



**INSTITUTE OF MARINE RESEARCH**  
*HAVFORSKNINGSINSTITUTTET*



# **Antarctic ecosystems under change requires revitalisation in scientific capabilities in observation, operation and cooperation**

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# Antarctic unique

- Variable
- Inaccessible – e.g vital processes under the ice

*Expect the unexpected!*

(Richer)



# Vulnerability

- Ecosystem sensitive to environmental changes



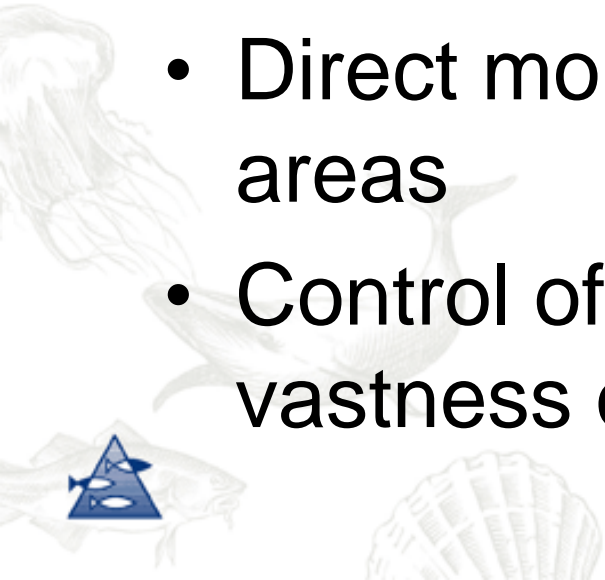
# Simple ecosystem

- Relatively few species involved in the chain towards human harvest
- Nevertheless difficult to predict
- Lack of knowledge and data

*Essentiel to collect key routine data!*

# Management suffering knowledge hunger

- Conceptual models available rather than data validated systems
- Knowledge on ecosystem processes as well as drivers are limited
- Direct monitoring limited to selected areas
- Control of human activity difficult due to vastness of the area



# But Norway searches consistency

- Norwegian policy designed by science
- How can consistency be obtained in north and south with such enormous differences in data availability?
- How can consensus be obtained when knowledge is vague or lacking, leaving large room for interpretation?



***Independency of science crucial!***

# Requires alliances

- Realizes that a small country produces only fragments alone
- Cooperation among countries required
- Sector interaction and collaboration might be even more important
- Industry operational capacity and competence is critically needed
- Part of Norway's strategy exemplified by the excellent involvement by krill industry





# Innovation in using human and technology resources

- SOOS (Southern Ocean Observing System)
- (a) • Technology adjusted to operational capacity
- (j) • Tighter integrated physical and biological data collection system



(i)



(b)



(g)



(c)



(d)

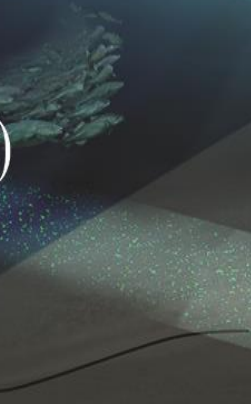


(e)

(f)



