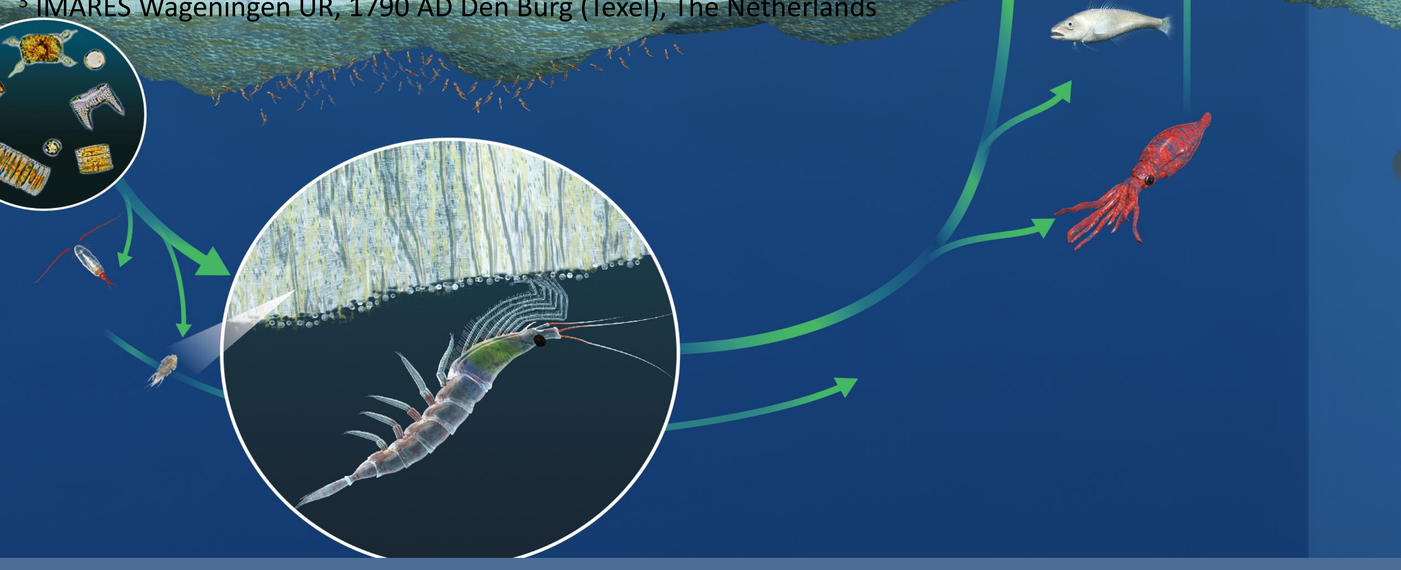
The role of sea ice habitats in structuring the under-ice community during Antarctic winter

