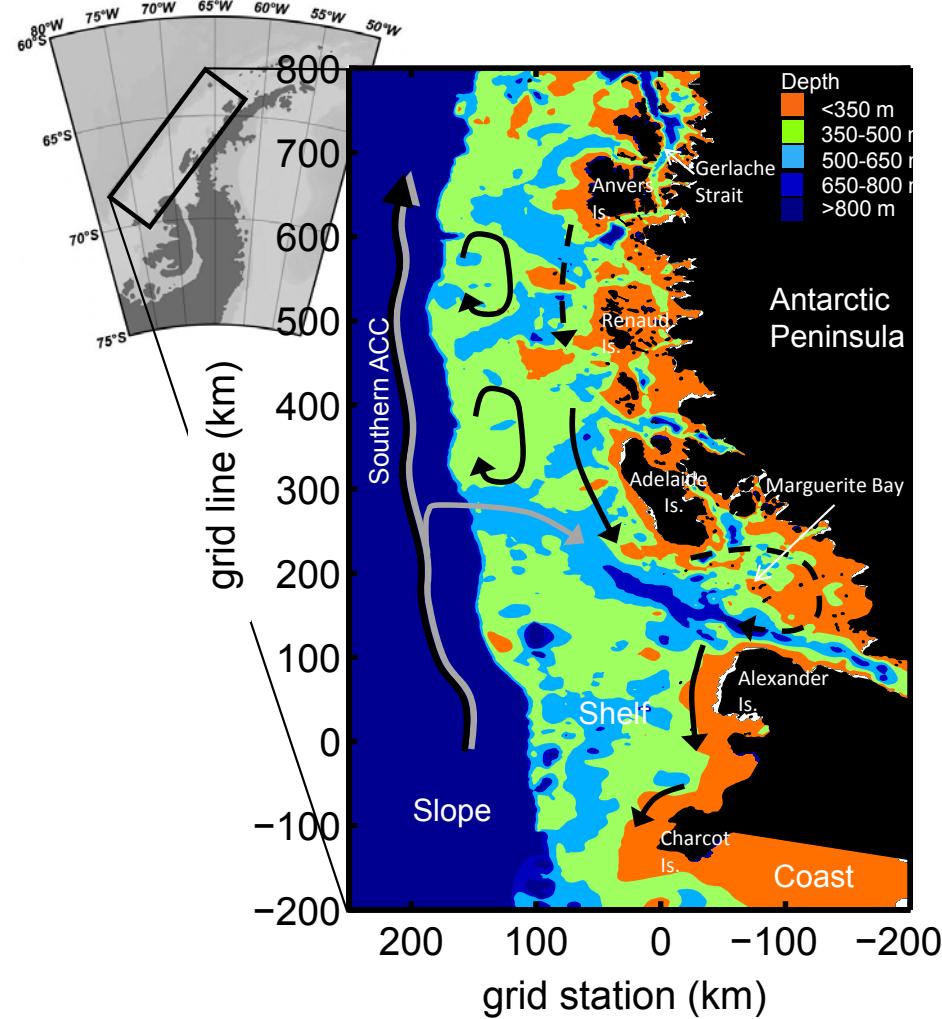
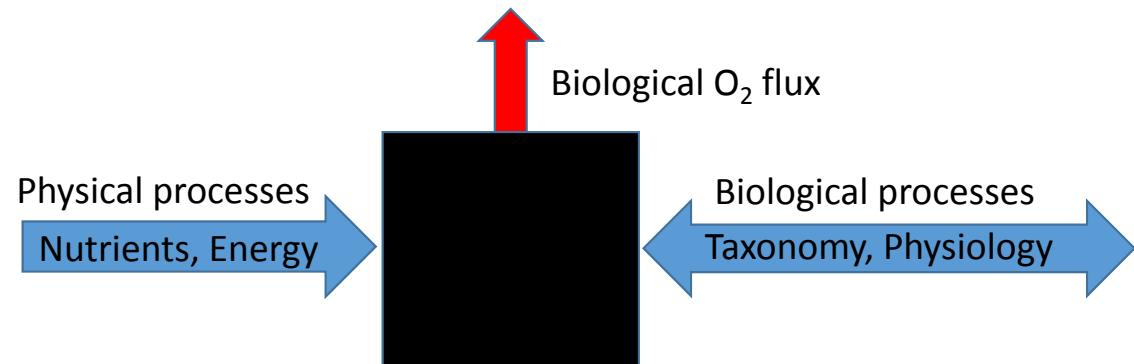