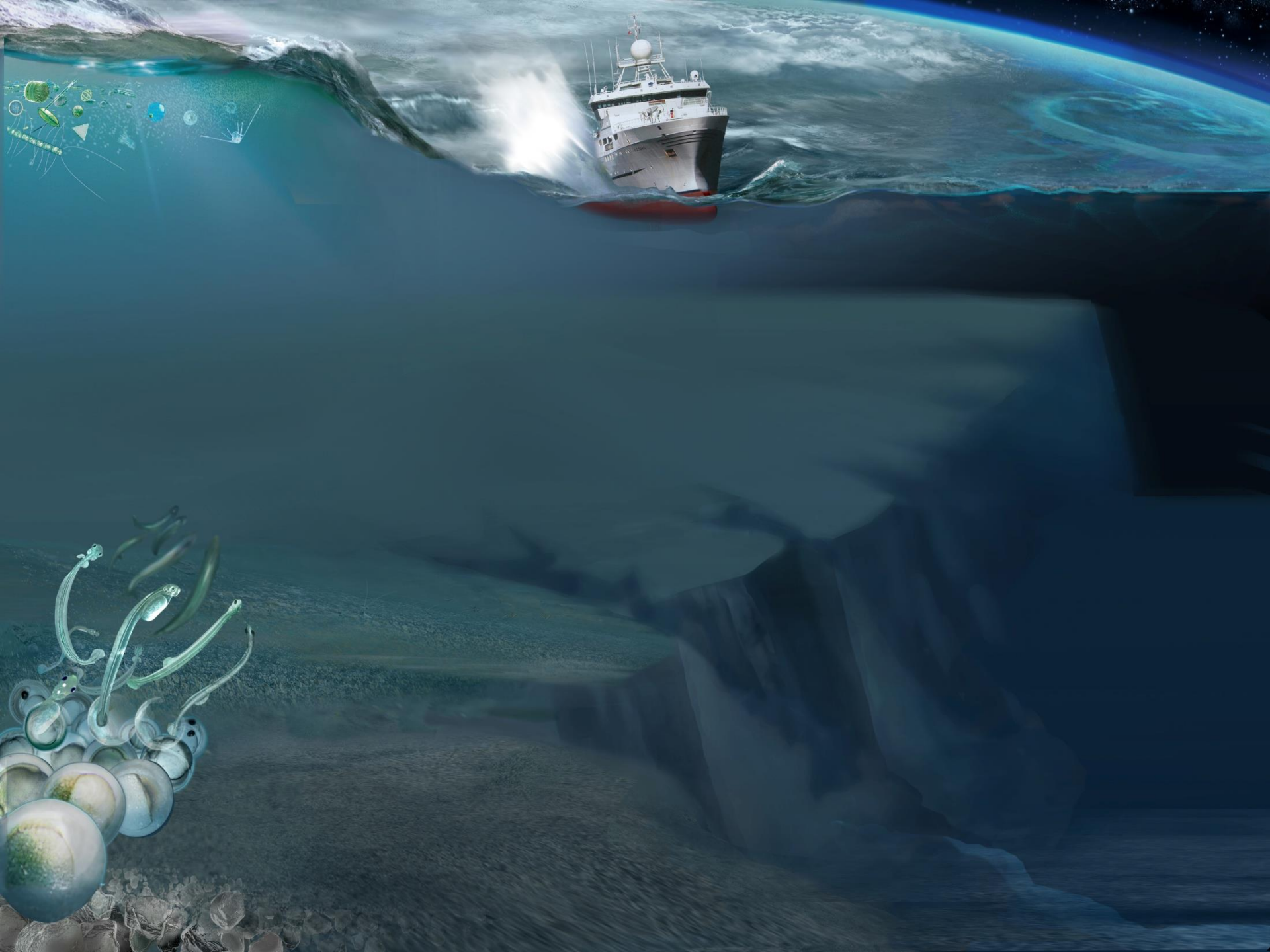
(h)

