
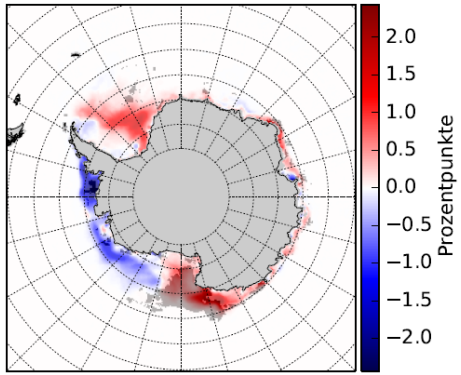




Atkinson et al (2004, 2008) Nature 432: 100-103 / MEPS 362: 1-23



Meereisportal.de

Trend in sea ice extent around Antarctica, 1976-2015

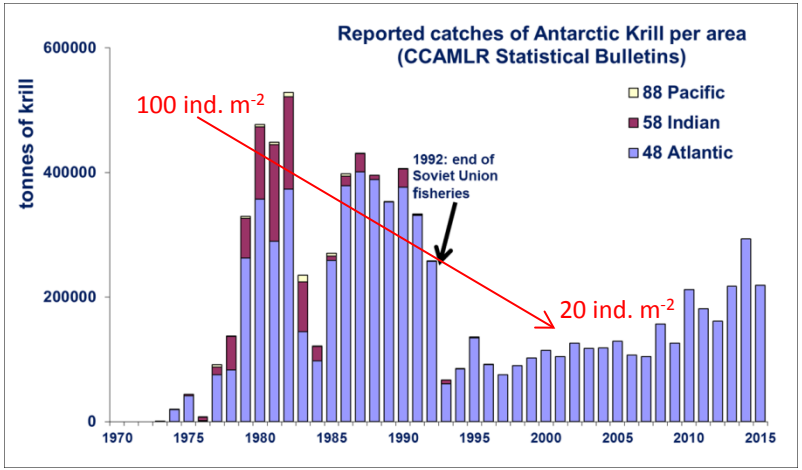
Background

CCAMLR

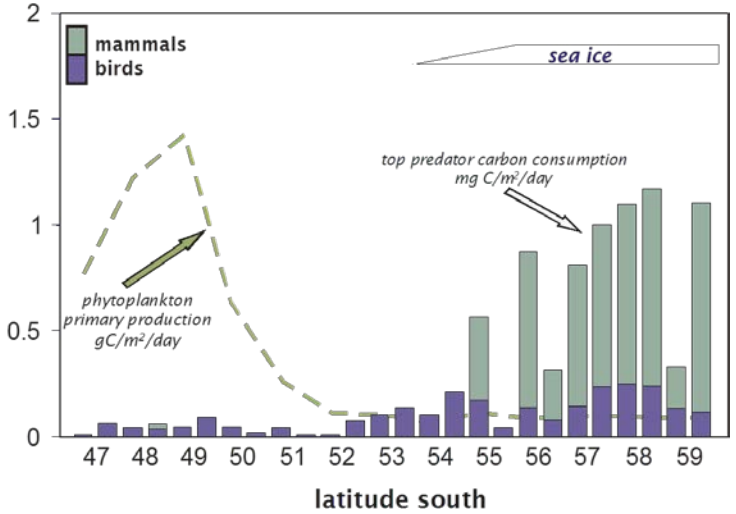
Resource sustainability

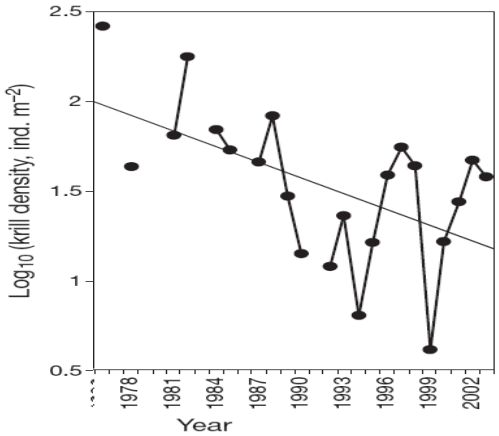
Ecosystem health

CCAMLR (2015)



Van Franeker *et al.* (1997) DSR2 44: 435-455





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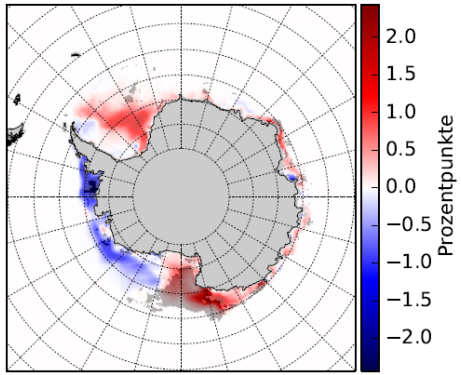


Meereisportal.de

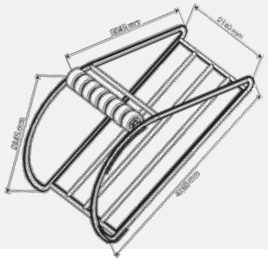
Trend in sea ice extent around Antarctica, 1976-2015

