Pteropod abundance in correlation to sea ice- finally some good news for Southern Ocean pteropods?

Results from a 20-year sediment trap study

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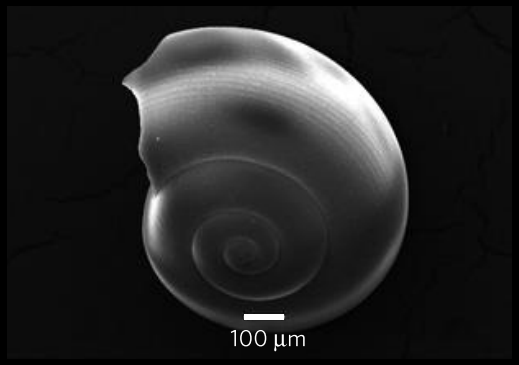
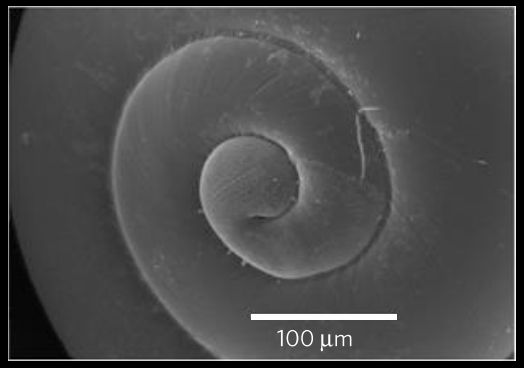
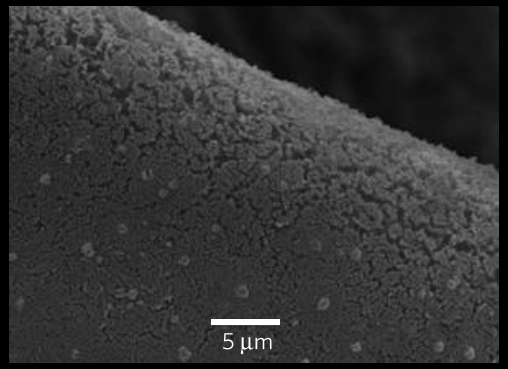
Pteropods are the canaries of the coal mine

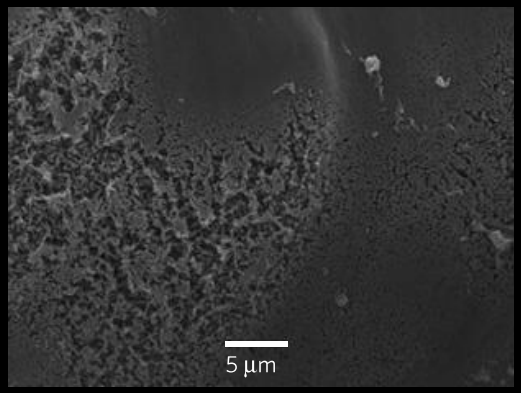
Nina Bednaršek

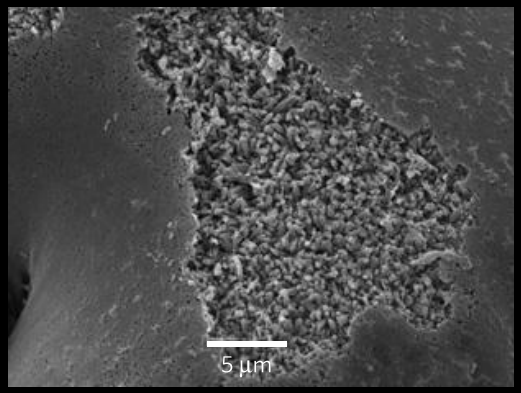
Pteropods are the canaries of the coal mine

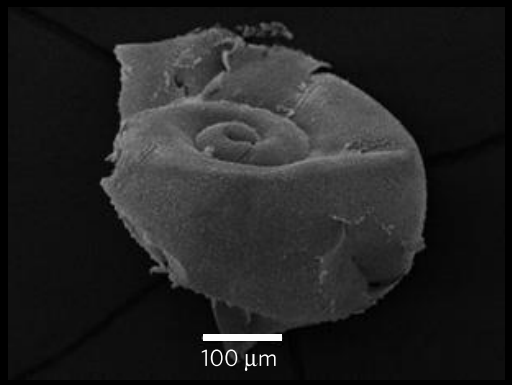










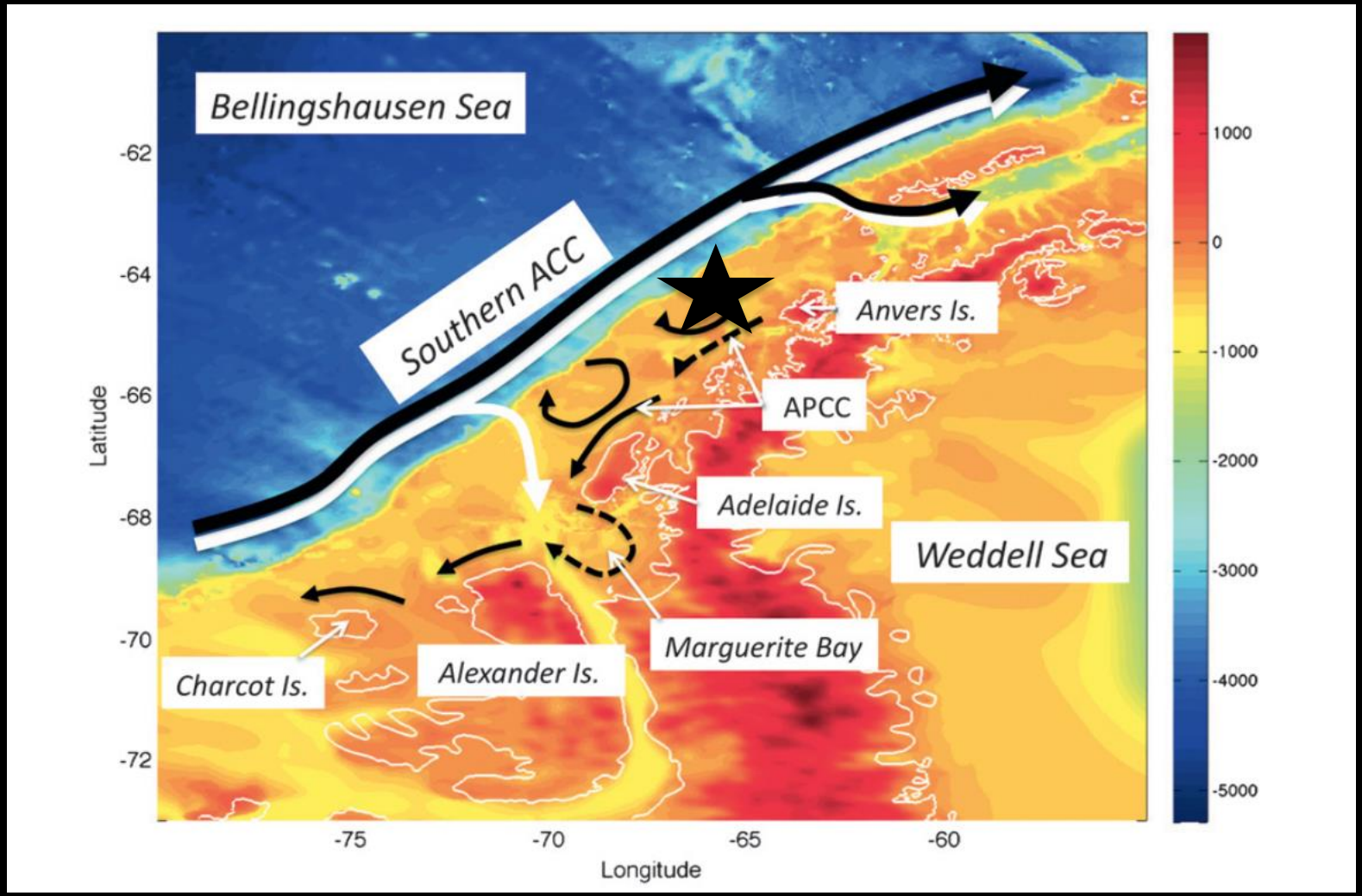


Bednaršek et al., 2014

Why study pteropods?