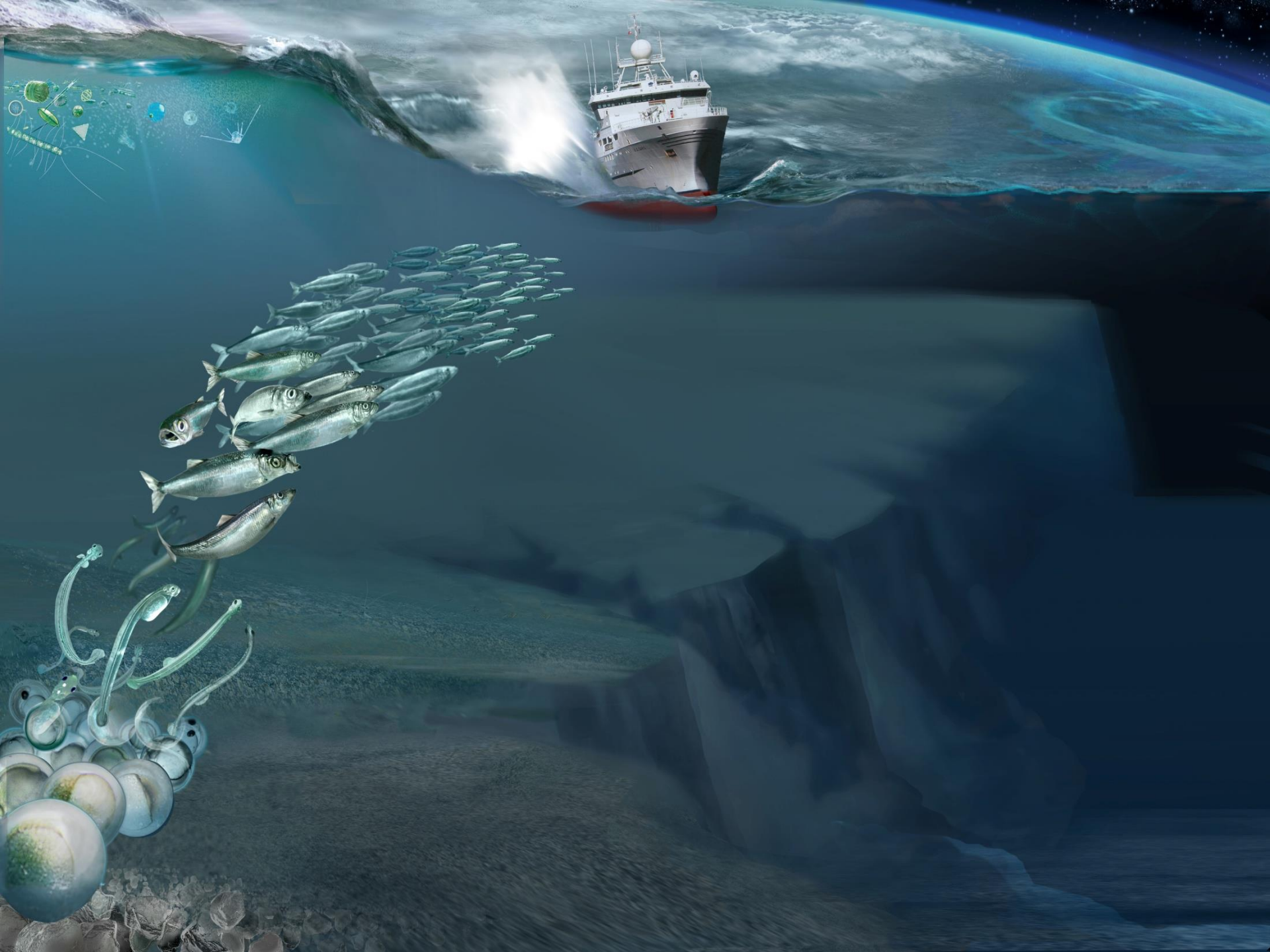


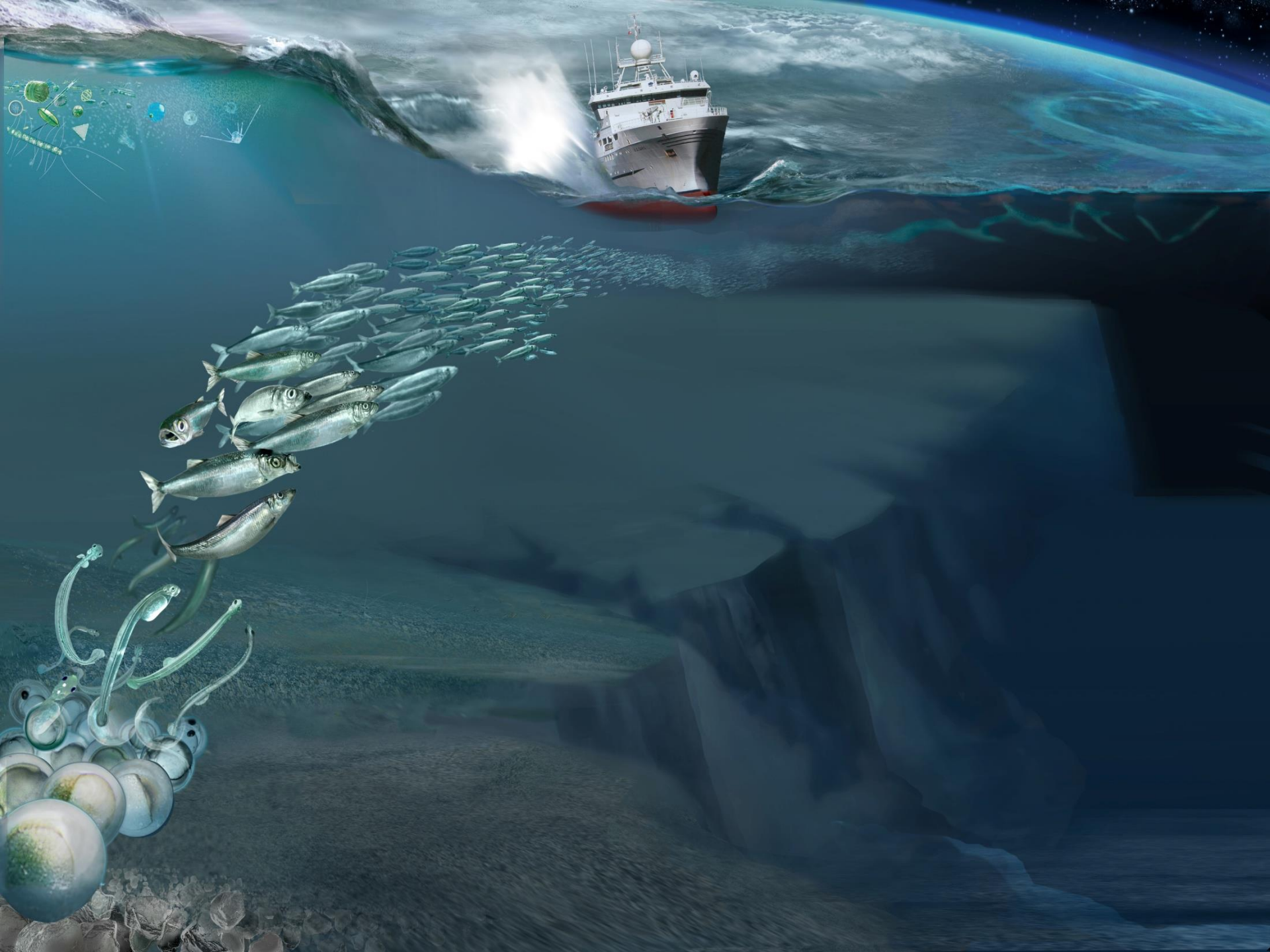


# CCAMLR is an excellent playground

- A consensus organisation
- Nations need to agree and cooperate
- Science can bridge disagreements and create mutual understanding
- Can we shed some light in the darkness?