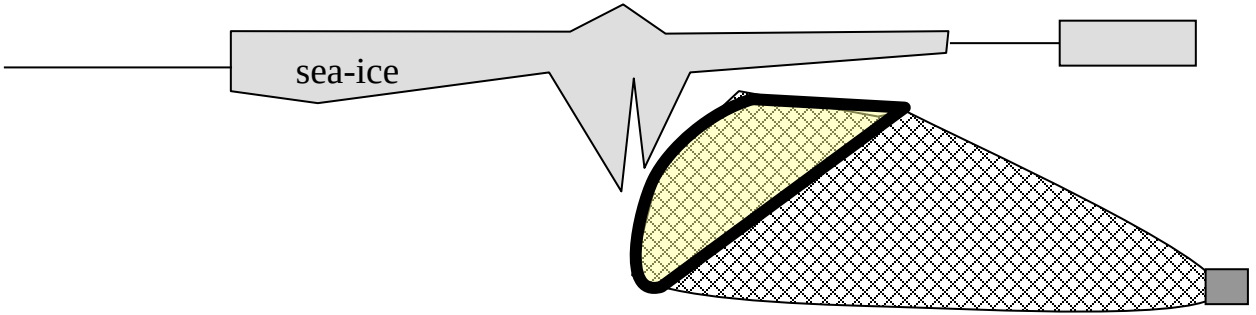
SUIT

Basic construction

Frame

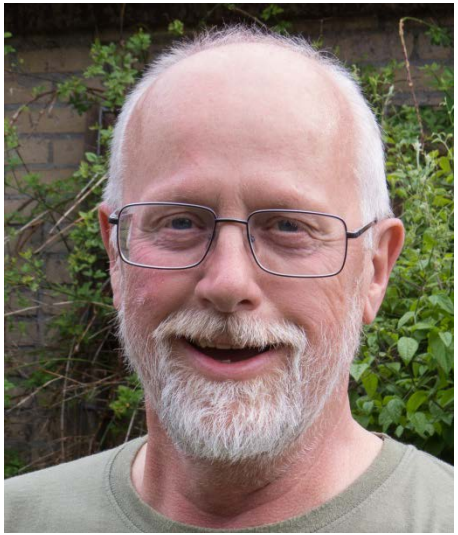
Nets





„A net that fishes where Crabeater Seals, Penguins and Minke Whales feed“

Jan Andries van Franeker

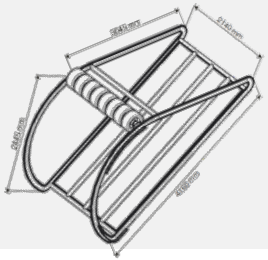


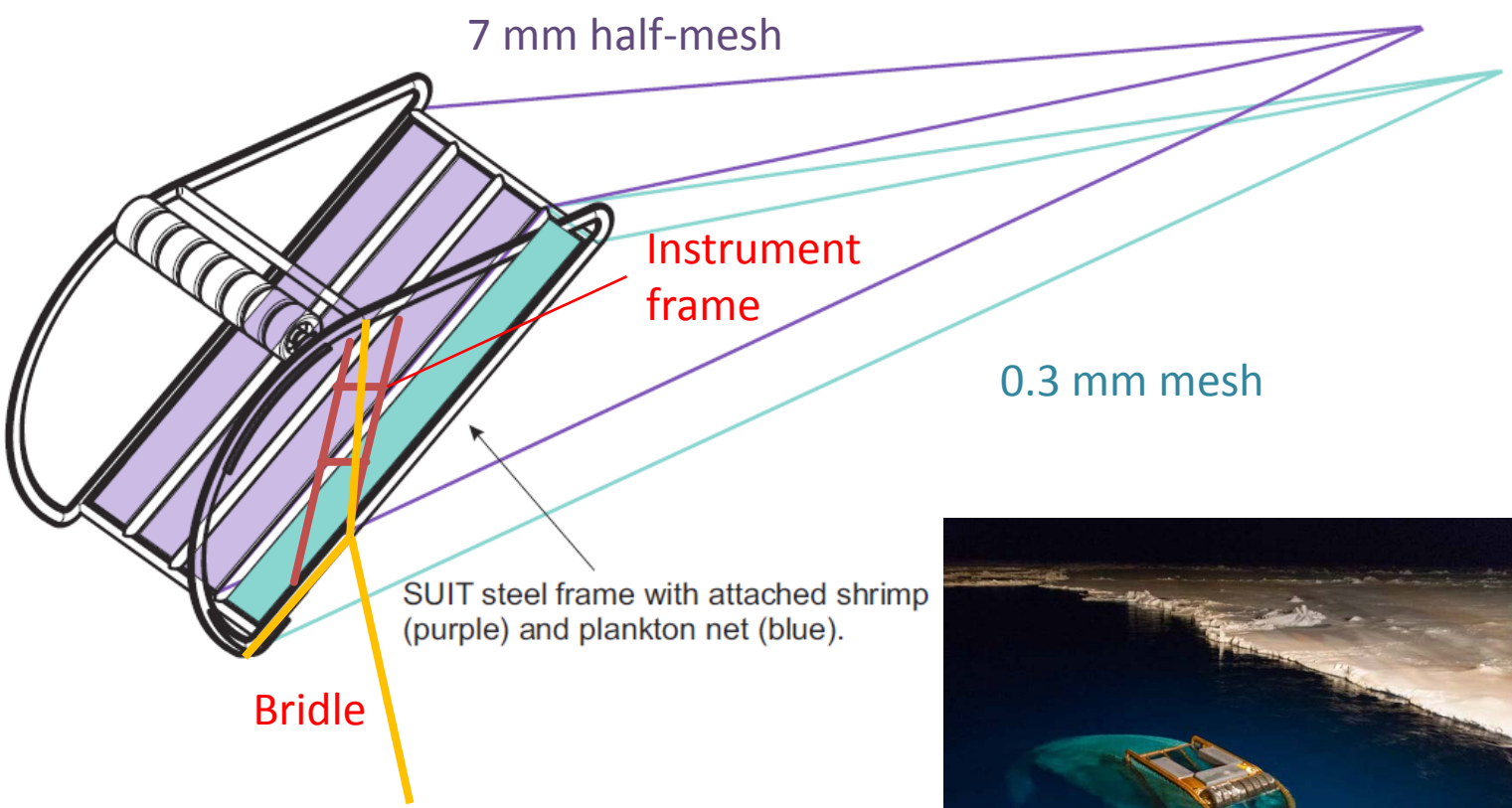