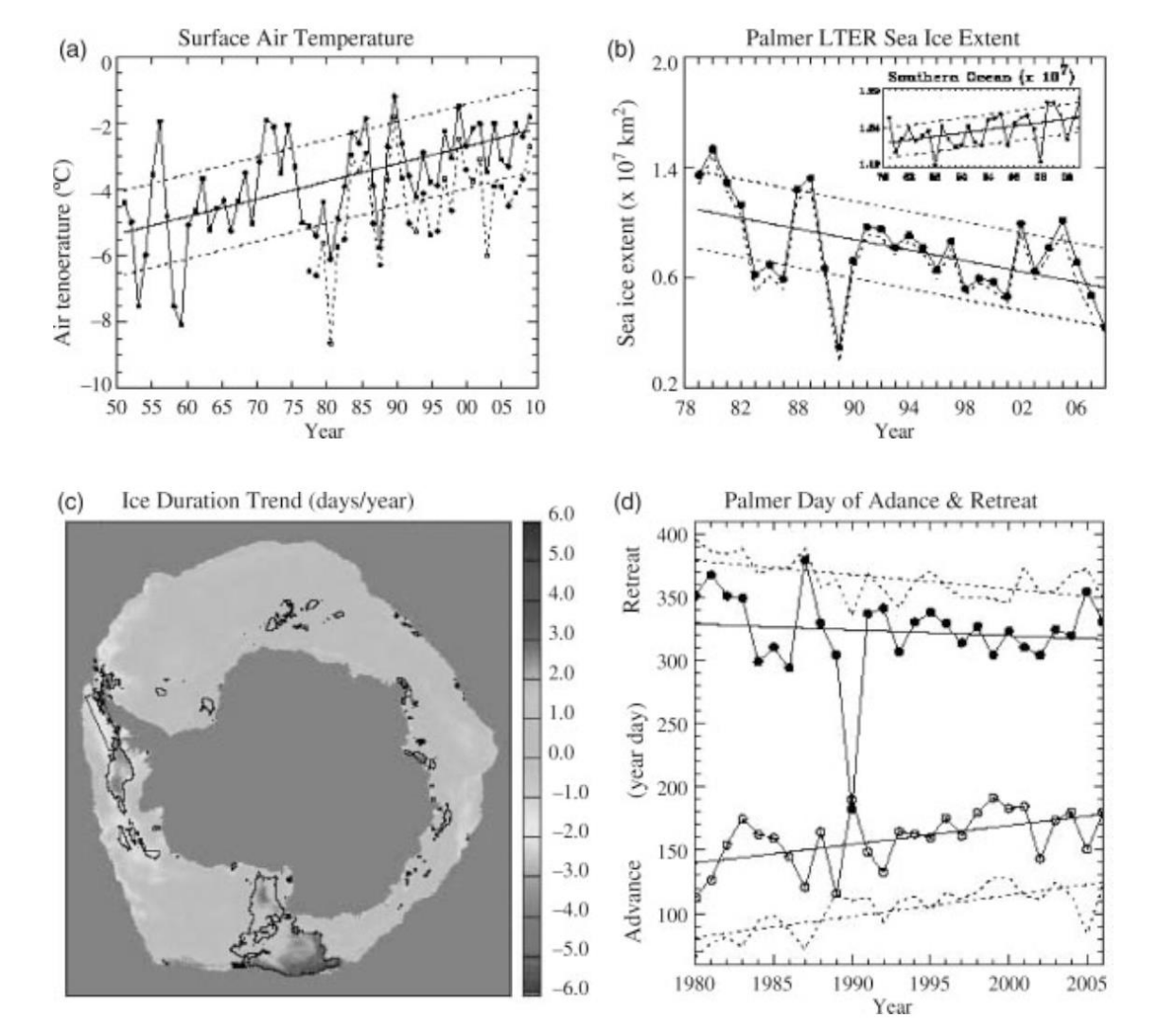
- “Canaries of the coal mines”
- highly abundant (all water masses)
- Important part of the food web (e.g. Norwegian salmon)

