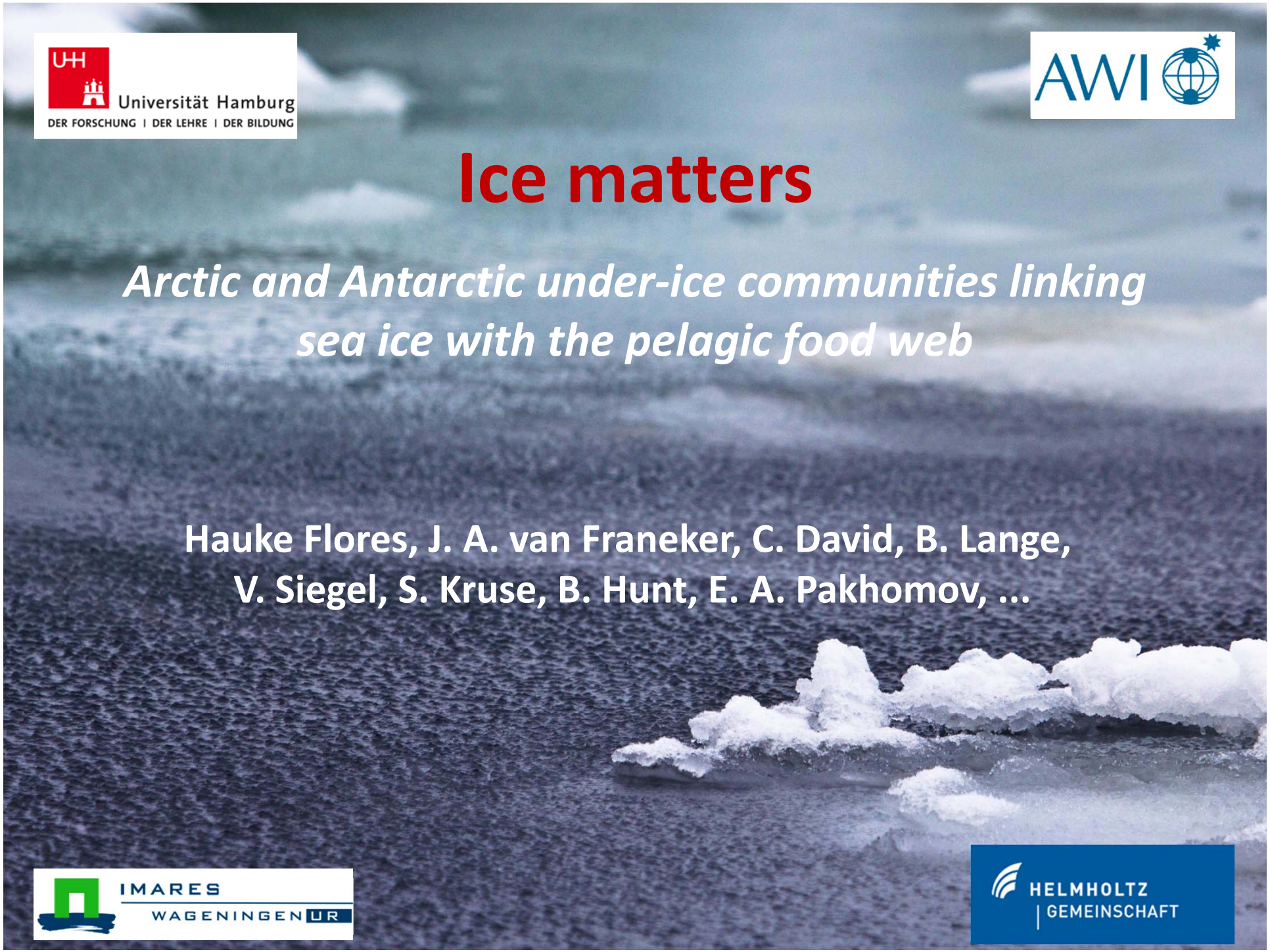
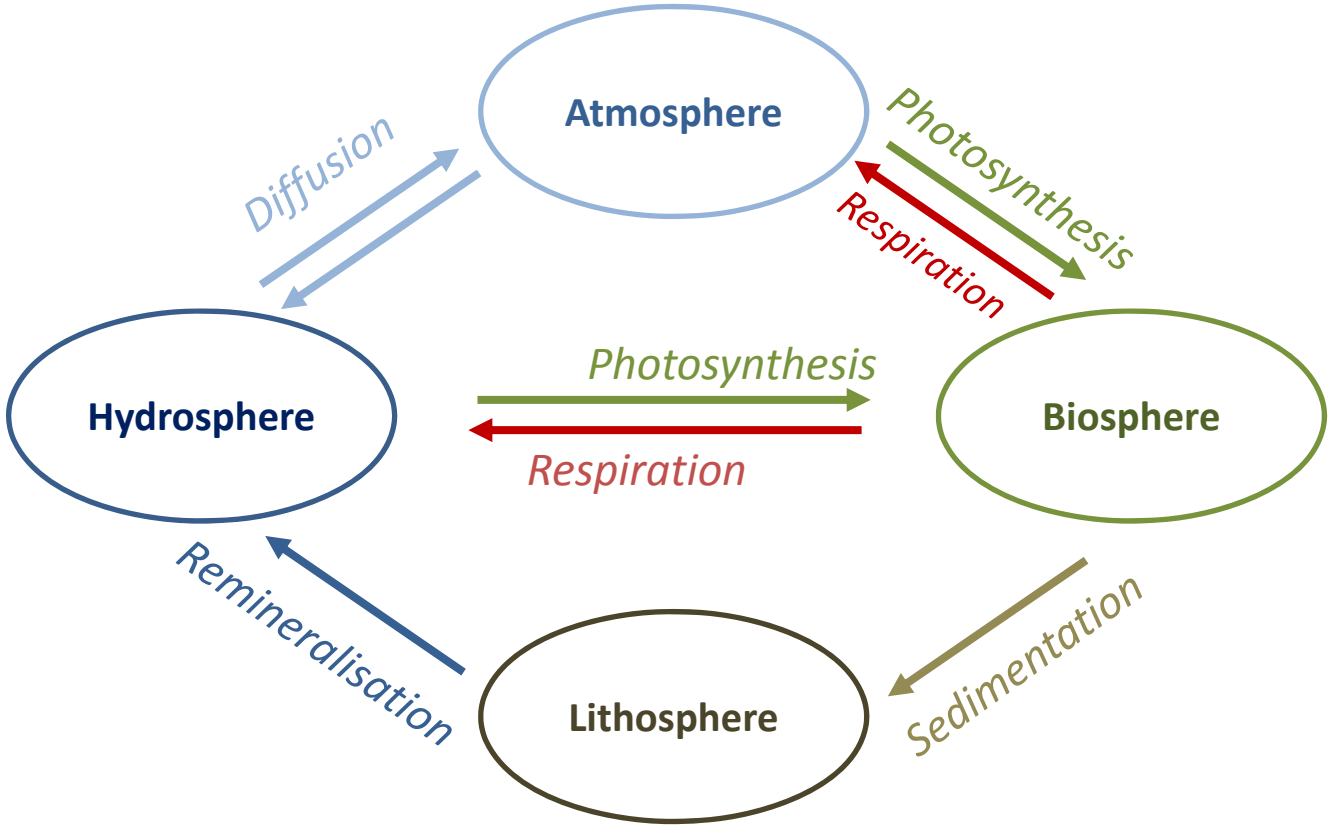

Universität Hamburg
DER FORSCHUNG | DER LEHRE | DER BILDUNG
AWI
Ice matters
Arctic and Antarctic under-ice communities linking sea ice with the pelagic food web
Hauke Flores, J. A. van Franeker, C. David, B. Lange,
V. Siegel, S. Kruse, B. Hunt, E. A. Pakhomov, ...
IMARES
WAGENINGEN UR
HELMHOLTZ
GEMEINSCHAFT

Outline

1. Introduction
2. The sea ice – food web link
   a) Lessons from the Antarctic ice underside
   b) First insights from a field study in the Arctic
3. Ideas on future European research

Biogeochemical cycling in Polar ecosystems

How will change affect the structure and function of polar ecosystems and biogeochemical cycles?



