Population dynamics of Antarctic krill in winter/early spring

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Questions

Describe distribution of different sizes & developmental stages in under ice surface

Can differences be explained by differences in diet?

Do sea ice properties have an effect on size/stage distribution?
Background

(Eicken, 1992; Quetin & Ross, 2003; Arrigo & Thomas, 2004; Flores et al., 2012)
Background: iceflux
Background

First year:
Furcilia $\rightarrow$ juveniles $\sim$ 15 mm

Second year:
Juveniles $< 33$ mm
Juveniles $\rightarrow$ sub-adults $> 26$ mm

Third year:
Sub-adults $\rightarrow$ adults $> 35$ mm

(Fraser, 1936; Bargmann, 1945; Marr, 1962; Siegel, 2000; Meyer & Oettl, 2005; Flores et al., 2012; Jia et al., 2014)
Methods: SUIT

Surface and Under Ice Trawl
Methods: sensors

- Data logger
- CTD
- ADCP
- Altimeter
- RAMSES
- Spectro-radiometers

Water Flow
Direction of travel
Video
Results: stages

size & stage distribution

<table>
<thead>
<tr>
<th>Stage</th>
<th>FIV</th>
<th>FV</th>
<th>FVI</th>
<th>Juvenile</th>
<th>Sub-ad</th>
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- Length (mm)
- Frequency (N)
Results: cluster analysis

Cluster Dendrogram

hclust (*, "average")

size & stage distribution
Results: cluster analysis

size & stage distribution

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<tr>
<th>Stage</th>
<th>Length (mm)</th>
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<tr>
<td>Juv</td>
<td>7.75</td>
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<td>FVI</td>
<td>10.54</td>
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<td>FV</td>
<td>13.91</td>
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<td>FIV</td>
<td>31.43</td>
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[Diagram showing size & stage distribution with specific values and pie charts for different stages.]
Results: sea ice
Conclusions

Krill found in the area are from different age classes → different origin or prolonged reproductive season

(Quetin & Ross, 2003)

A separation in size and/or location is reflected in fatty acid composition.

Length distribution does not seem to be associated with sea ice or under ice properties.
Thank you!

Fokje Schaafsma, Carmen David, Doreen Kohlbach, Benjamin Lange, Hauke Flores, Jan Andries van Franeker

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