WAP: West Antarctic Peninsula



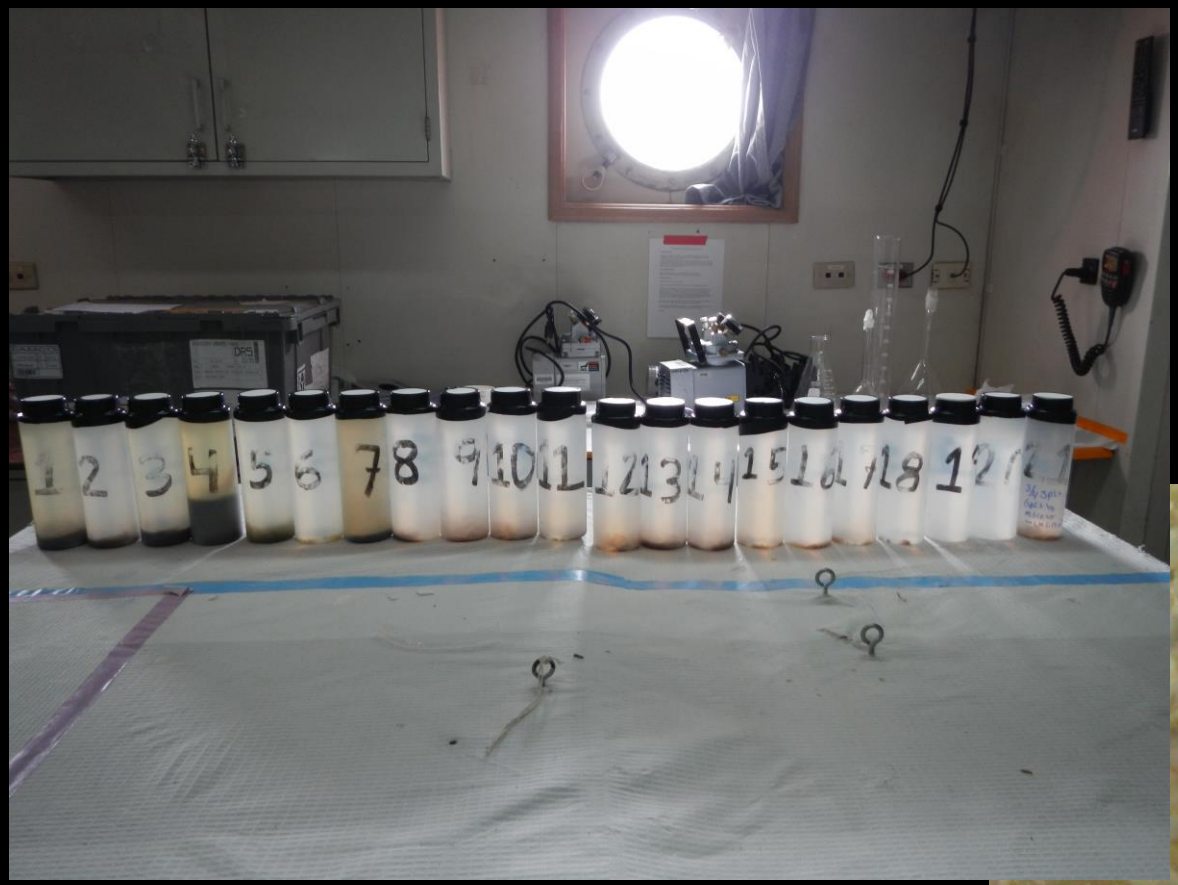
Meredith et al., 2013

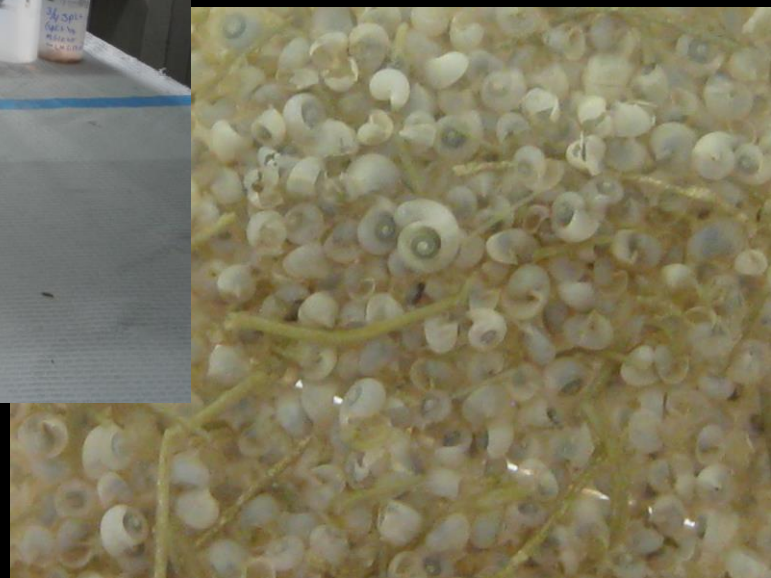
Climate change at WAP



Ducklow et al., 2013

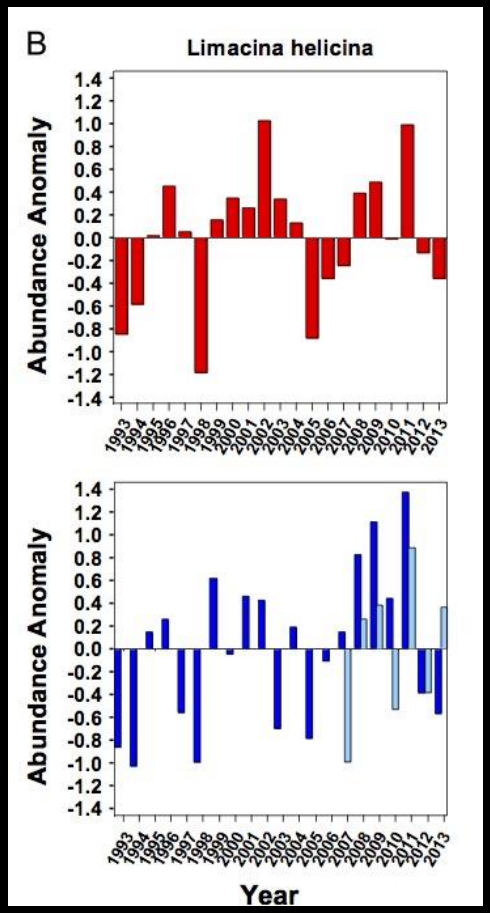
20 year sediment trap: 170m depth