Biogeochemical cycling in Polar ecosystems

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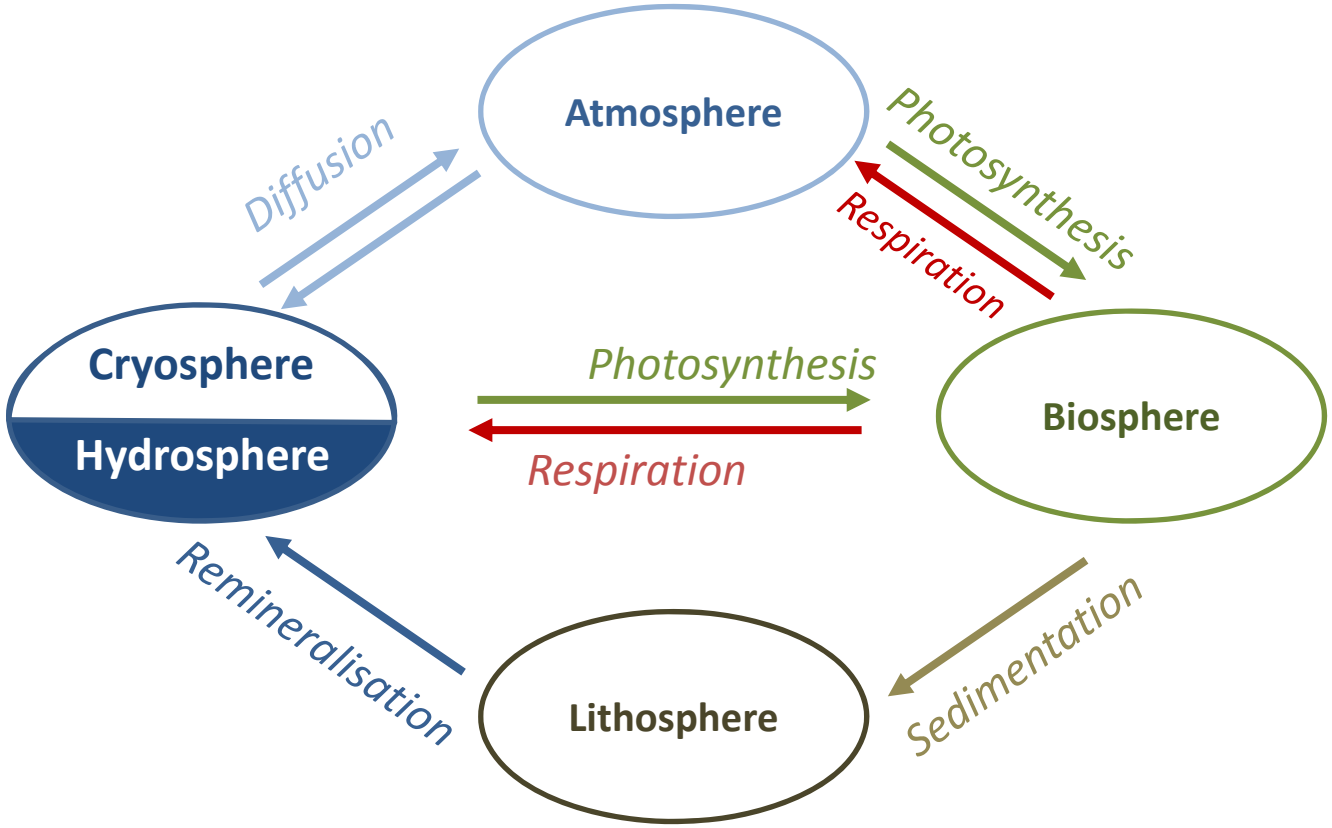
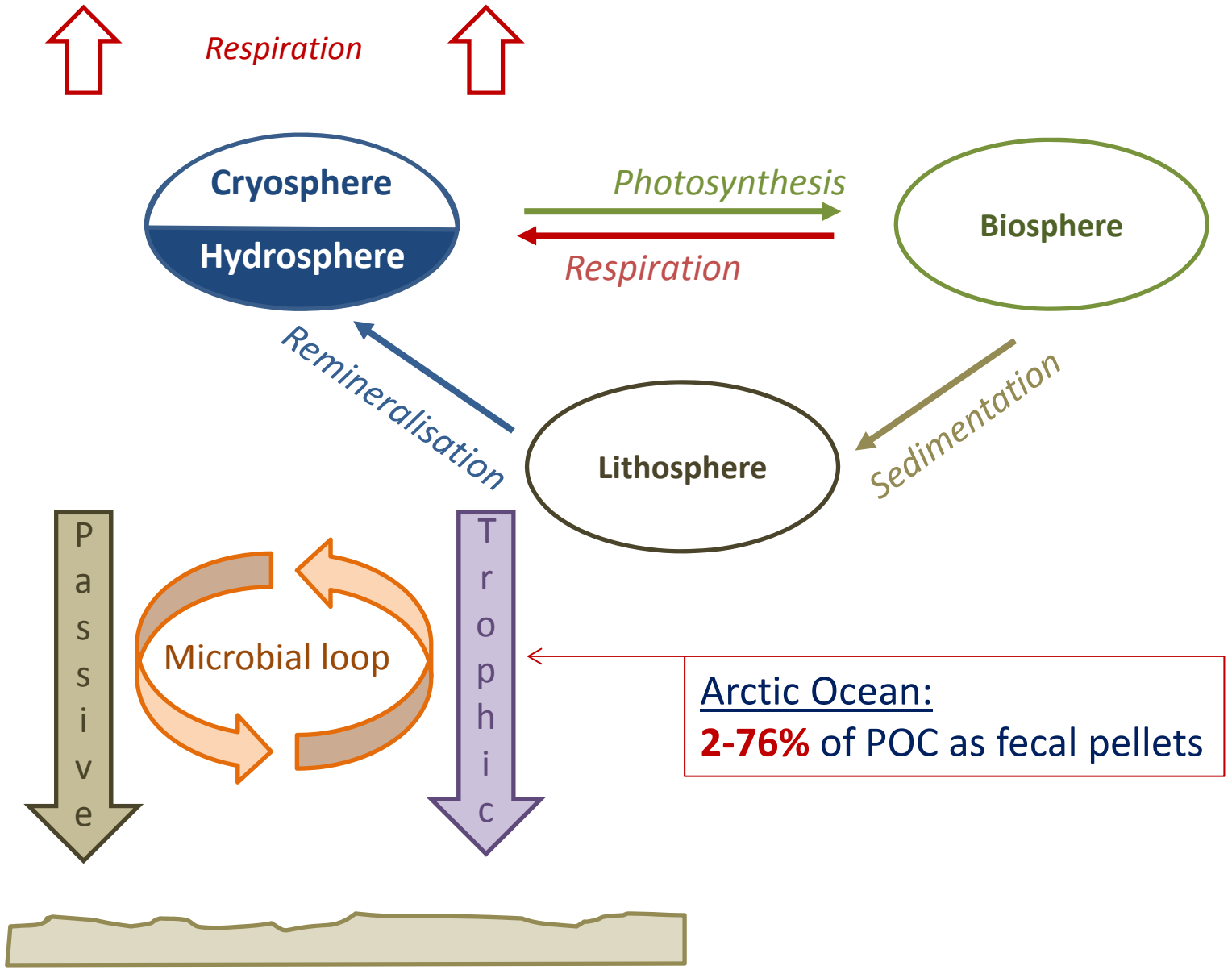
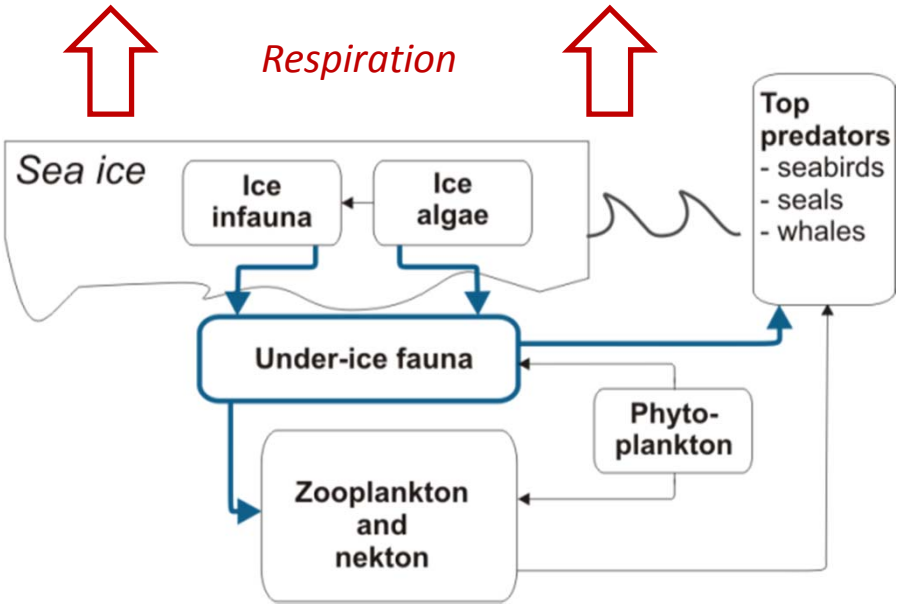
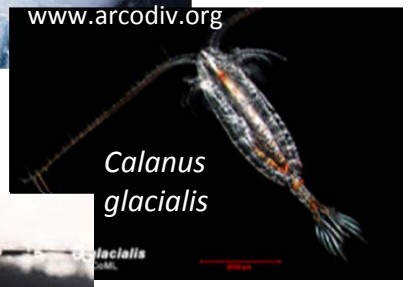