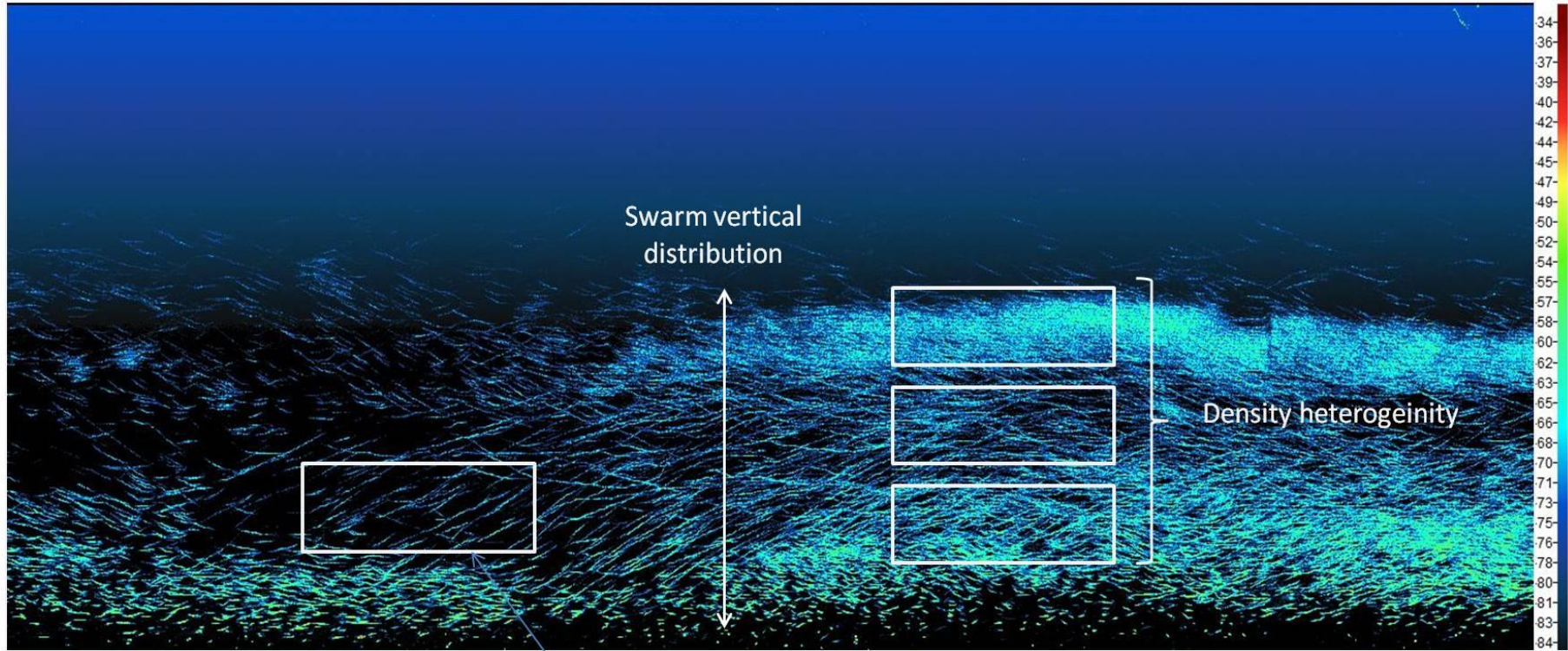








Be present at location and  
time when processes take  
place!