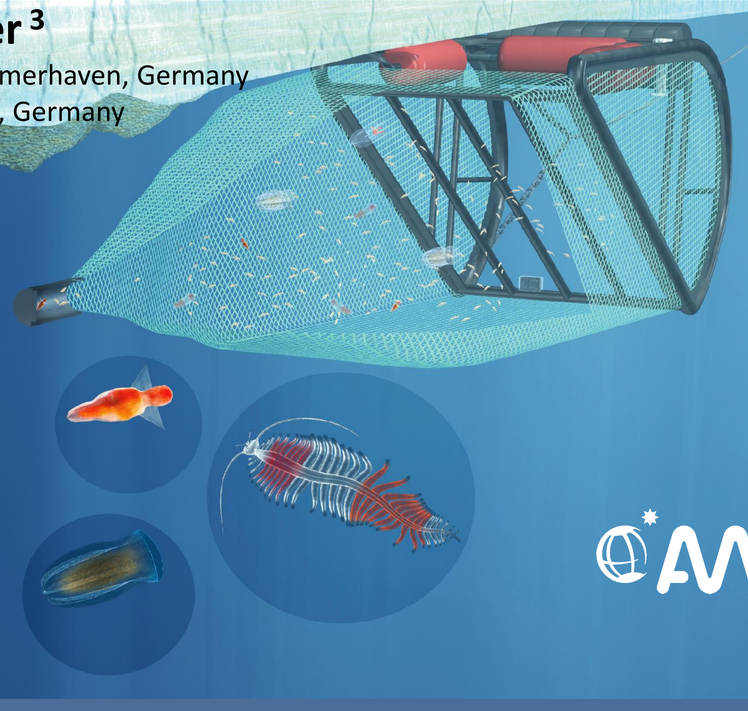
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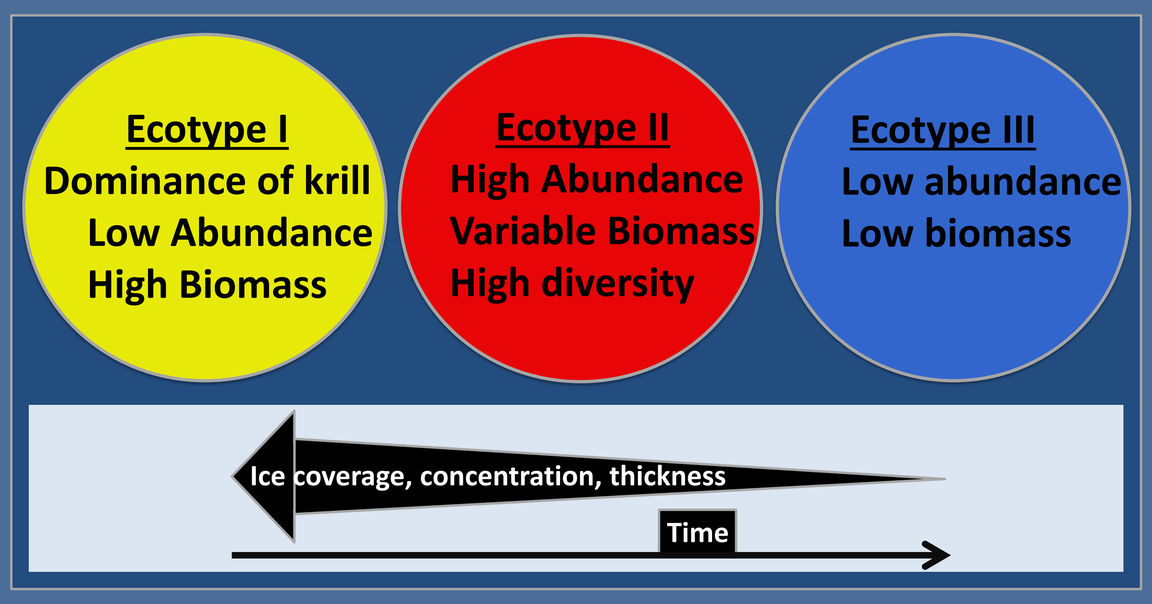




ALFRED-WEGENER-INSTITUT
HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG

Graphics by GEO Grafik/Illuteam43

INTRODUCTION Sea ice habitats are changing in some parts of the Antarctic Ocean. Sea ice hosts a specific algal community that can serve as a critical carbon source for juveniles Antarctic krill *Euphausia superba* and other species during winter. Therefore, changes of sea ice habitats can have a significant impact on ecosystem functioning. During a winter expedition in the Weddell Sea in 2013, we studied the community composition of under-ice fauna using a Surface and Under-Ice Trawl (SUIT) (in the upper image) equipped with a bio-environmental sensor array (CTD, altimeter, ADCP, video camera, two Hyperspectral radiometers).