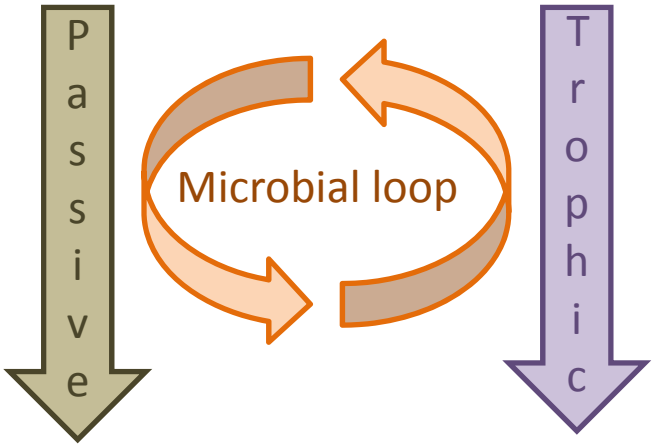
Sea ice – food web transition

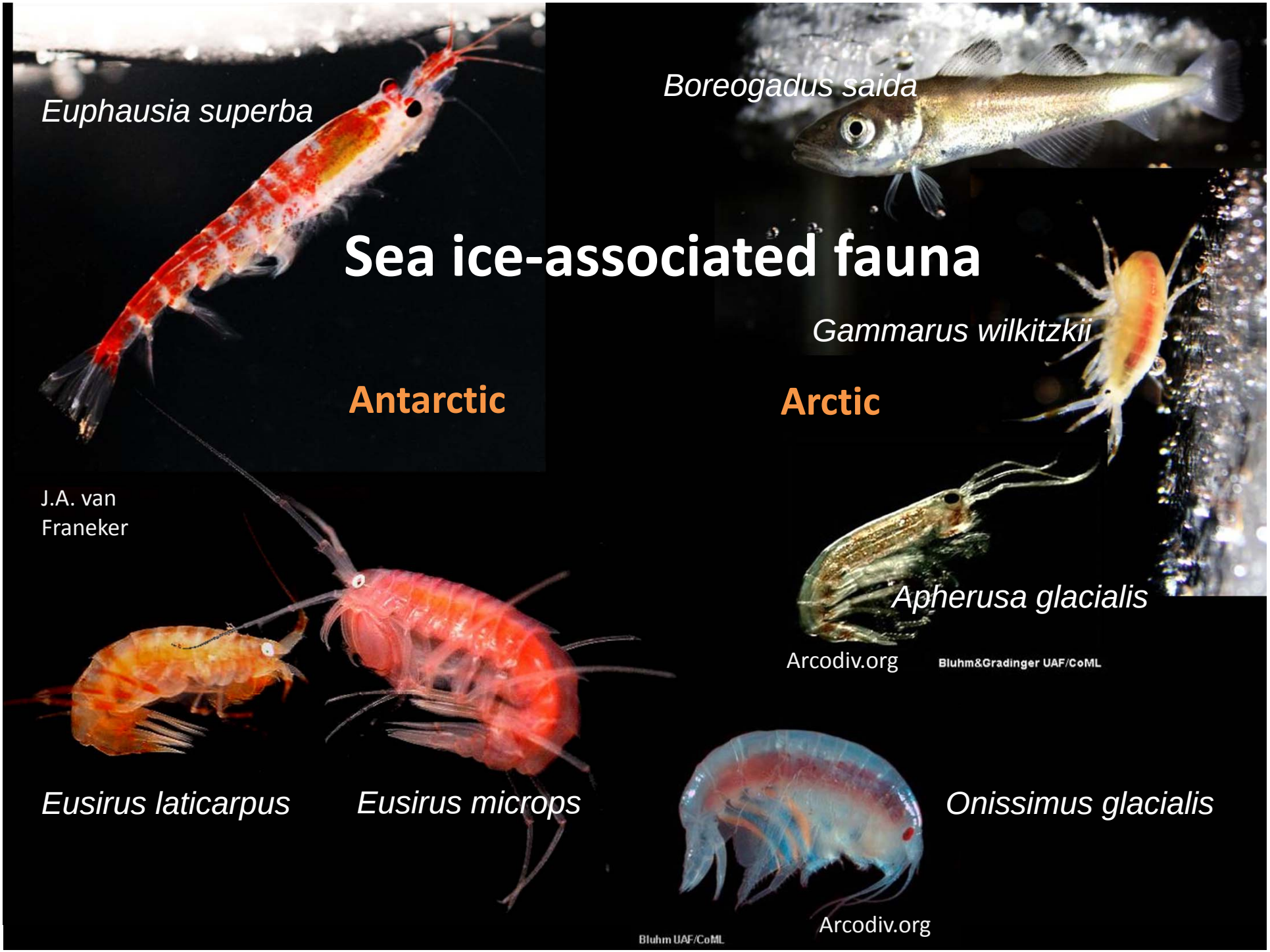


Sea ice – food web transition

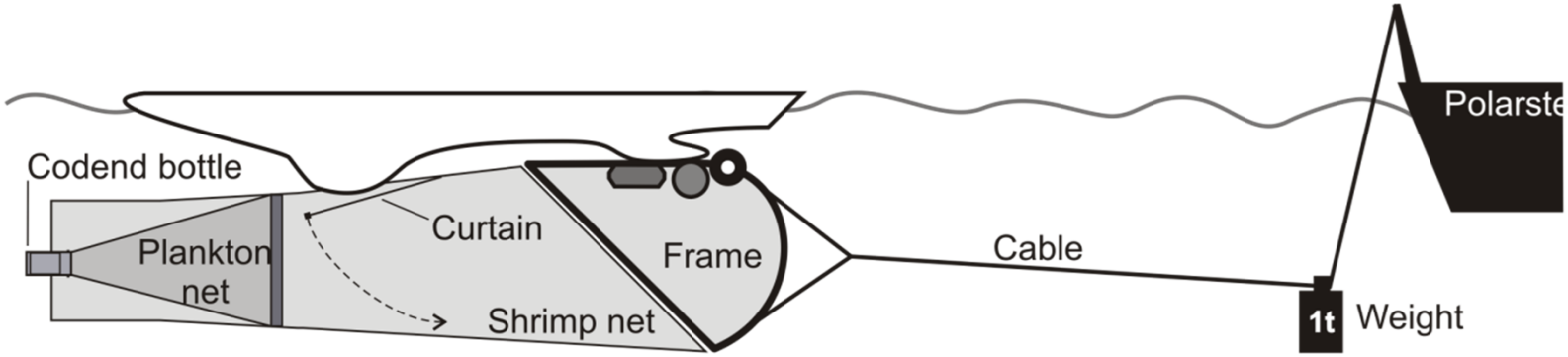


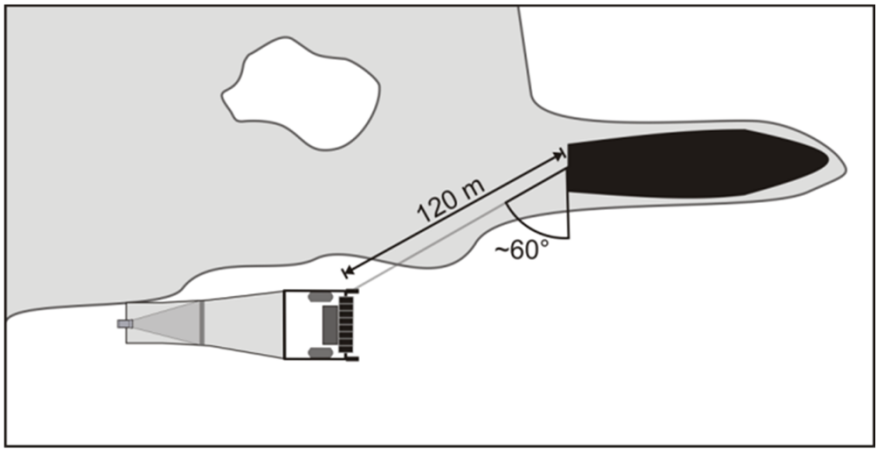




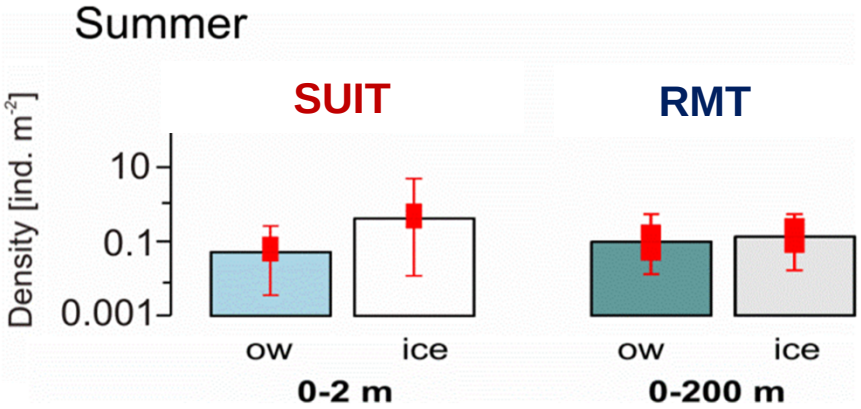

Euphausia superba
Boreogadus saida
Sea ice-associated fauna
Gammarus wilkitzkii
Antarctic
Arctic
J.A. van Franeker
Apherusa glacialis
Arcodiv.org
Bluhm&Gradinger UAF/CoML
Eusirus laticarpus
Eusirus microps
Onissimus glacialis
Arcodiv.org
Bluhm UAF/CoML