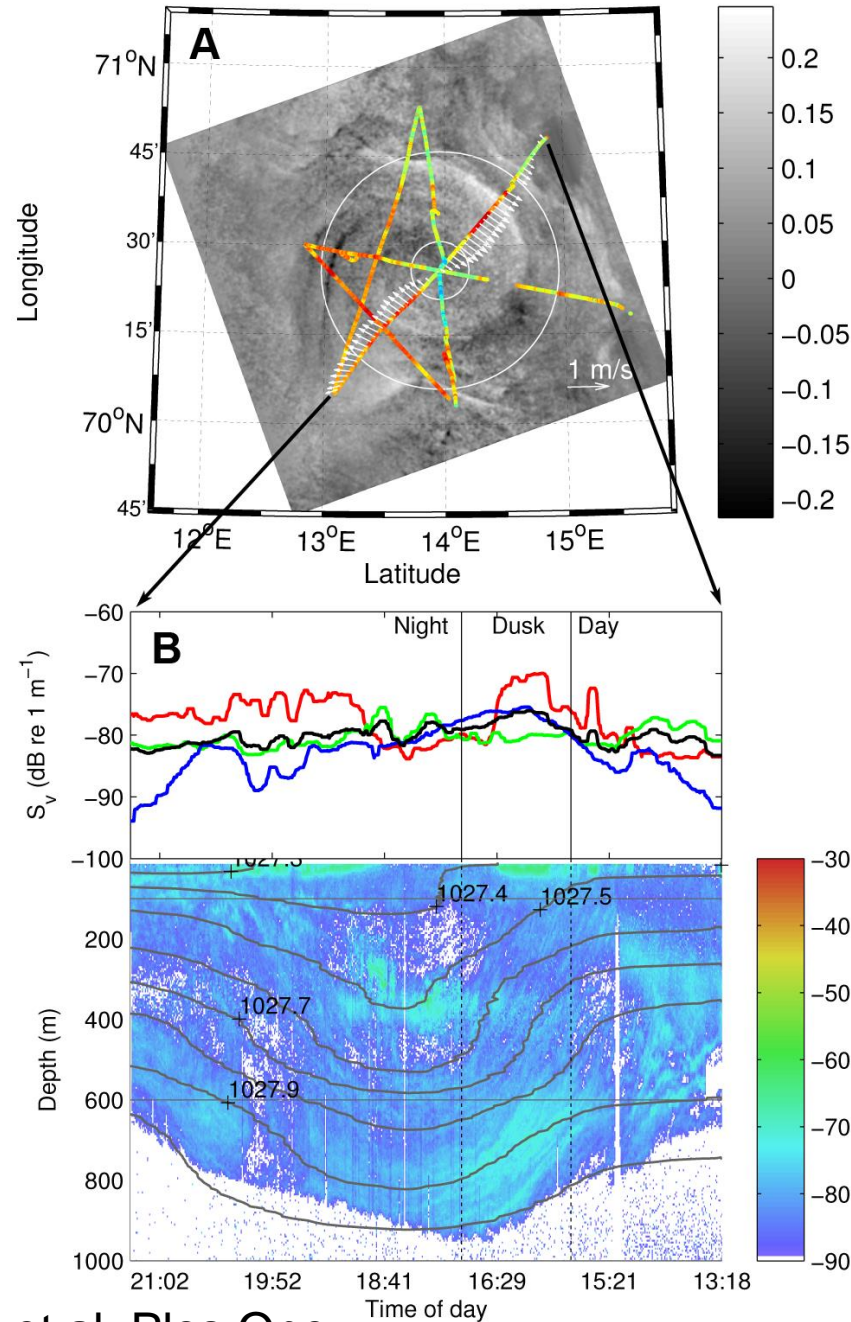
Echosounder orientation

Polarization, swimming dynamic, alignment and inter-individual distances



# Concerted action the only way

- Understanding requires effort
- Joint resources gives added value
- Physical forcing and biological response is a key





# To obtain success and consensus

- Coordination and joint work are needed
- Australia's contribution through SOOS highly appreciated
- Next step must be to include industry in much tighter alliance and give them tasks and access to information
- In that way both knowledge hunger and management issues can be satisfied



Marine  
Ecosystem  
Acoustics

Illustration by Glynis Gorick  
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# Summary

- Antarctic unique
- Vulnerable
- Simple ecosystem
- Where management suffering knowledge hunger
- But Norway searches north-south consistency
- Which requires alliances
- And innovation in using human and technology resources.
- CCAMLR is an excellent playground where
- Concerted science based action is the only way
- To obtain success and consensus
- **Australia – Norway relationship matters!**

*Thank you for your attention!*