SUIT

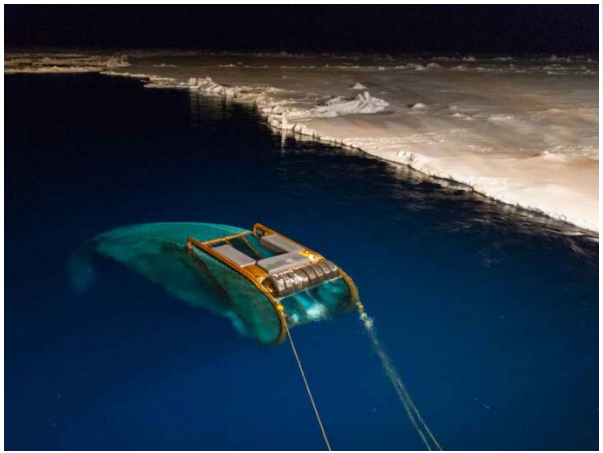
Basic construction

Frame

Nets



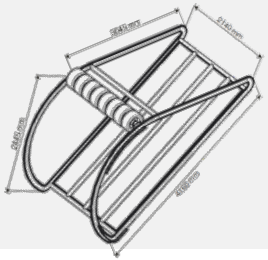


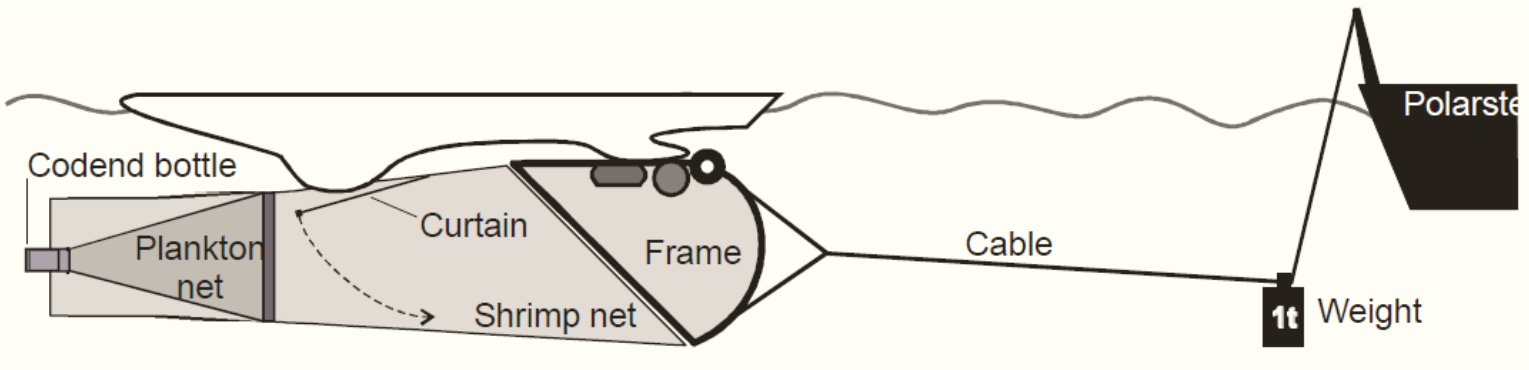


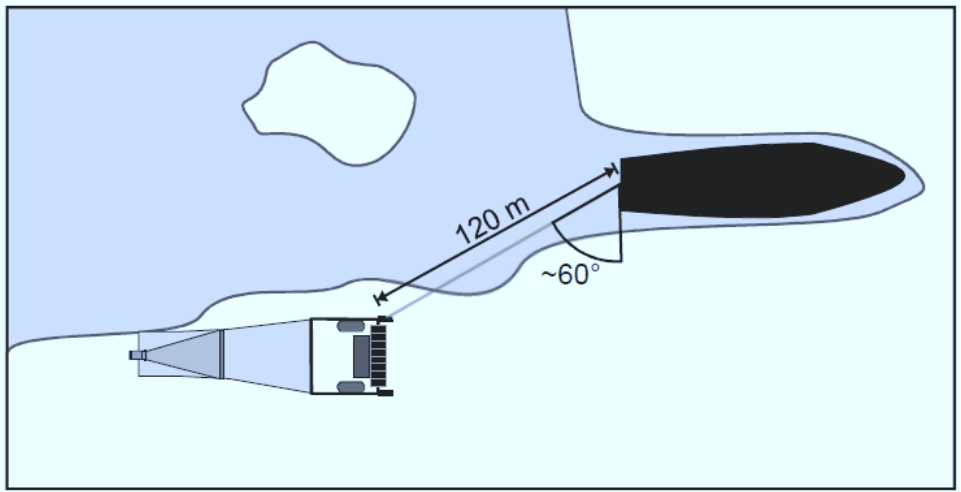
SUIT

Operation

Trawling



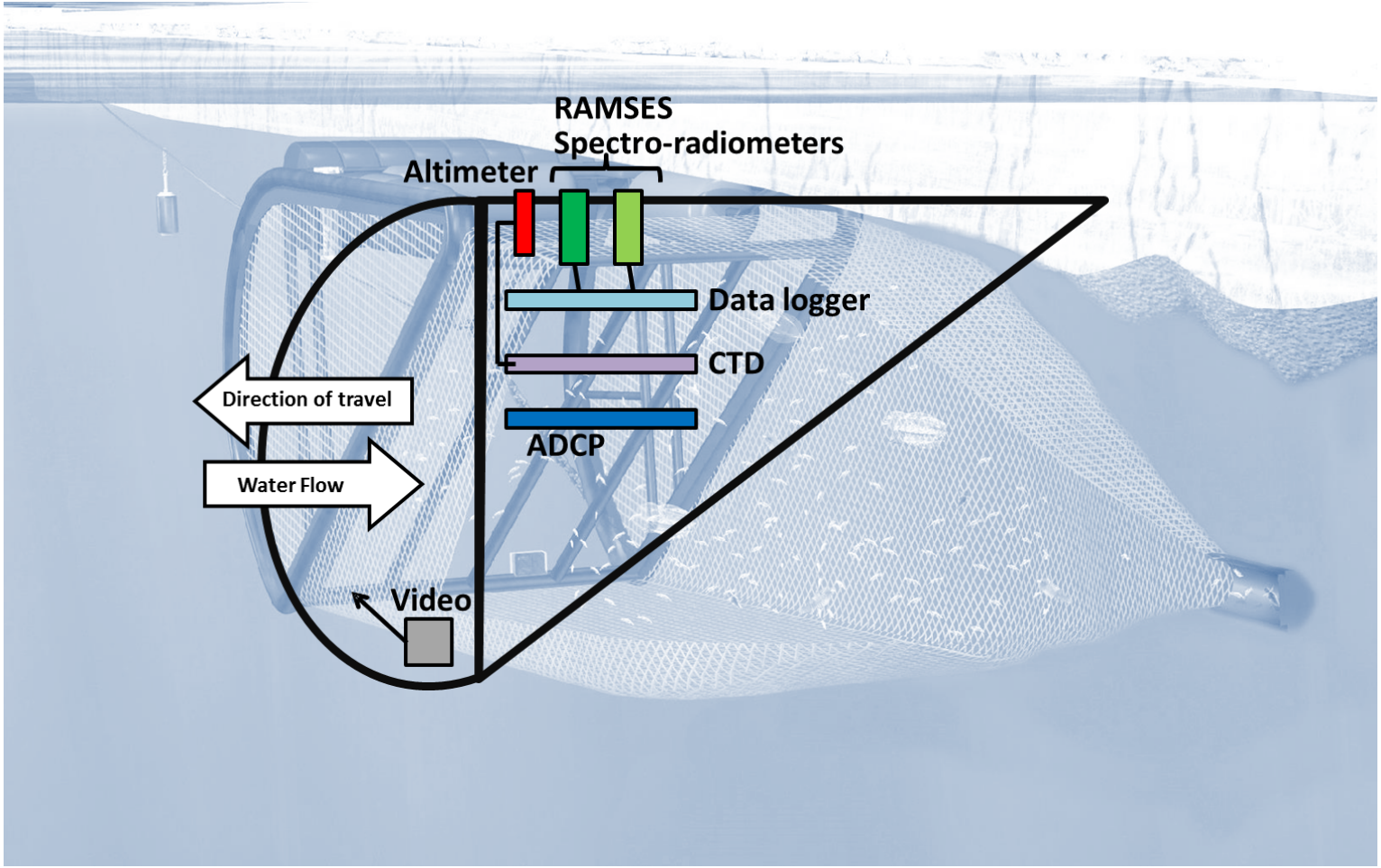


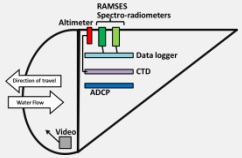