The Surface and Under-Ice Trawl (SUIT)

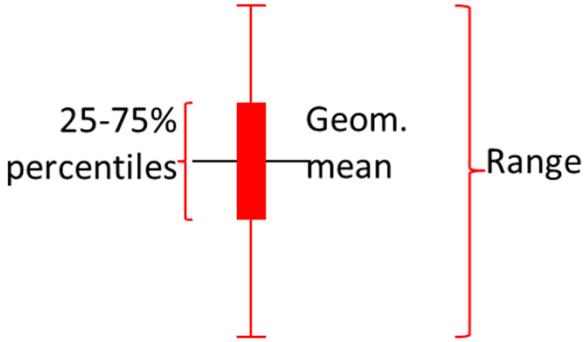


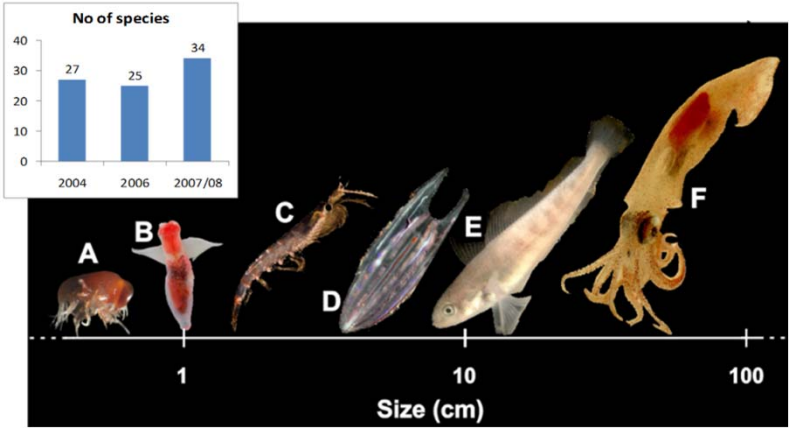


Sea ice - an attractive habitat



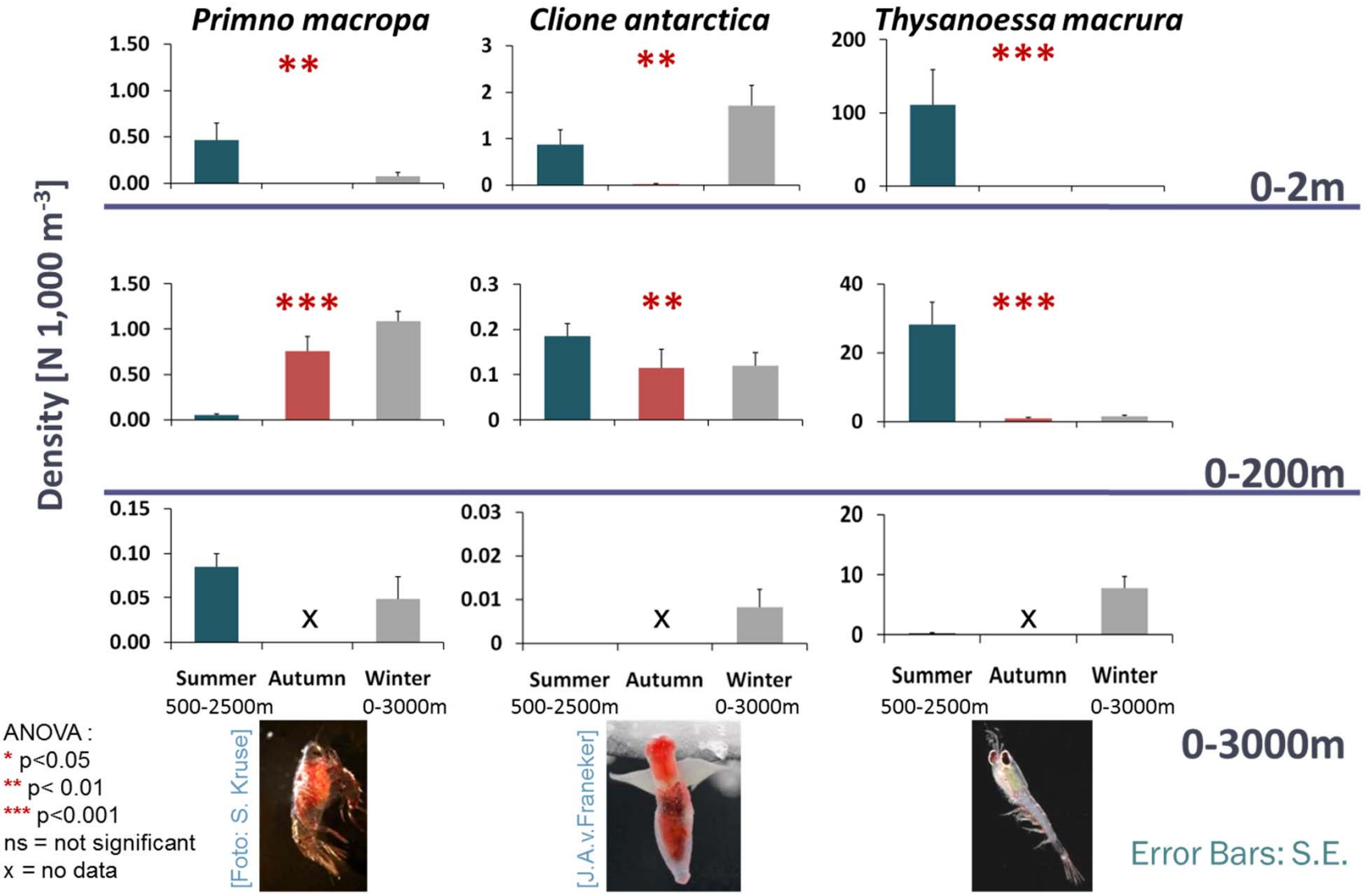
Antarctic krill



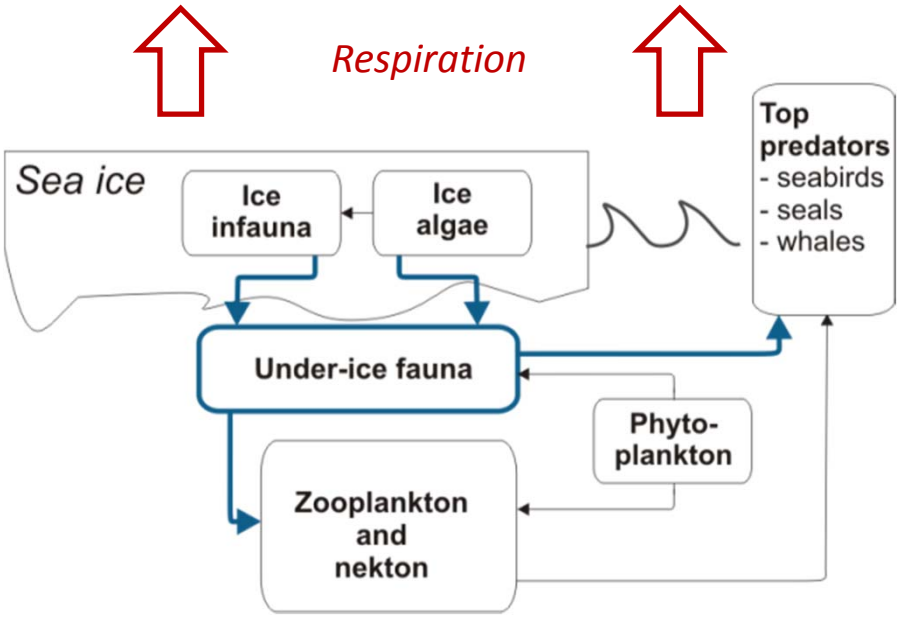


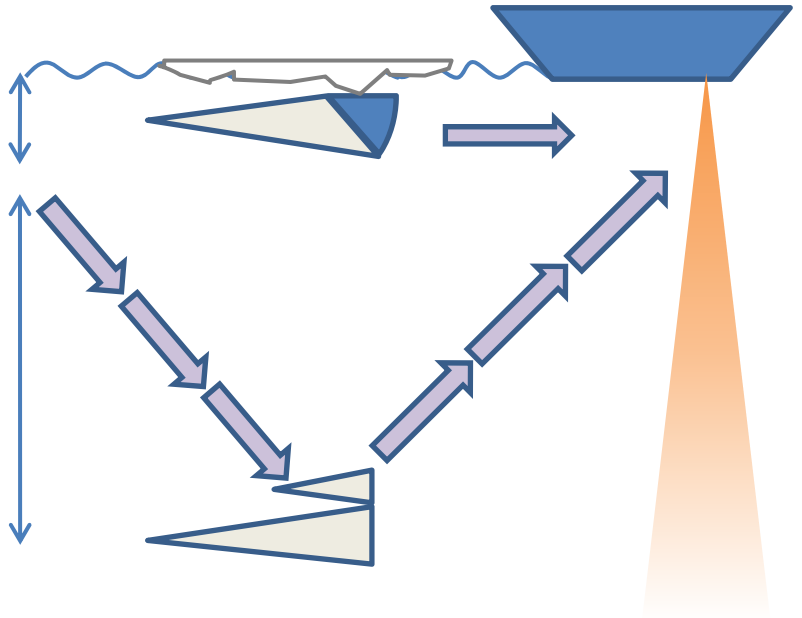
Flores et al. (2012) PLoS ONE

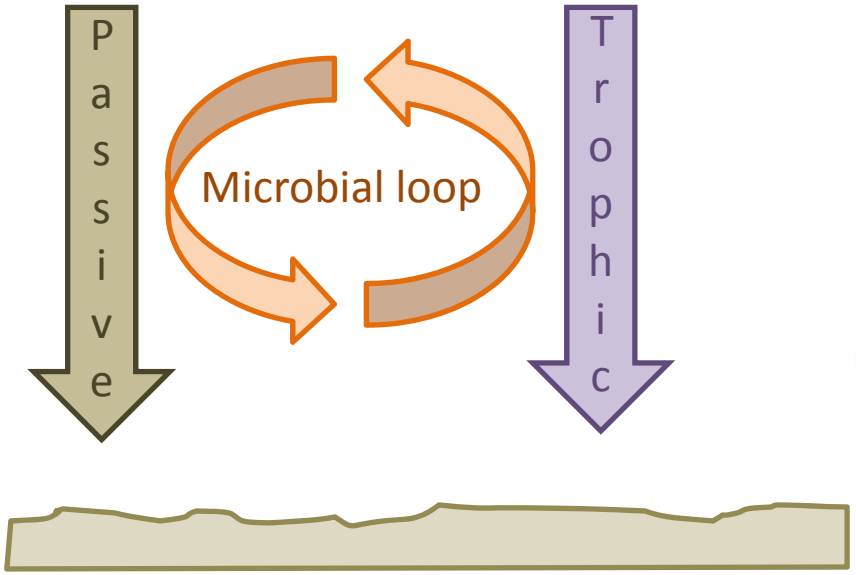
Sea ice – and seasonal depth distribution

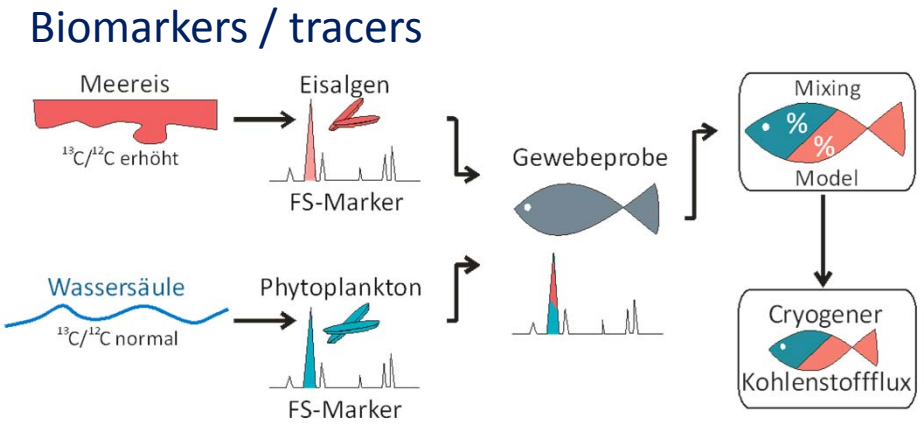


How design?

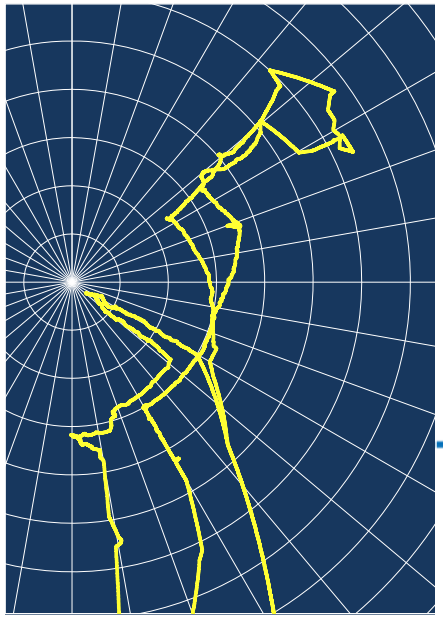

Respiration
Sea ice
Ice infauna
Ice algae
Top predators
- seabirds
- seals
- whales
Under-ice fauna
Phyto-plankton
Zooplankton and nekton