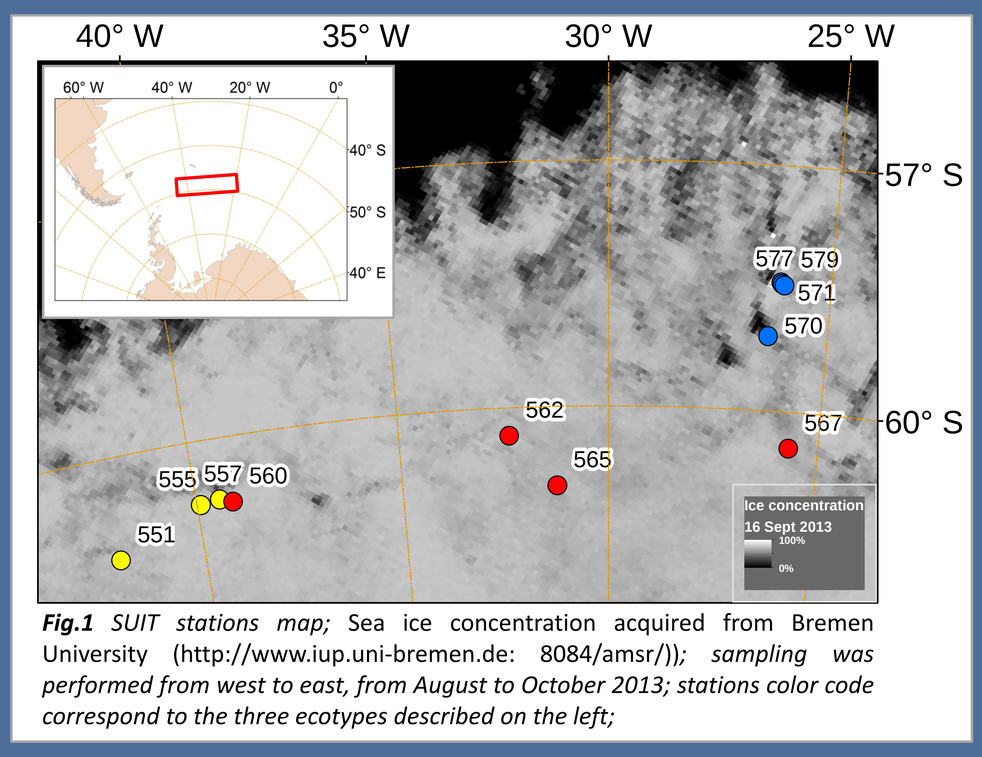


Fig.1 *SUIT stations map;* Sea ice concentration acquired from Bremen University (http://www.iup.uni-bremen.de: 8084/amsr/))*; sampling was performed from west to east, from August to October 2013; stations color code correspond to the three ecotypes described on the left;*

UNDER-ICE FAUNA

Abundance and **biomass** differentiated 3 ecotypes

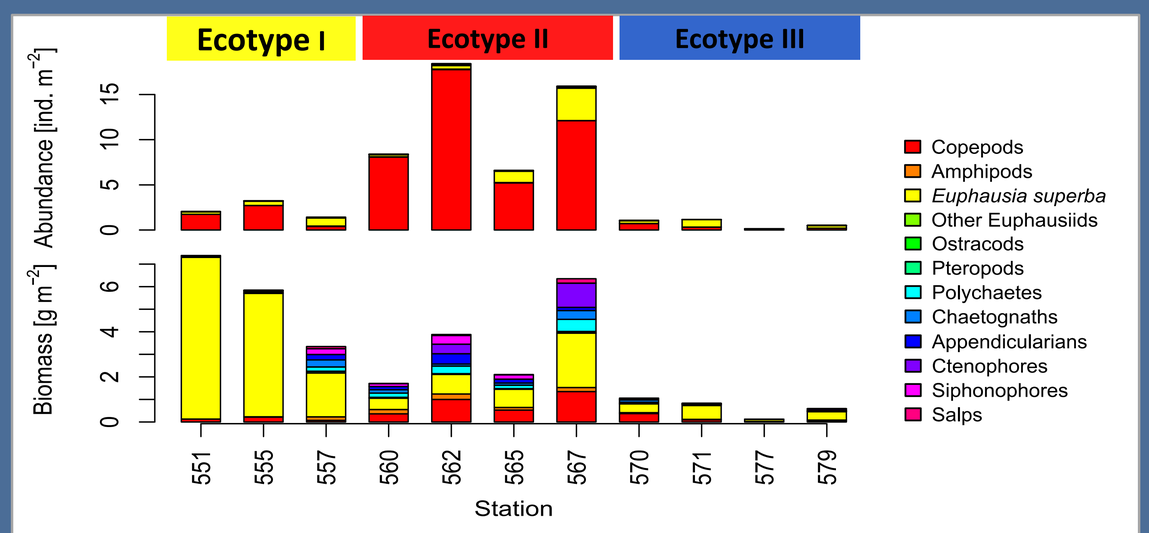


Fig.2 *Cumulated abundance and biomass (dry weight) of the taxonomic groups in the SUIT stations*

SEA ICE HABITATS

Ice conditions varied spatially and seasonally. Higher **ice concentration**, **thickness** and **roughness** were encountered at the first stations and decrease to left on the PCA ordination (Fig.3). **Snow thickness** differentiates within groups' stations ecotype II and ecotype III.