SUIT

Basic construction

Sensor array

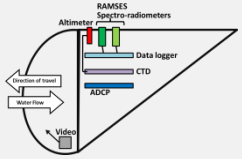




SUIT

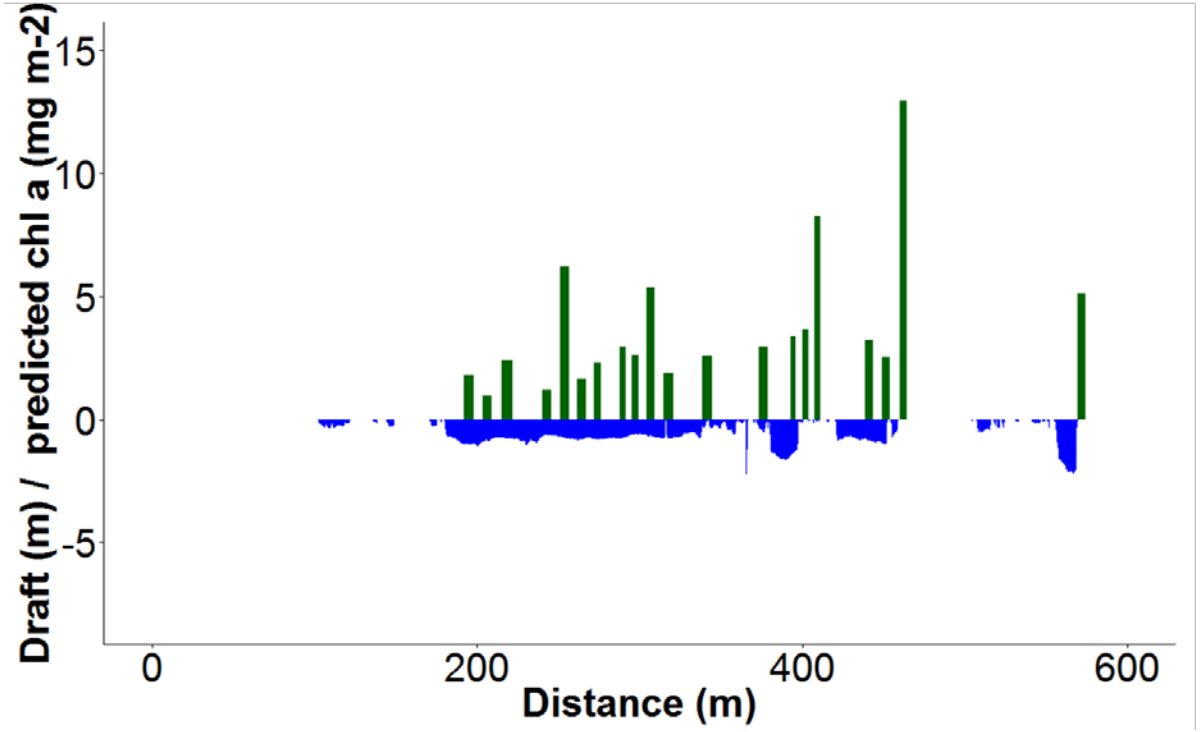
Sensor array

Under-ice profiles



SUIT haul 12 (Stn 345)

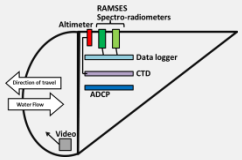
Transmittance EOF-GLM ice-chl *a* model w/ Ice Draft