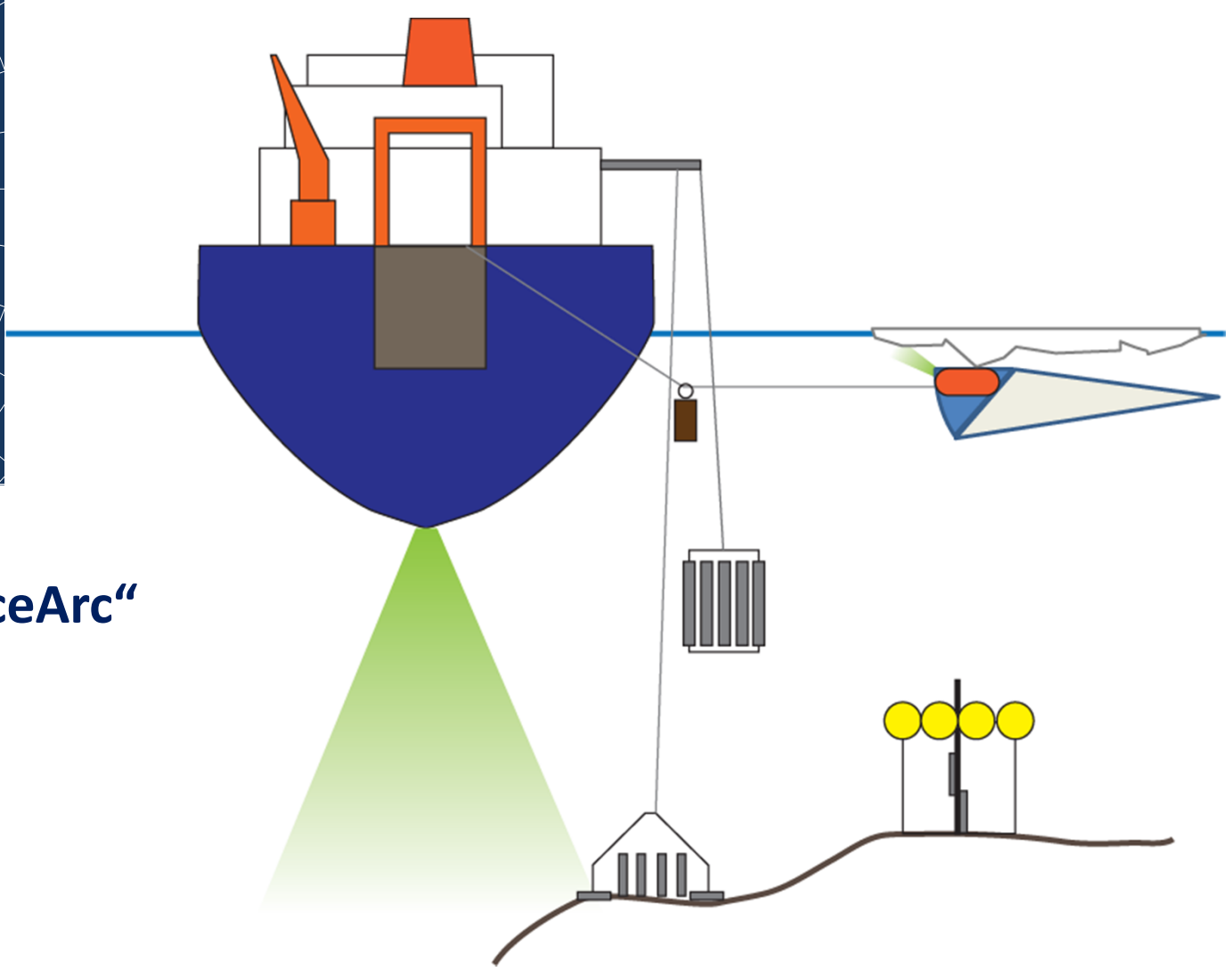



Passive
Microbial loop
Trophic


Biomarkers / tracers
Meereis
$^{13}C/^{12}C$ erhöht
Eisalgen
FS-Marker
Gewebeprobe
Mixing
%
%
Model
Wassersäule
$^{13}C/^{12}C$ normal
Phytoplankton
FS-Marker
Cryogener
Kohlenstoffflux