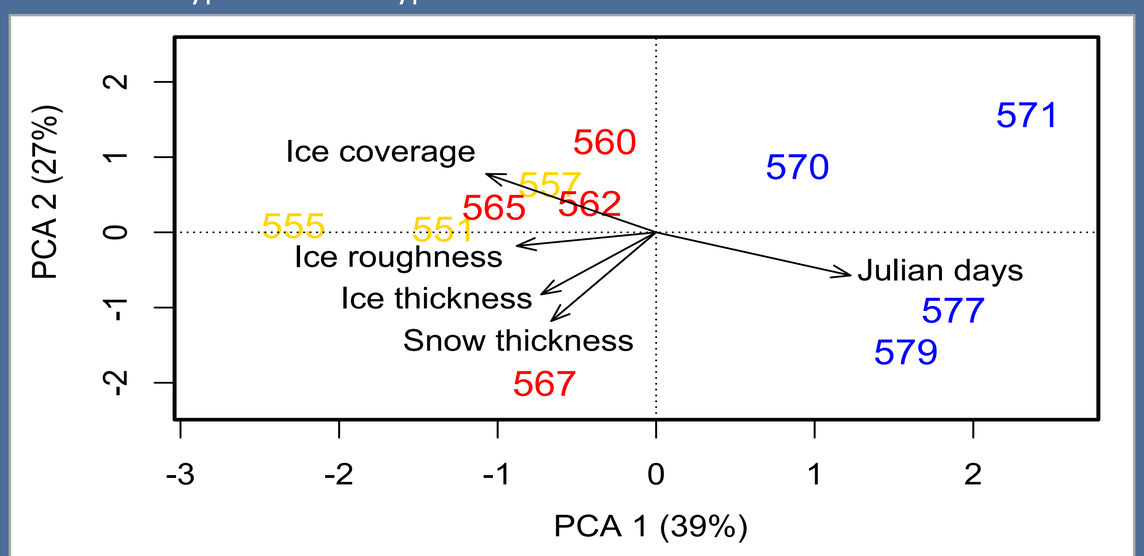
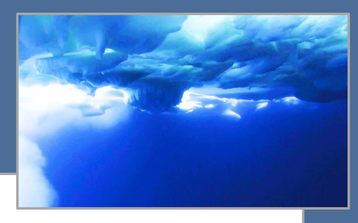


Fig.3 *Principal component analysis on sea ice properties describing the under-ice habitats; stations color code correspond with the 3 ecotypes described above.*

SEA ICE HABITATS

Thickness profiles (Fig.4) reveal differences of the under side of ice. An example where **rough sea ice** with the presence of ridges of 6-8m in station 565, contrasts with station 570 where **flat ice** dominates.



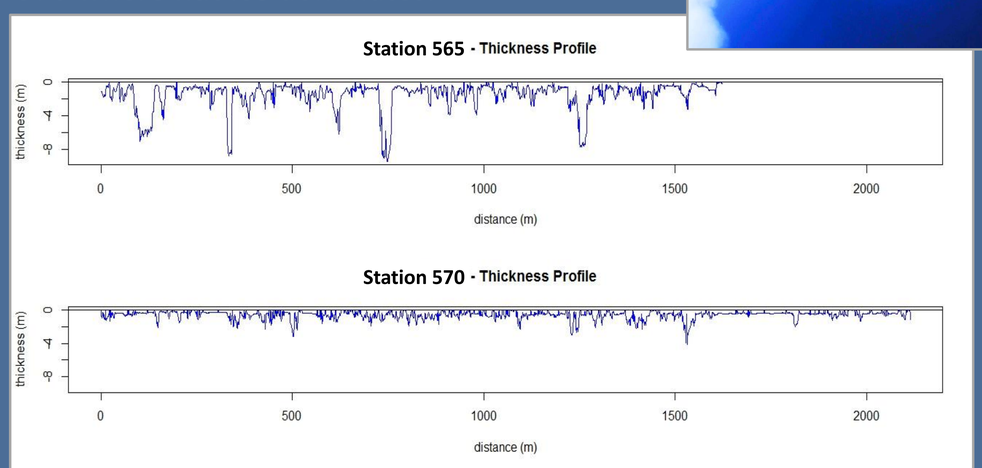


Fig.4 *Sea ice thickness profiles of two SUIT hauls; photo made during trawling with the video camera attached to SUIT frame*

CONCLUSION

- **Differences in community are dictated by sea ice properties, with a strong seasonal signal**
- **Antarctic krill (predominantly larvae) are associated with higher sea ice roughness**
- **Higher species diversity is associated with thicker ice**

More information on ***Iceflux*** **project**
Ice-ecosystem carbon flux in polar oceans