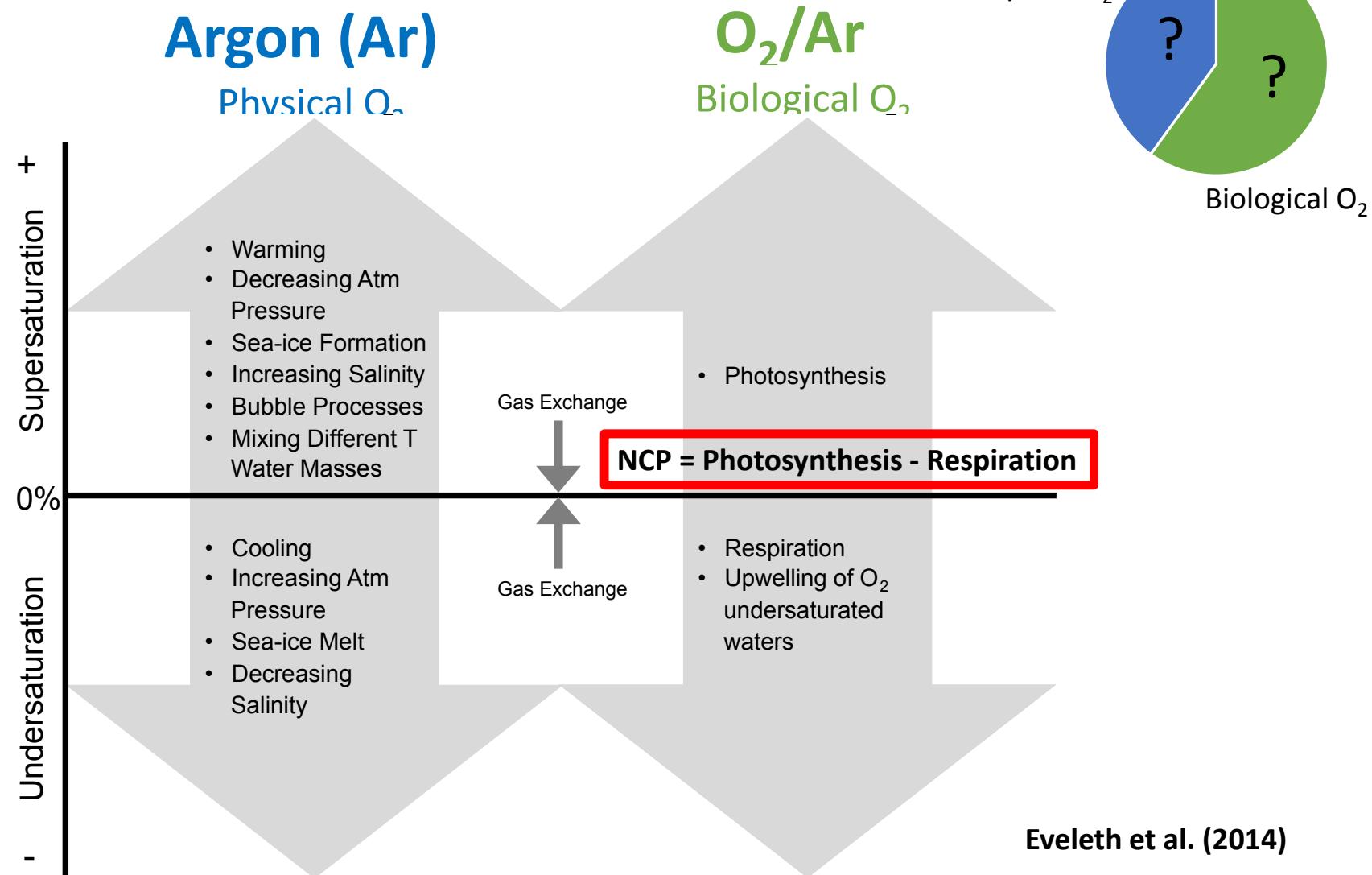
Drivers of biological O₂ flux in the Western Antarctic Peninsula