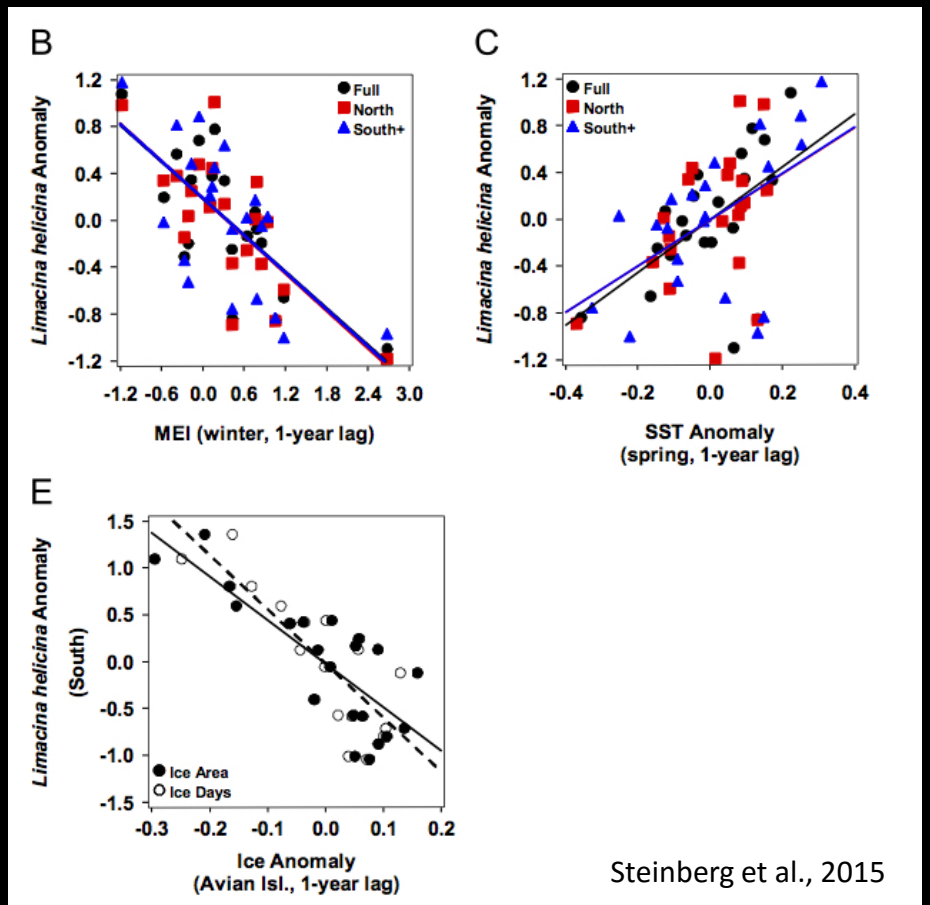




Pictures: courtesy of Hugh Ducklow

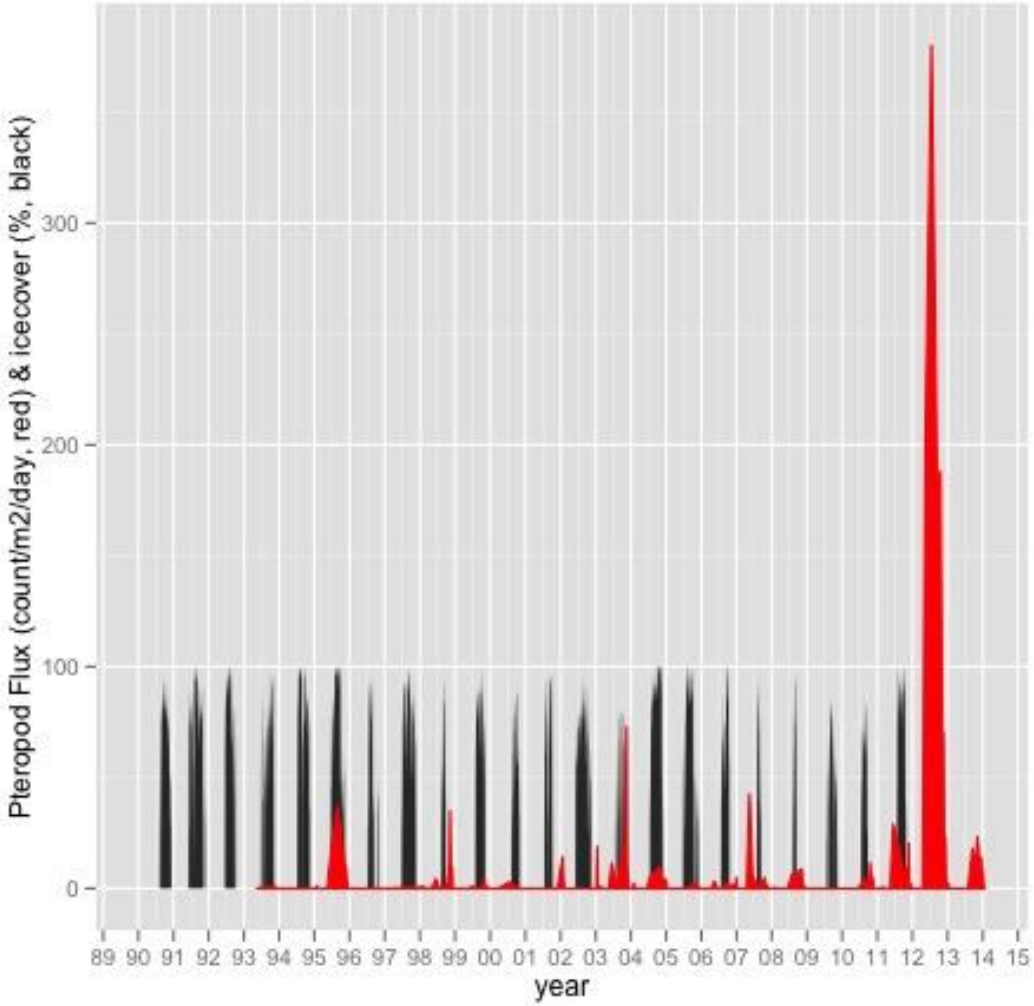
Summer abundances

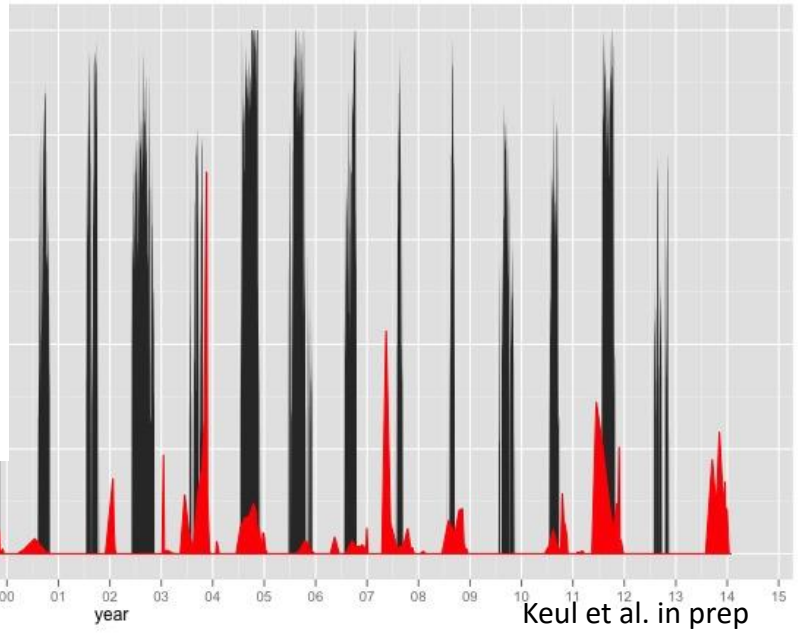




Steinberg et al., 2015

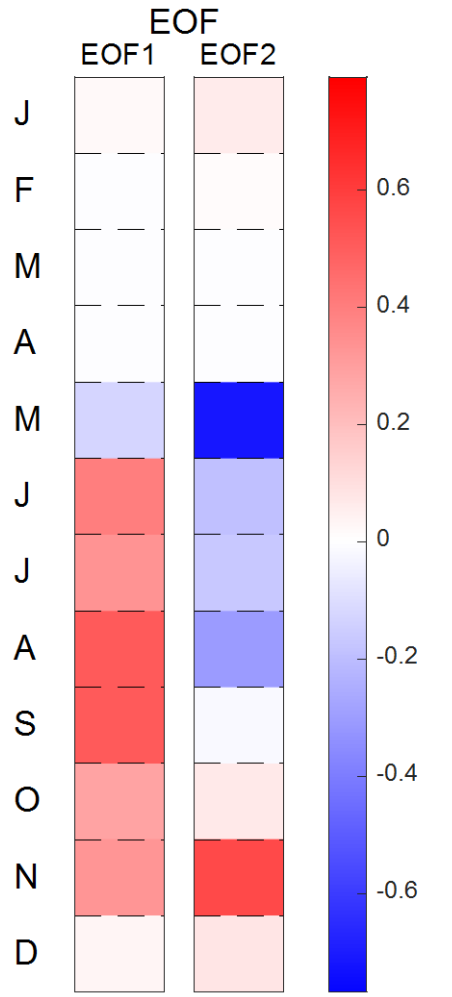