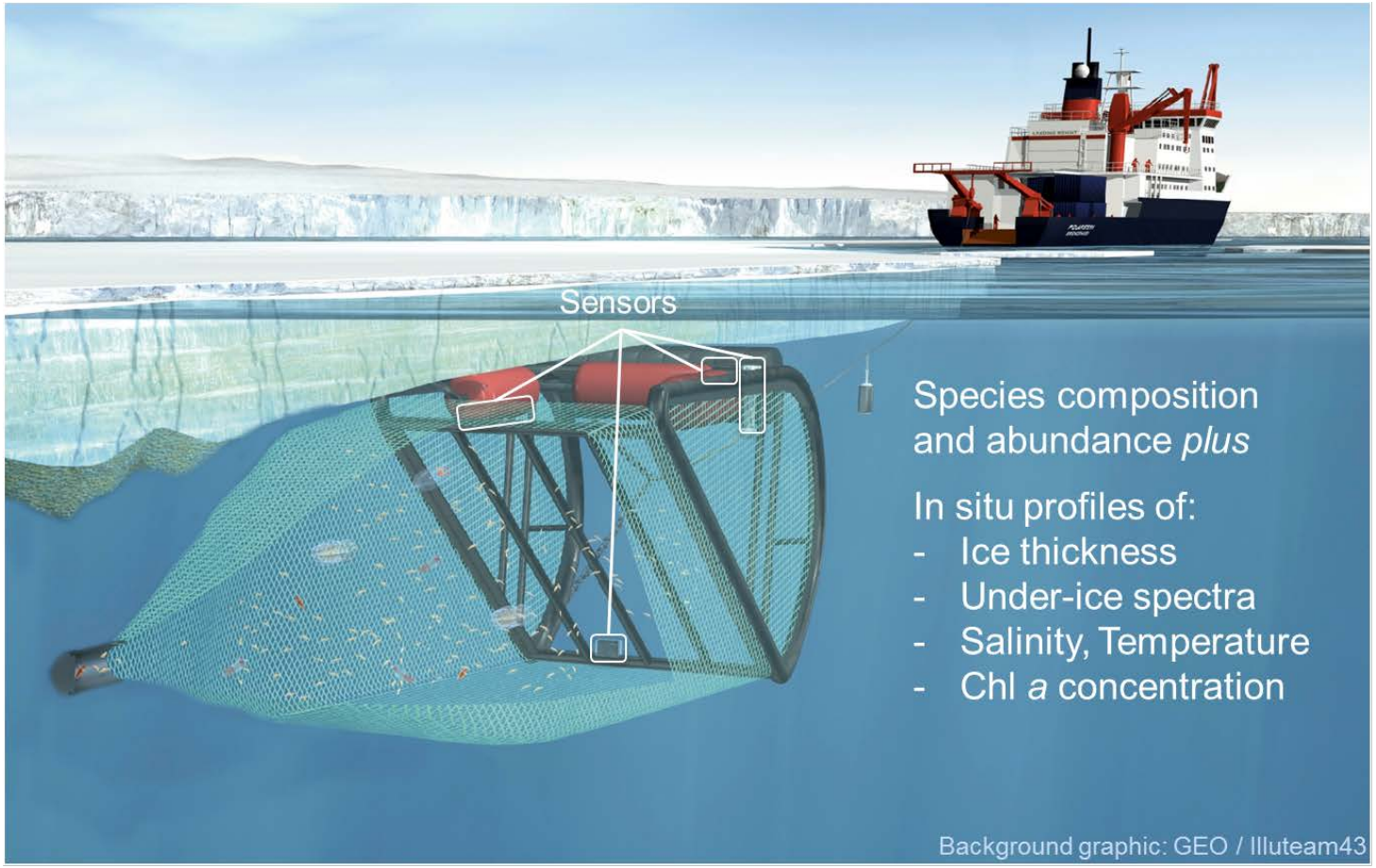


SUIT

Operation

Trawling

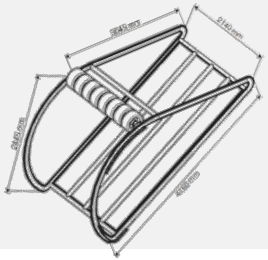




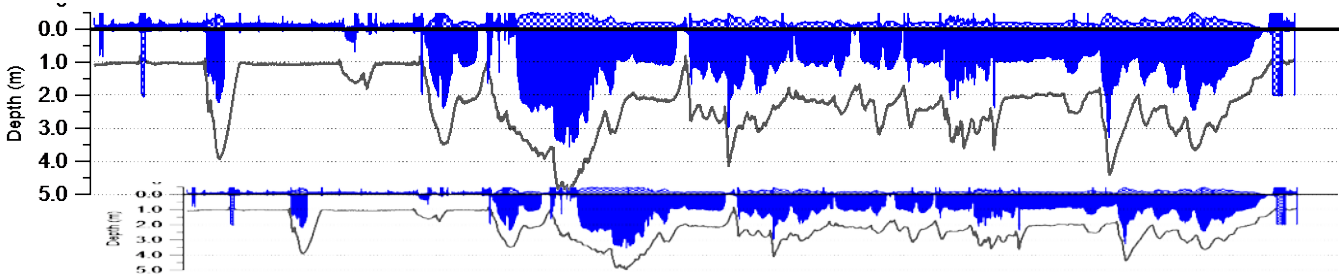
SUIT

Haul

Typical characteristics



Thickness profile

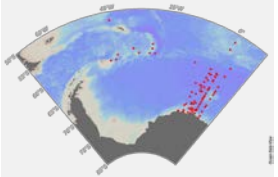


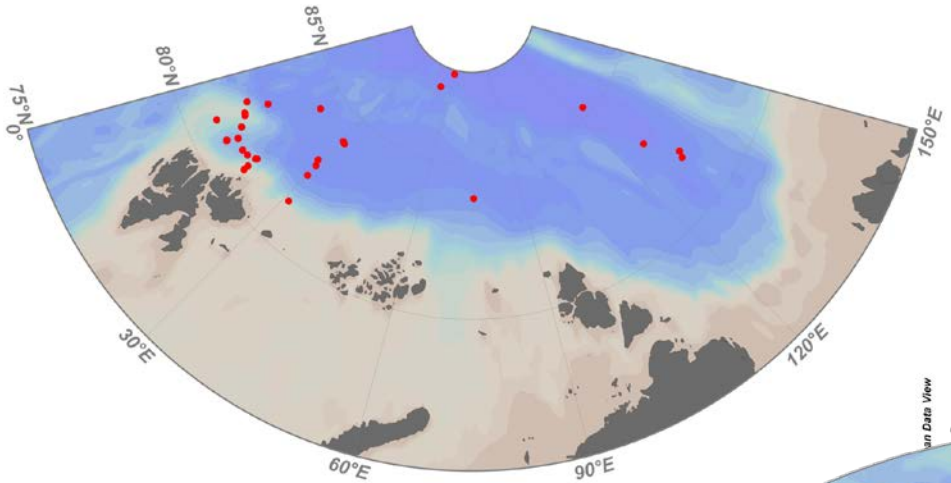
Ship type	Icebreaker (Polarstern: 20,000 hp)
Crew	4+7
Shiptime	1-2 hours
Fishing duration	30 min
Fishing speed	1-2.5 kn
Fishing distance	1-3 nm

