

SKAG online workshop to evaluate change in the krill-based food web and to develop solutions for the future sampling of krill

Save the date: Mornings (UTC) of 26-30 April 2021

Introduction

The SCAR krill action group (SKAG) provides a forum to guide research directions, promote collaboration, improve understanding of krill biology and ecology, and facilitate information exchange. A key activity in 2021 will be a scientific workshop, supported by WWF, which aims to address one of the major issues in current understanding of Antarctic krill ecology: How the krill-based food web changes over time.

Objectives

The workshop will address the following questions:

1. *What do existing sampling methods tell us about changes in the krill-based food-web?*
2. *How can newly emerging approaches and the next generation of krill scientists help us understand change within the krill-based food web?*

Background

Scientific background. The recent SKAG paper (Meyer et al 2020; <https://doi.org/10.1038/s43247-020-00026-1>) showed that we are entering uncharted waters for the management of the fishery for Antarctic krill, with a suite of changes:

- The fishery is slowly increasing;
- it is becoming more concentrated spatially;
- it is becoming a more autumn/winter operation;
- the climate is changing and projected to change further in future;
- reports on apparent stability and decline in krill are conflicting;
- current management policy is being challenged in the scientific literature; and
- the way we sample and monitor krill is changing.

The SKAG paper identified a series of stand-out issues that scientists need to solve in order to provide the improved understanding needed to respond to the above challenges. One major issue concerns the longer-term trajectory of the stock, and whether it is fairly stable or is declining/showing step-changes and thus likely to change in future in response to climate change.

The first objective of the workshop specifically tackles this issue, aiming to provide the “best, independent, objective advice” (consistent with CCAMLR Resolution 31/XXVIII) of the SKAG community on the detection of past and future change in the SW Atlantic krill stock. It will be forward-looking, identifying the opportunities for construction of future time series.

There are currently a series of seemingly conflicting reports of both change and stability in krill stocks in the SW Atlantic sector. As well as being important scientifically, this confusion impedes clear advice to management on whether the species is sensitive to rapid climate change. The confusion also prevents any firm basis for future projection. Our workshop will focus on the insights gained from a series of methods of sampling krill. We will compare the types of information gained from each method (species, time and depth resolution; spatial

coverage of data; relationship between abundance and biomass units; process level insights) to ask our first key question:

1: What do existing sampling methods tell us about changes in the krill-based food-web?

Given the termination of some key time series and changes in emphasis (e.g. increased autumn-winter fishing, increasing use of moorings, gliders and acoustics over nets, new methods of analysing krill) our second key question is:

2. How can newly emerging approaches and the next generation of krill scientists help us understand change within the krill-based food web?

We are entering a transition period in how we sample krill, with some countries reducing their sampling while others, for example China and Korea, are increasing their Antarctic presence. Commensurate with this is a change in sampling methods, for example nets at pre-fixed locations are being used less, while other methods, for example gliders, moorings, fisheries data are partially replacing them, posing both opportunities but also questions for the long-term integrity of time series observations. New stable isotope and other stable dietary marker methods are also being developed, which can be applied to time series samples to understand change in the krill-based food web. This section of the workshop would evaluate the strengths and weaknesses of these newly emerging types of data, in terms of financial cost, data quality, taxonomic resolution, spatial/temporal/depth coverage, ambiguity of result, with recommendations for sampling and harmonisation going forward. The workshop will also promote SKAG aims for information sharing, effective science communication and the role of diversifying krill research through early career scientists.

Workshop output.

This workshop will be focussed on producing a scientific paper from the outset. This will be a SKAG synthesis paper, authored by the participants. It will be accompanied by a plain-language briefing note displaying the key findings, possibly by means of an infographic for presentation at CCAMLR and other fora such as the Antarctic Futures meeting. The paper structure will not overlap with recent reviews and initiatives such as Constable et al. (2014), Rogers et al. (2019), IPCC (2019), Meyer et al (2020) or MEASO because it will go into much greater detail on how indices of krill differ and provide a methods-based forward-look.

Format.

The workshop will be a Zoom-only meeting: mornings (UTC) of 26-30 April 2021

The first morning will feature presentations providing an overview of key knowledge gaps in krill biology and how they map onto the needs of management and conservation. This will likely include a short audience questionnaire as “homework”. Sessions on subsequent mornings will address a series of topics pertinent to the key questions, with topic overviews presented by early career researchers followed by structured group discussion. The candidate topics include:

- acoustic time series
- net time series
- various indices of recruitment
- predator indices of changing krill availability
- fisheries data
- moorings data
- gliders and AUVs
- lowered cameras and direct observation
- under ice sampling

- instrumented predators
- isotopic/molecular reconstructions of predator diets
- stable markers and other new food web methods

There will be an additional session on science communication for the next generation of krill scientists.

Key dates

Registration opens – *December 2020*

Registration closes - *late February 2021*

Workshop - *26-30 April 2021*

Paper preparation and submission - *June 2021*

SKAG is a SCAR working group tasked with helping to strengthen the link from science to management of the Antarctic krill fishery. If you are interested in becoming a member of SKAG please visit our member page: [SKAG Members](#)