Pteropod Flux and ice

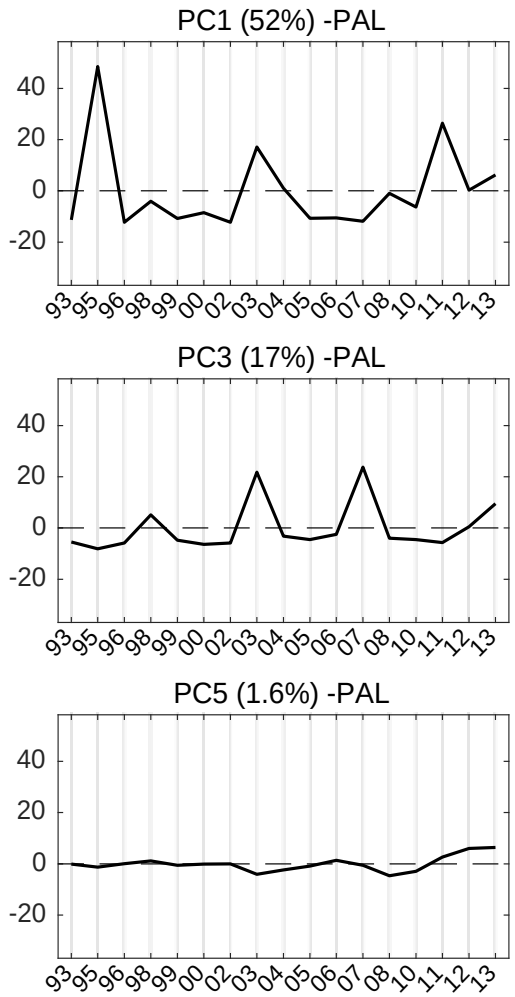


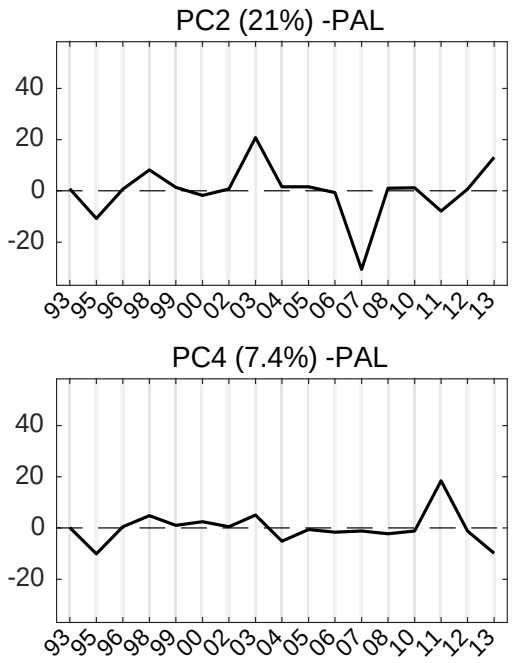


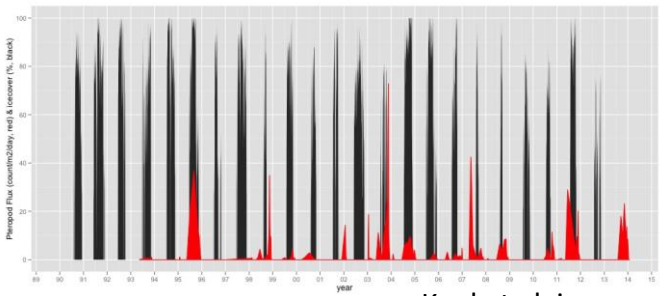
Keul et al. in prep

EOF: empirical orthogonal functions& PCA (principal component analysis)