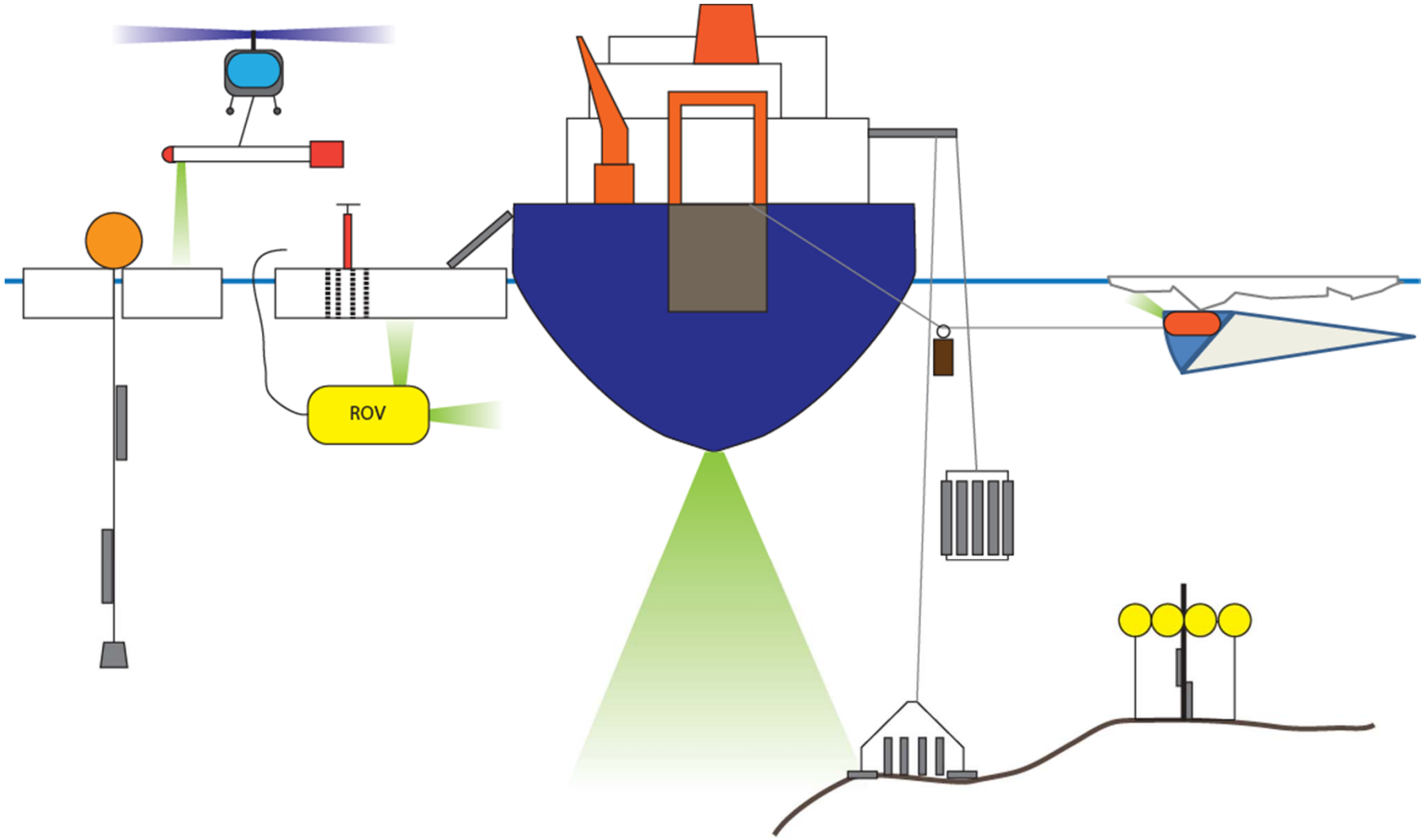
Multi-disciplinary surveys



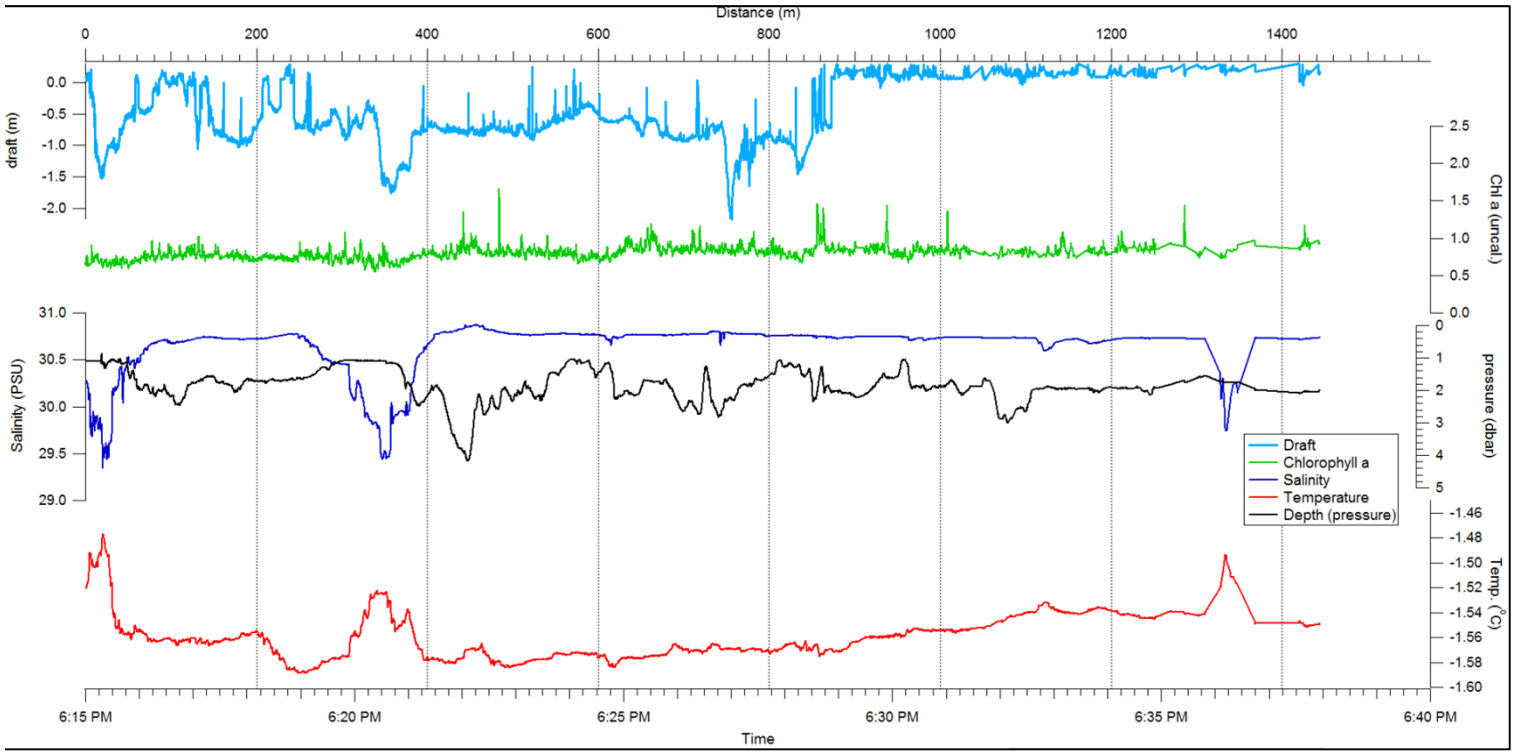


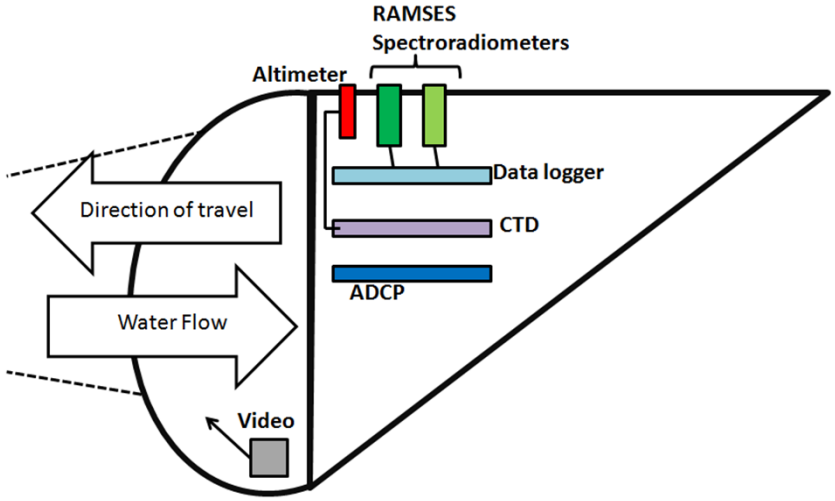
ARK XXVII/3 “IceArc“

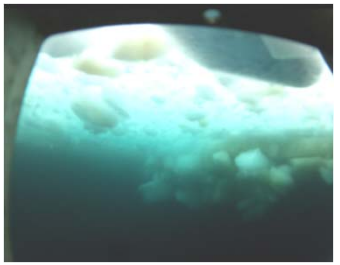
Multi-disciplinary surveys

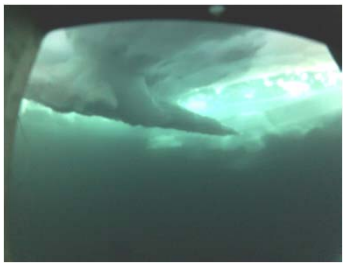


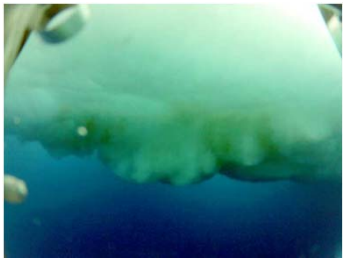
Linking data



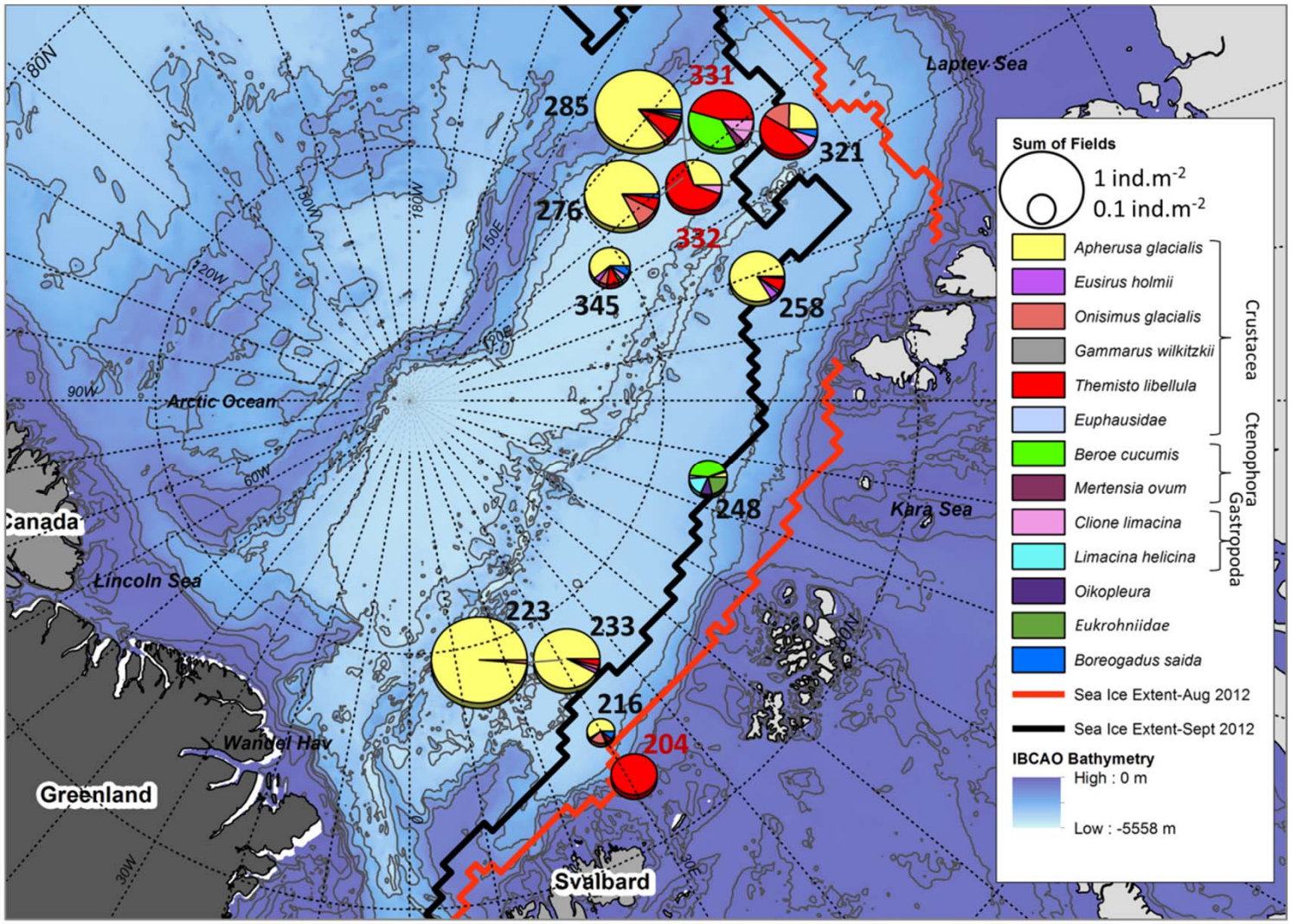






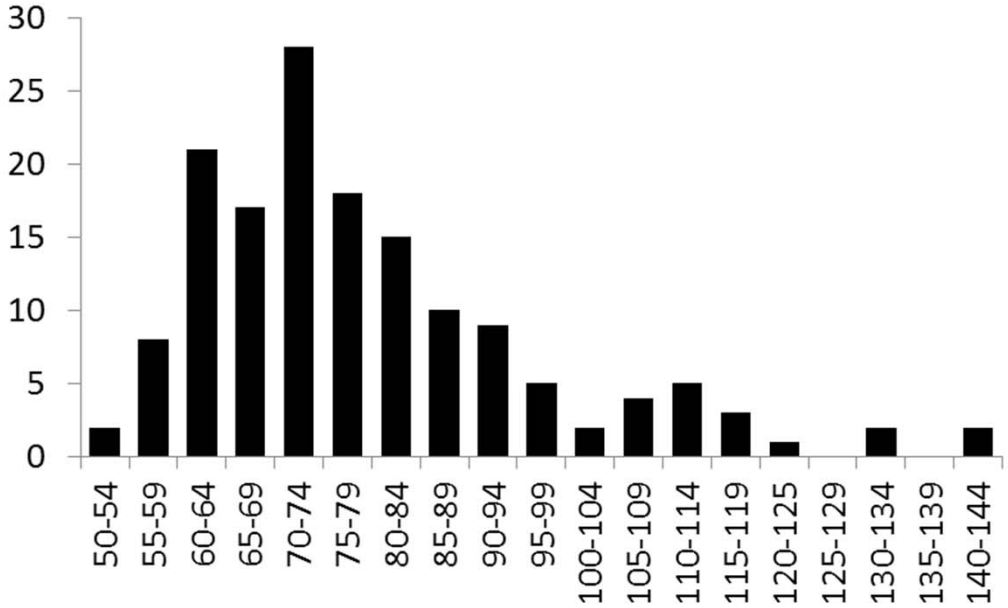


First glimpse at Arctic under-ice communities

