

# ANTARCTIC KRILL IN A CHANGING OCEAN

Scientific workshop on effects of environmental change on Antarctic krill  
and implications for ecosystem-based management

Texel, The Netherlands, 11 - 15 April 2011

## Objectives

The Netherlands and the European Commission are funding a workshop aiming to compile the state of knowledge about the impact of environmental change and increasing human exploitation on Antarctic krill in the light of an updated analysis of existing knowledge, and to discuss potential implications for CCAMLR's ecosystem-based management approach. In addition, the intended workshop may set the base for a network of krill researchers, including early career scientists. The specific objectives are:

- 1) A critical review of the implications of environmental change for Antarctic krill stock management considering various aspects, such as population dynamics, recruitment, genetic diversity, physiology, predator-prey interactions, and fisheries management;
- 2) an evaluation of the ecosystem effects of changing krill populations caused by environmental change.

## References

- Atkinson A, Siegel V, Pakhomov E, Rothery P (2004) Long-term decline in krill stock and increase in salps within the Southern Ocean. *Nature* 432 (7013):100-103
- Jacquet J, Pauly D, Ainley D, Holt S, Dayton P, Jackson J (2010) Seafood stewardship in crisis. *Nature* 467 (7311):28-29
- Schiermeier Q (2010) Ecologists fear Antarctic krill crisis. *Nature* 467 (7311):15



Picture by J.A. van Franeker

## Rationale

In Europe, interest in the exploitation of Antarctic krill *Euphausia superba* is increasing, and new fishing methods are being developed. At the same time, key nursery habitats and feeding grounds of Antarctic krill have experienced significant change during recent decades. This ongoing environmental change, e.g. sea ice decline, temperature rise and ocean acidification, is likely to severely affect Antarctic krill stocks. Recently, strong concern was expressed in the scientific community about the future sustainability of Antarctic krill fisheries under increasing environmental pressure on krill populations (Schiermeier 2010, Jacquet et al. 2010).

Atkinson et al (2004) is periodically cited as an exemplar of biological change that has occurred as a consequence of increasing temperatures. The paper describes declining Antarctic krill stocks in the western Antarctic Peninsula region and highlights that this is one of the world's fastest warming areas, where winter sea-ice duration is shortening. However, the work says relatively little about causal linkages with climate change.

If Antarctic krill populations are changing as a consequence of environmental change,

## Host

Institute for Marine Resources and  
Ecosystem Studies (IMARES)

## Time / location

11 - 15 April 2011  
Texel / The Netherlands

## Contact

Hauke Flores M: [hauke.flores@wur.nl](mailto:hauke.flores@wur.nl)  
IMARES F: +31 317 487 414  
P.O. Box 167  
1790 AD Den Burg  
The Netherlands

then it is a critical issue for the managers of the Southern Ocean marine ecosystem, and likely to have very important consequences for CCAMLR. This is especially relevant, as the Generalized Yield Model applied by CCAMLR to estimate stock development over time, and ultimately catch limits, does not account for environmental change, because it assumes a stable krill stock and stable environmental conditions. Therefore, there is an urgent need to evaluate how Antarctic krill stocks will respond to environmental change.

Furthermore, evidence is increasing that Antarctic krill provides a suite of large-scale services to the ecosystems of the Southern Ocean. Under a scenario of declining Antarctic krill stocks caused primarily by climate warming, ecosystems may fundamentally alter in biodiversity composition and productivity, with consequences for resource management and conservation objectives in the Southern Ocean. It is important to evaluate possible ecosystem impacts of declining Antarctic krill stocks and to discuss potential adaptations of CCAMLR's ecosystem-based management approach.