SUIT

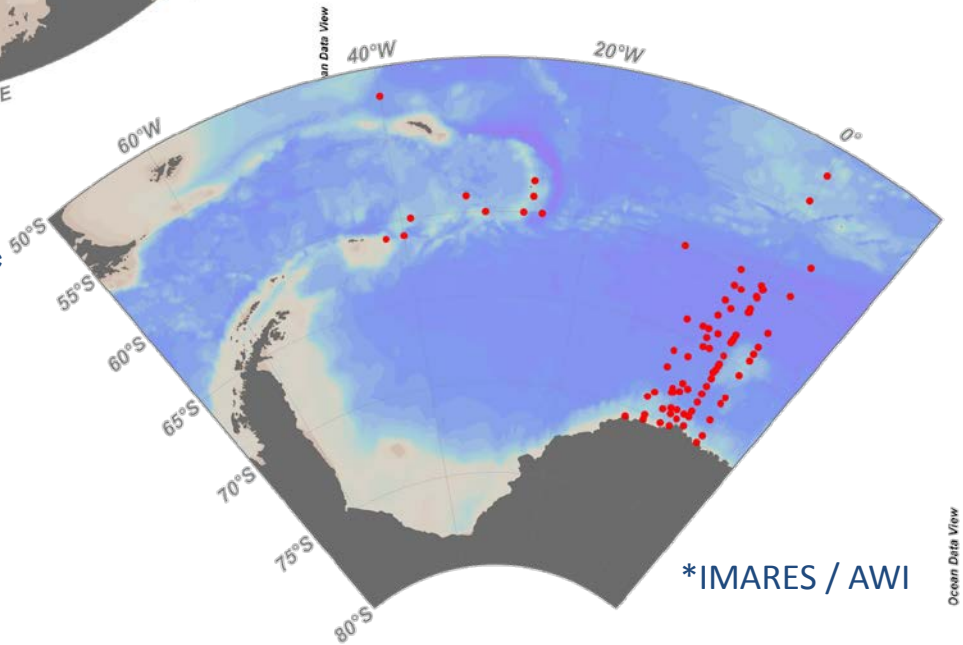
Experience

Global coverage





Arctic SUIT stations*



Antarctic SUIT stations*

Open water	73
Ice	95
Grand Total	168

*IMARES / AWI

Diversity of SUIT catches


Beroe sp.


Calanus glacialis

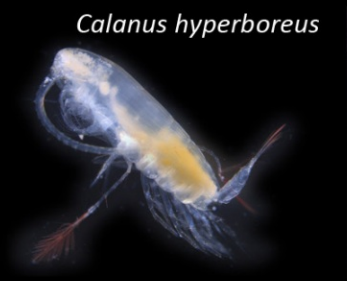

Clione limacina


Gammarus wilkitzkii

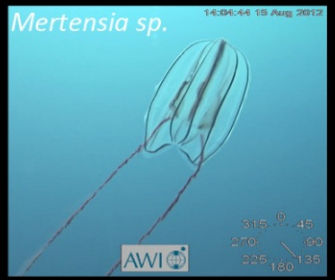

Beroe sp.


Boreogadus saida


Limacina helicina


Calanus hyperboreus


Aethotaxis mitopteryx



Mertensia sp.


Eusirus microps


Clione limacina antarctica


Euphausia superba


Salpa thompsoni


Tomopteris sp.

ARCTIC AND ANTARCTIC UNDER-ICE FAUNA

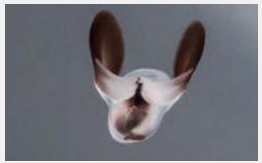
Photos: Carmen David, Christian Katlein, Jan Andries van Franeker, Julia Ehrlich, Hauke Flores

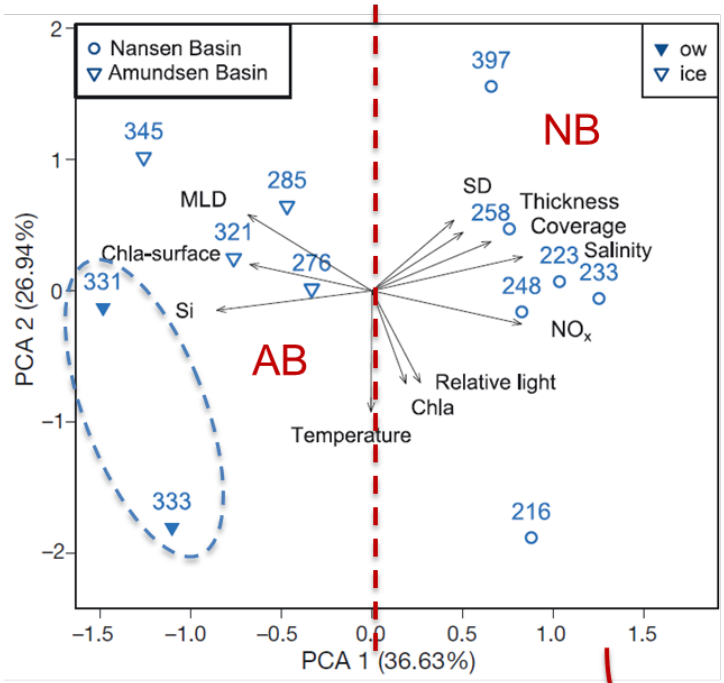
SUIT

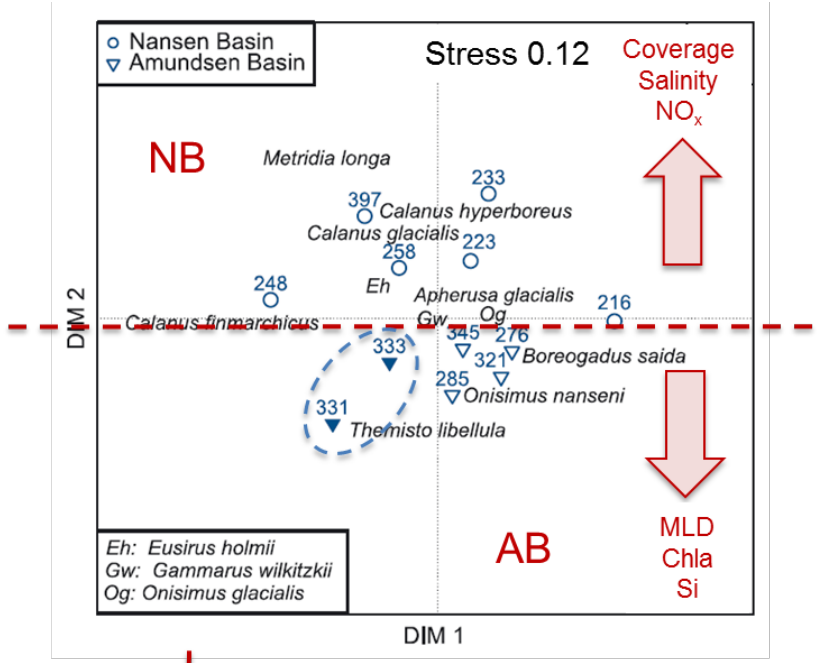
Catch

Arctic under-ice fauna

Community structure & environmental regimes







Mantel test r: 0.65 ($p < 0.001$)