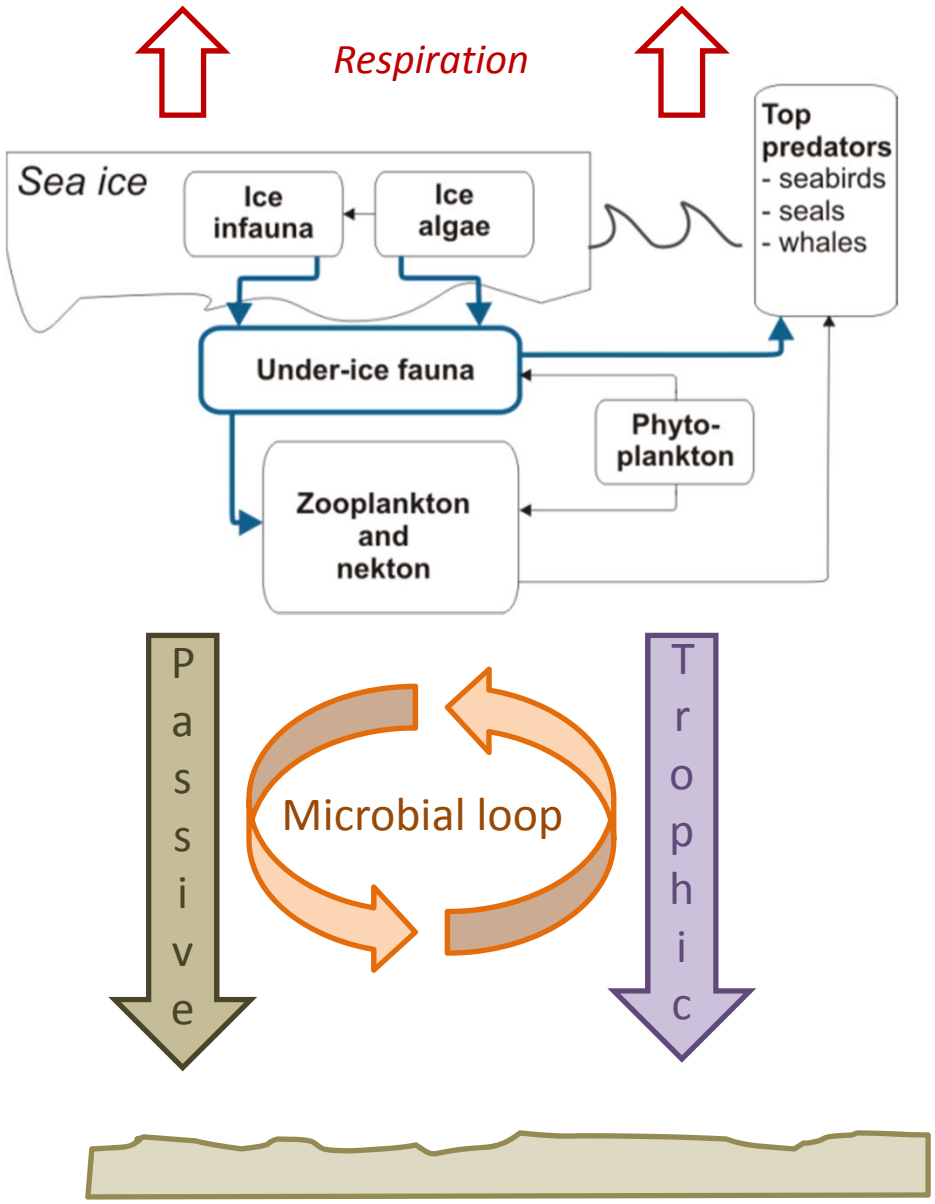


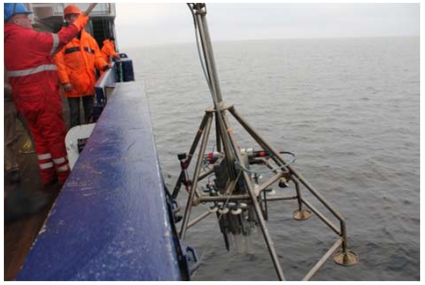
Species composition at the first 12 SUIT hauls during ARK XXVII/3.

Polar cod

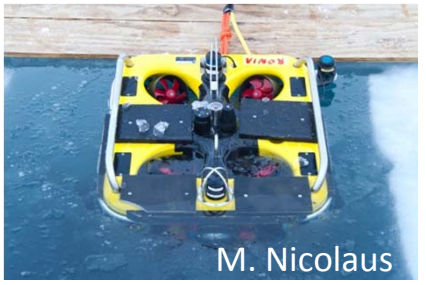

30
25
20
15
10
5
0
50-54
55-59
60-64
65-69
70-74
75-79
80-84
85-89
90-94
95-99
100-104
105-109
110-114
115-119
120-125
125-129
130-134
135-139
140-144

Pre-design!


Respiration
Sea ice
Ice infauna
Ice algae
Top predators
- seabirds
- seals
- whales
Under-ice fauna
Phyto-plankton
Zooplankton and nekton