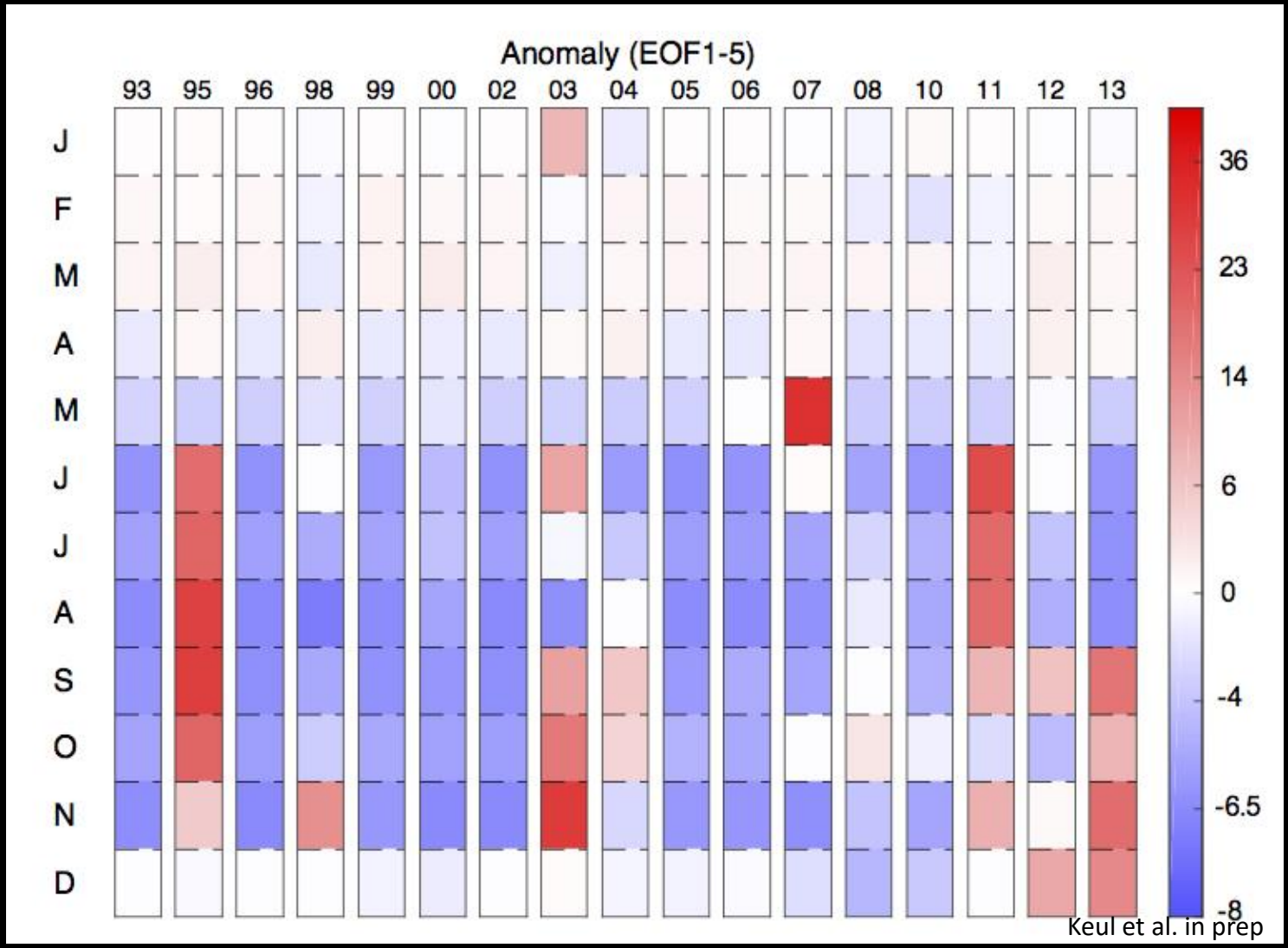




Keul et al. in prep

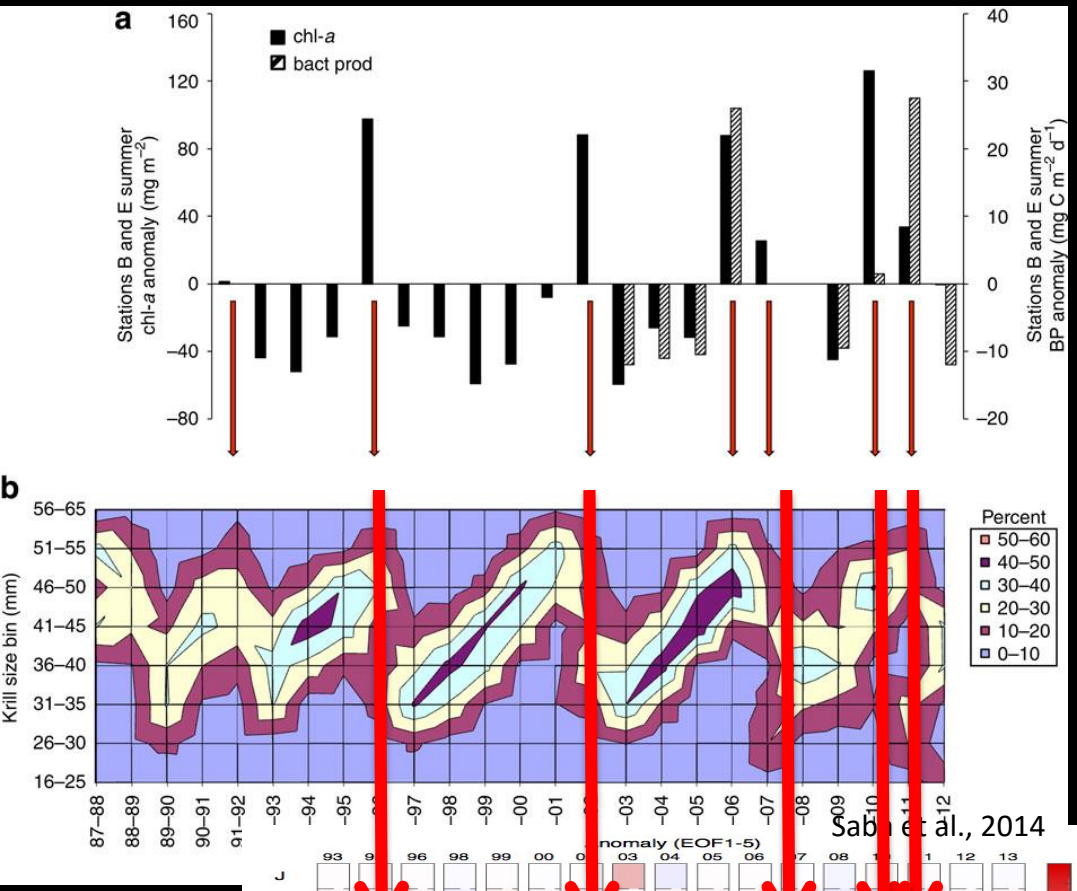
52% 21% of total variance

Anomalies



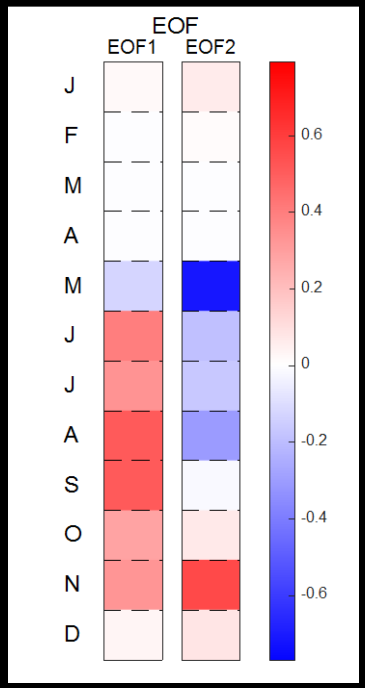
Keul et al. in prep

Correlation to Chlorophyll (bloom from Dec. to March)



Saba et al., 2014

PC1 vs. Chlorophyll
PC1: p= 0.032, r 0 0.63



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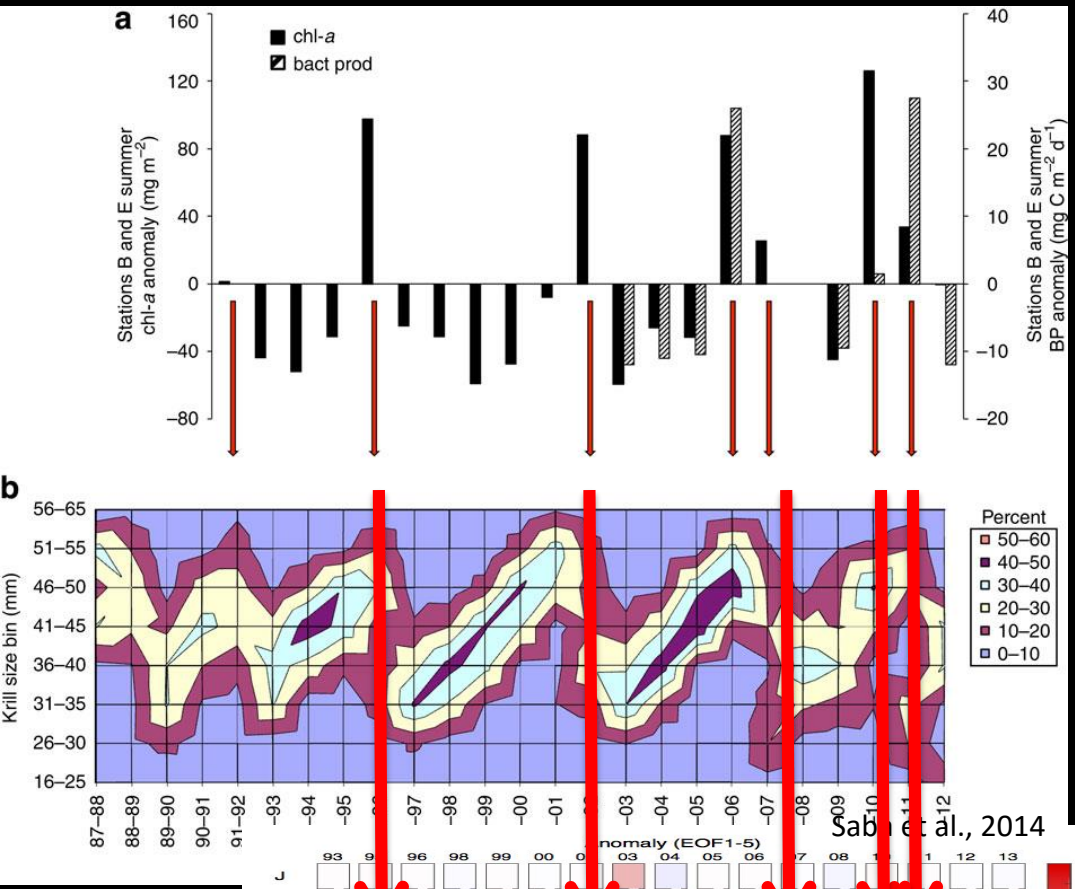