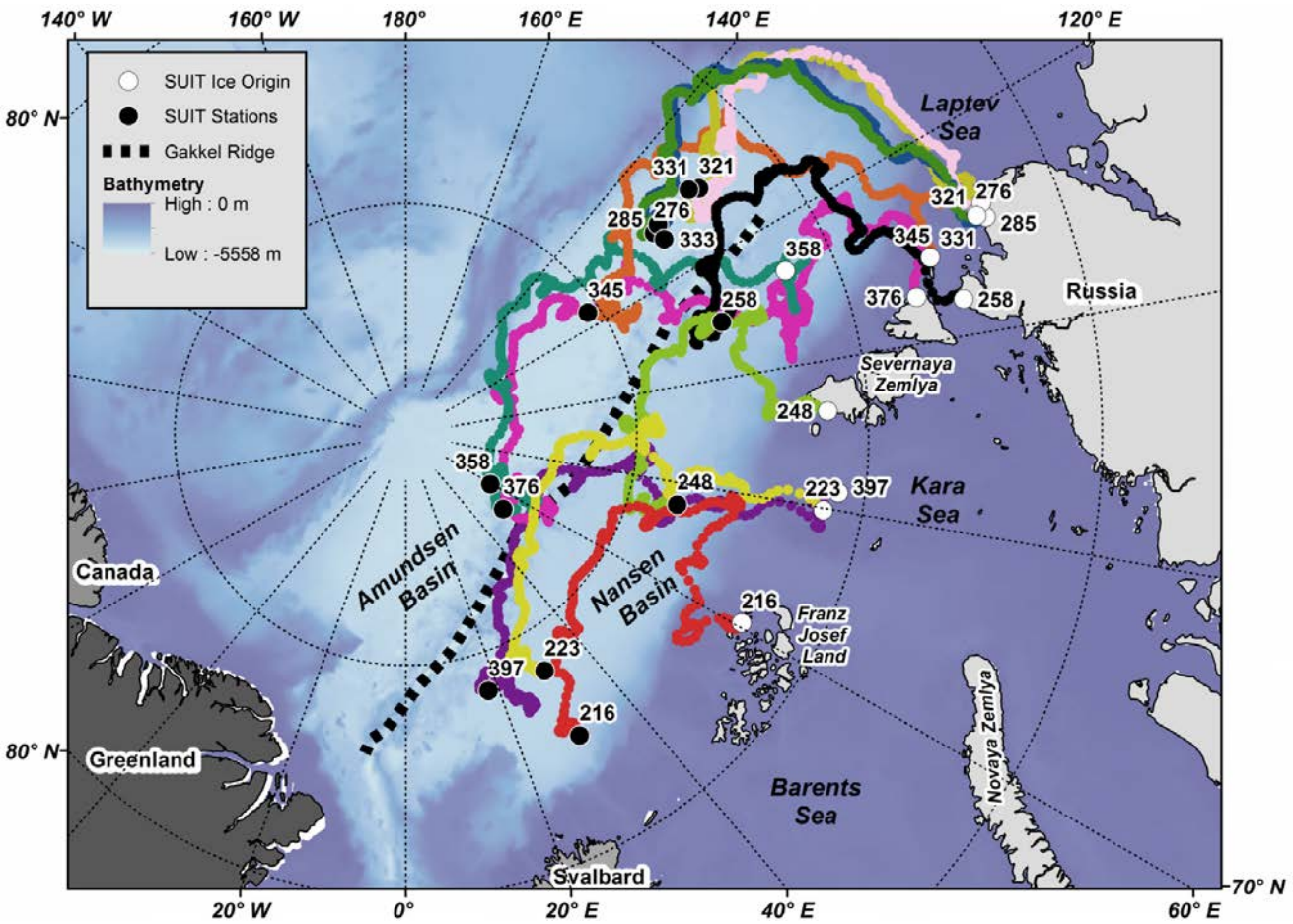
David et al. (2015) *Mar Ecol Prog Ser* 522: 15-32