Passive
Microbial loop
Trophic




S. Hendricks


M. Nicolaus

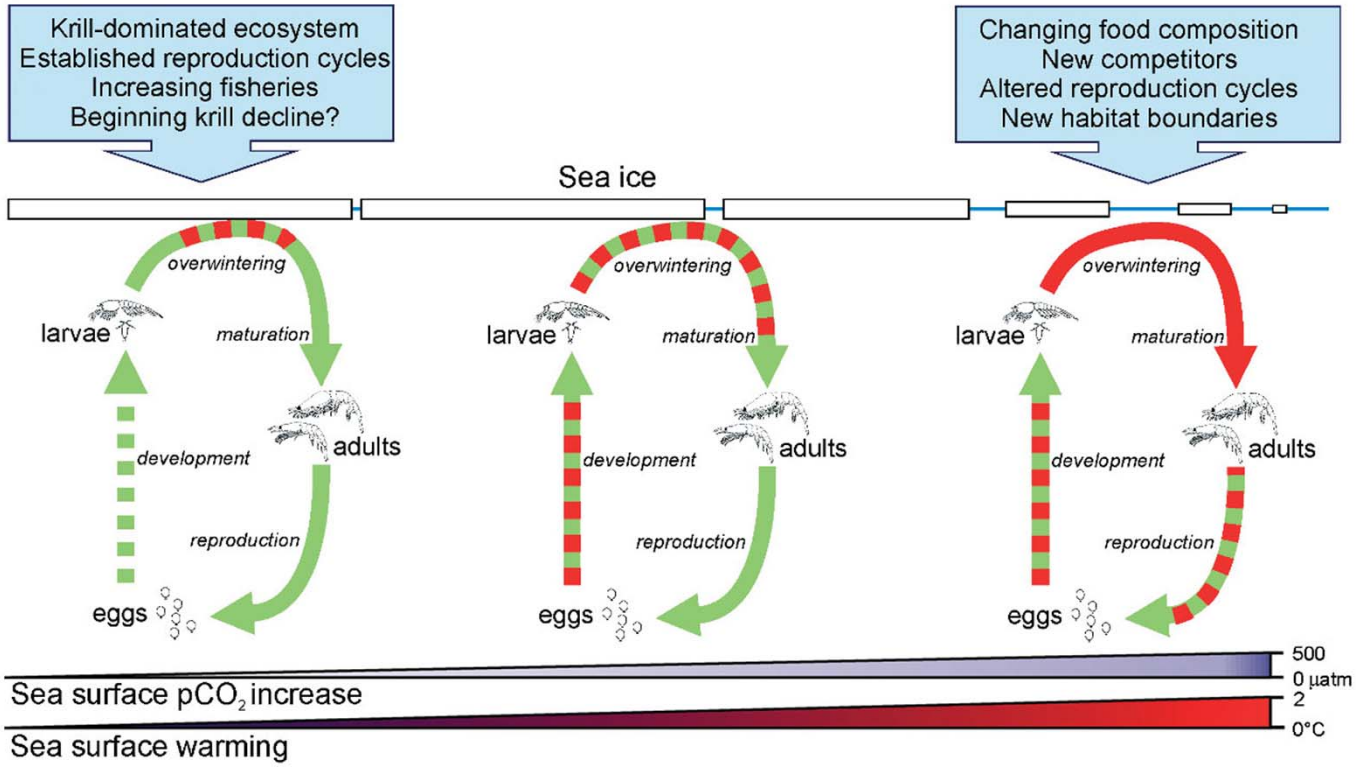
Towards a EU research strategy

- Pre-designed multi-disciplinary surveys
- Pre-designed data management
- Long-term committment

Towards a EU research strategy

- Model organisms
- Their role in the food web & carbon cycling
- Bi-polar comparisons

Antarctic krill
Under scenarios
Of environmental
change



Flores et al. (2012) Mar Ecol Prog Ser

SUIT on-deck crew, *Polarstern* ARK XXVII/3