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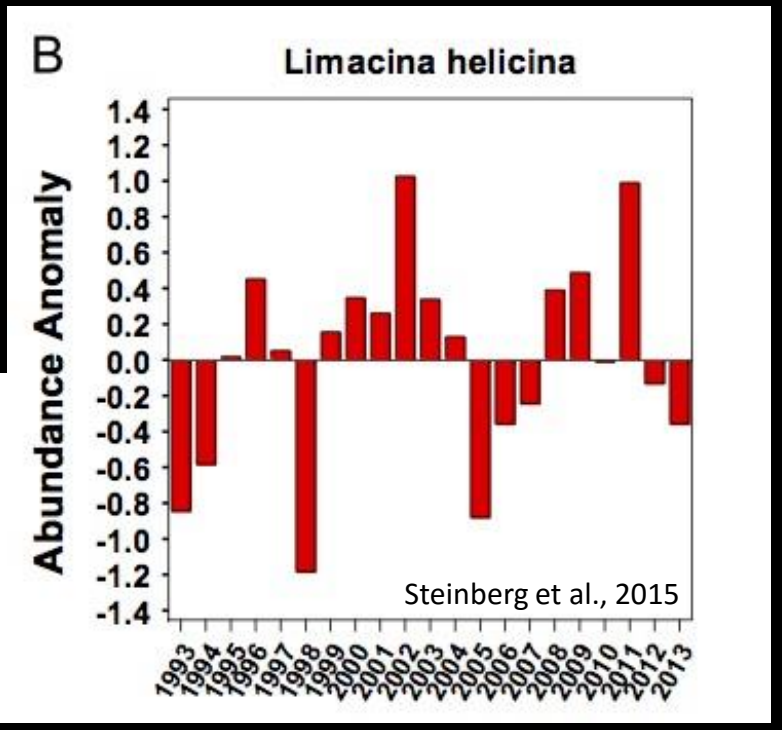
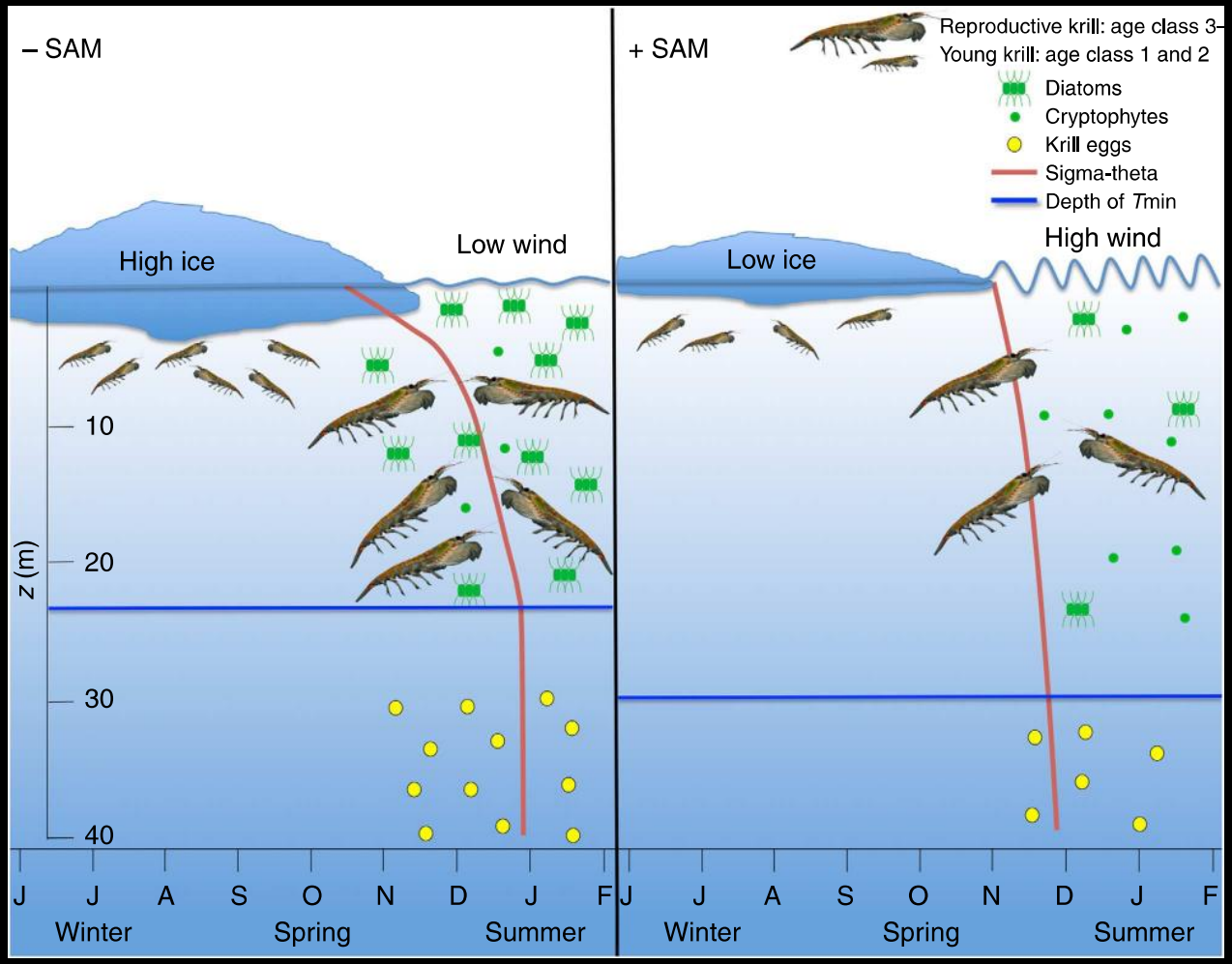
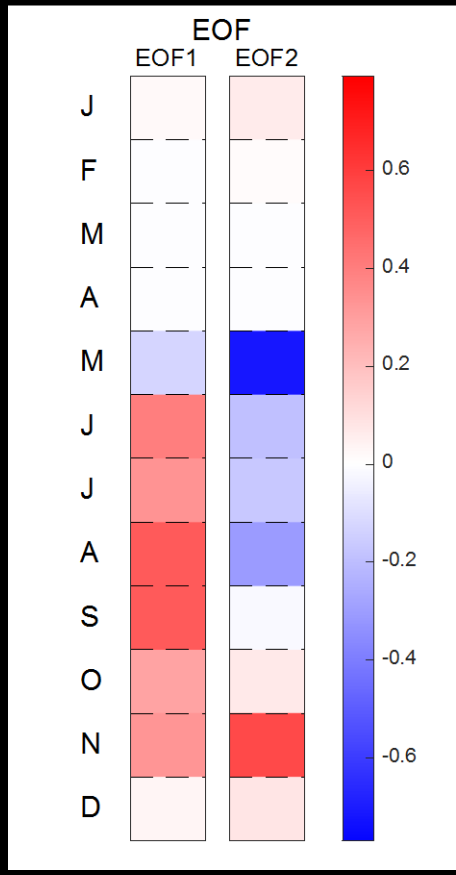


Correlation to SAM (Southern Annular Mode)