SUIT

Catch

Polar cod

Sea ice backtracking

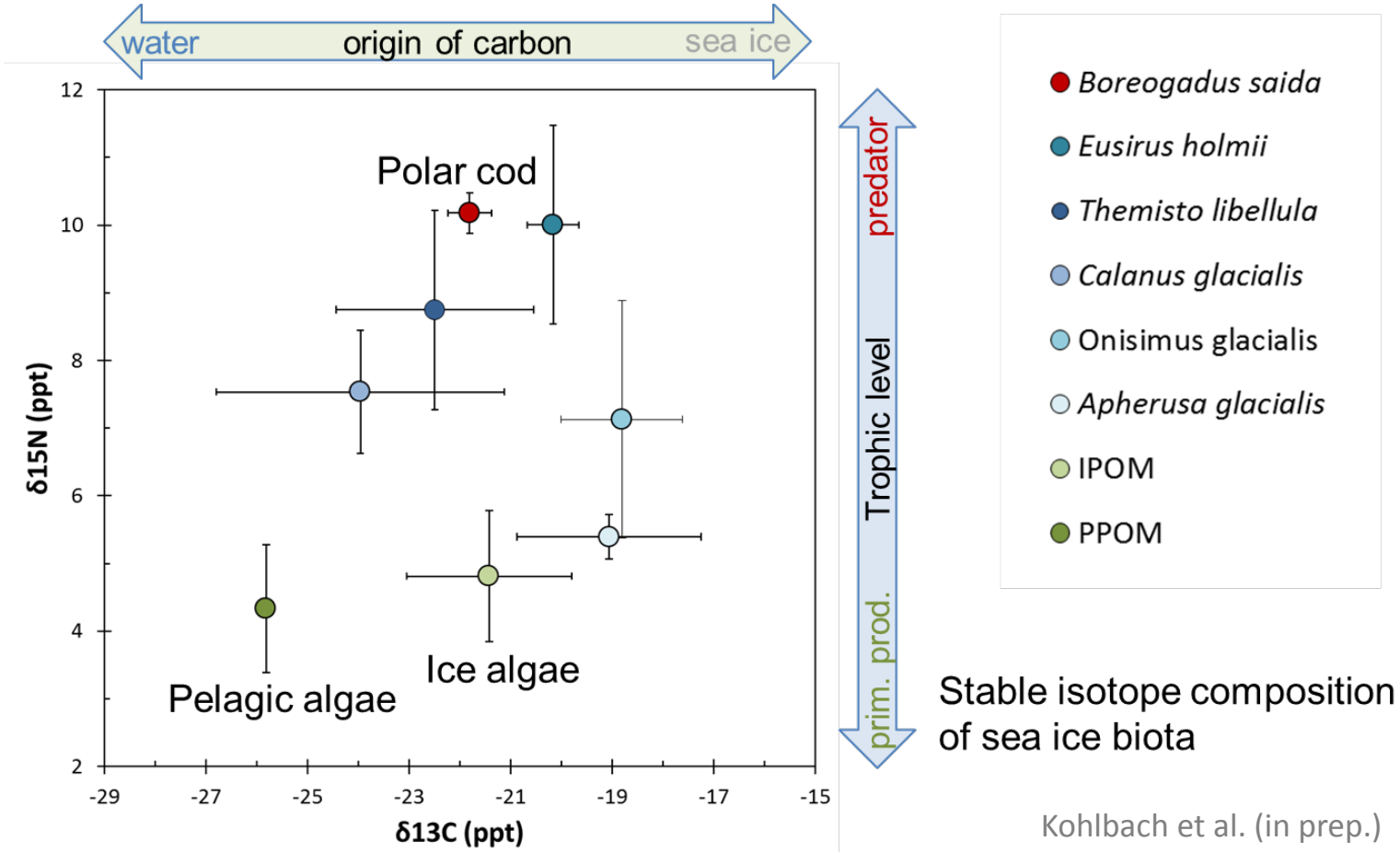


David et al. (2015) *Pol Biol*

SUIT

Catch

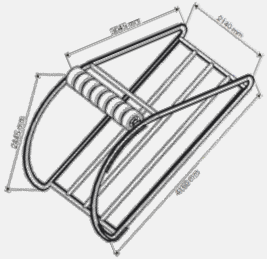
Food web studies

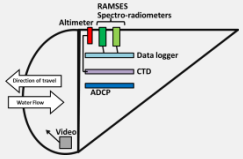


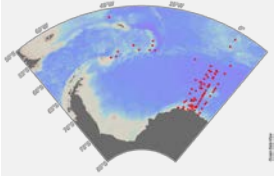
Stable isotope composition of sea ice biota

Kohlbach et al. (in prep.)

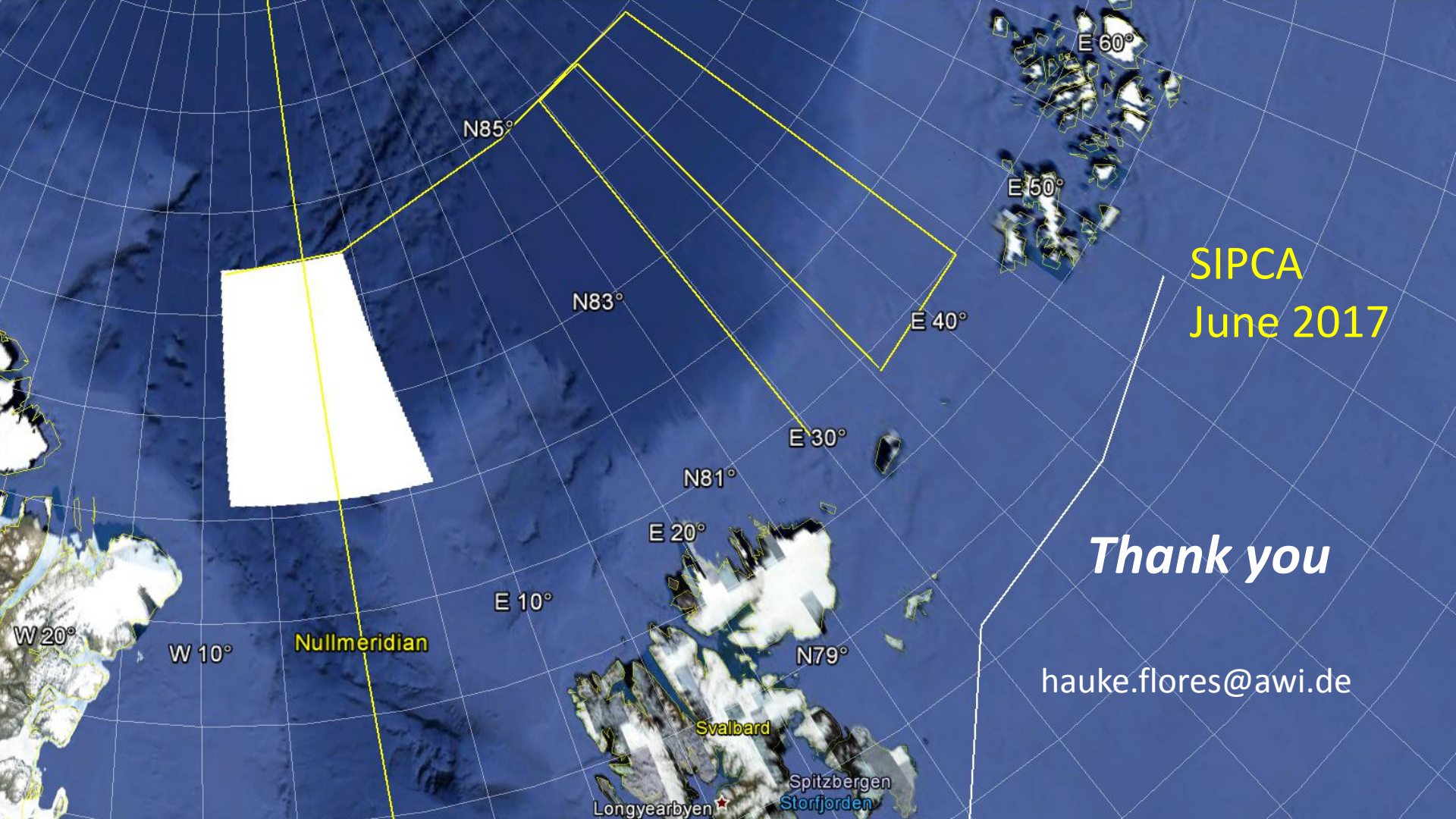
Conclusions







- SUIT is a **proven tool** to sample under-ice fauna
- SUIT data brought a **new perspective** on the role of the surface / under ice habitat in the pelagic system
- A **sensor array** extents SUIT to a bio-physical profiler
- Its strength is the capabaility of synoptic sampling at **large spatial scales**
- SUIT is not a CTD: Careful **cost-benefit assessments** are necessary when planning to use SUIT
- SUIT **inspires** other under-ice applications (e.g. Triaxus, MicroNESS, microplastics ...)


E 60°
N85°
E 50°
SIPCA
June 2017
N83°
E 40°
E 30°
N81°
E 20°
Thank you
E 10°
W 20°
W 10°
Nullmeridian
N79°
hauke.flores@awi.de
Svalbard
Spitzbergen
Storfjorden
Longyearbyen