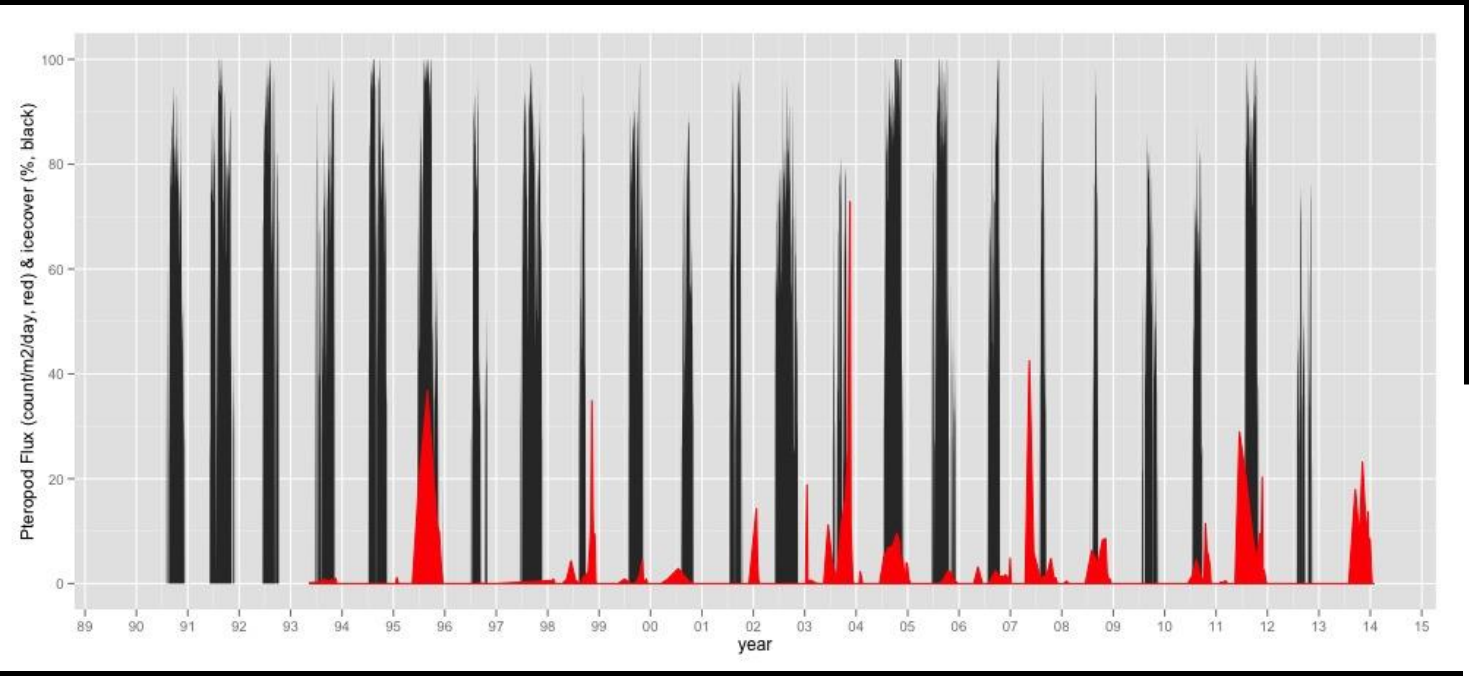
Saba et al., 2014



PC1 vs SAM July
p= 0.034, r= -0.52

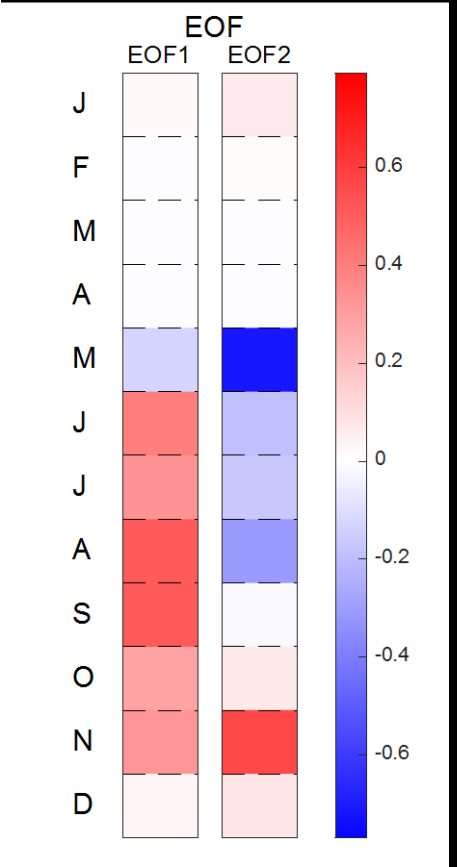
PC2 vs SAM July
p= 0.014, r= 0.62

Correlation to sea ice extent

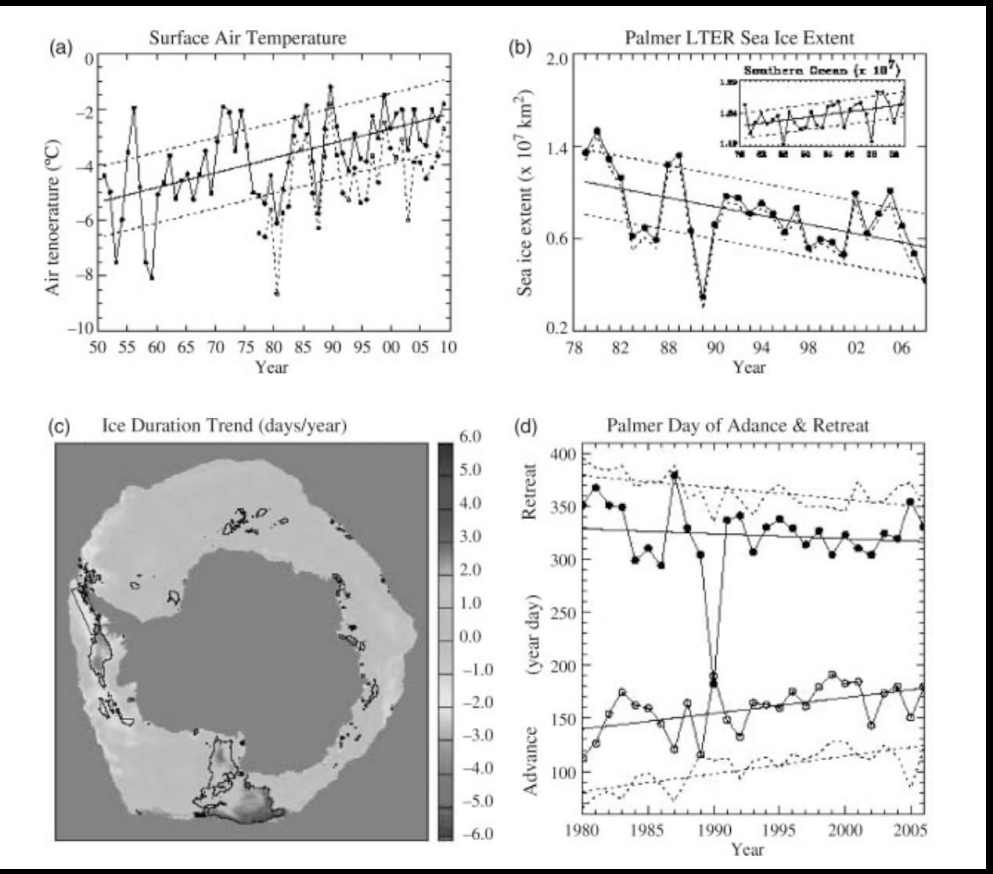


PC2 vs. sea ice extent
-Sept: p=0.002, r= 0.70

1 year lag
-Oct: p= 0.005, r= 0.73
-Nov: p= 0.008, r= 0.65
-Dec: p= 0.007, r= 0.51



Future Outlook



Ducklow et al., 2013

Increasingly ice-free, warmer, and productive waters:

More favorable (and expanding) environment for *L. helicina*

L. helicina abundance linked to phytoplankton: larger amount of energy cycled through *L. helicina* if this trend in increasing flux continues.

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Acknowledgements

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