- Motivating question

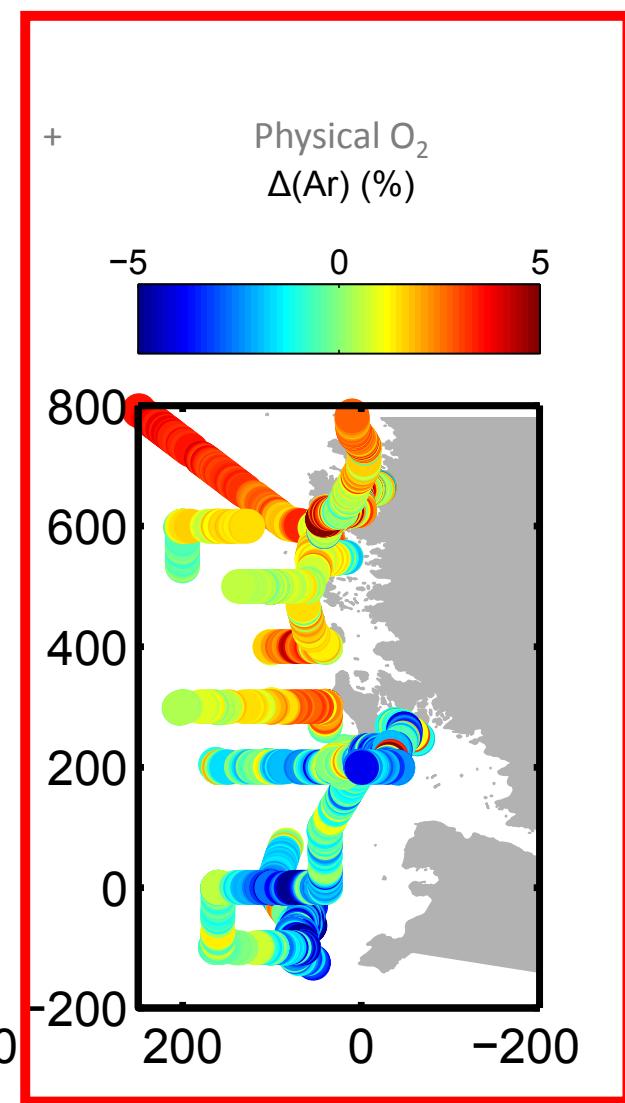
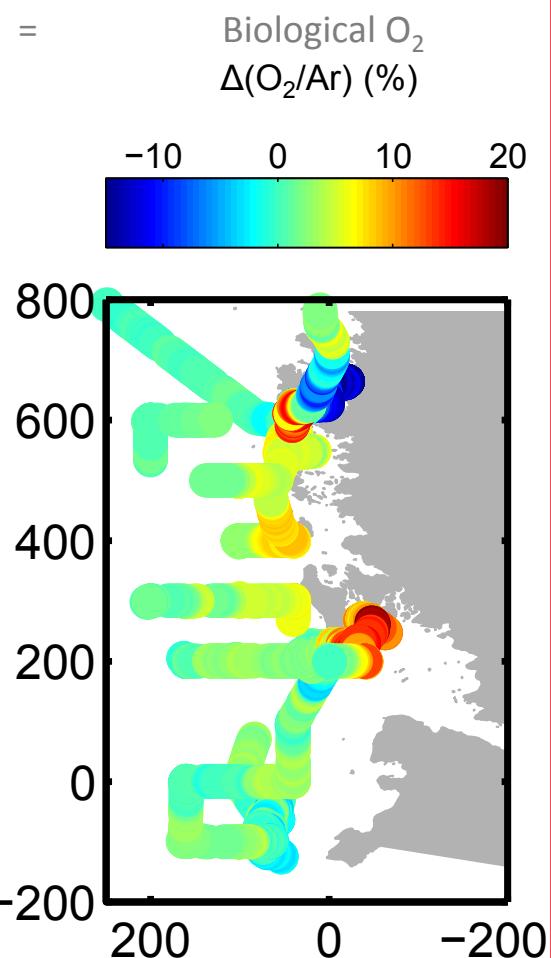
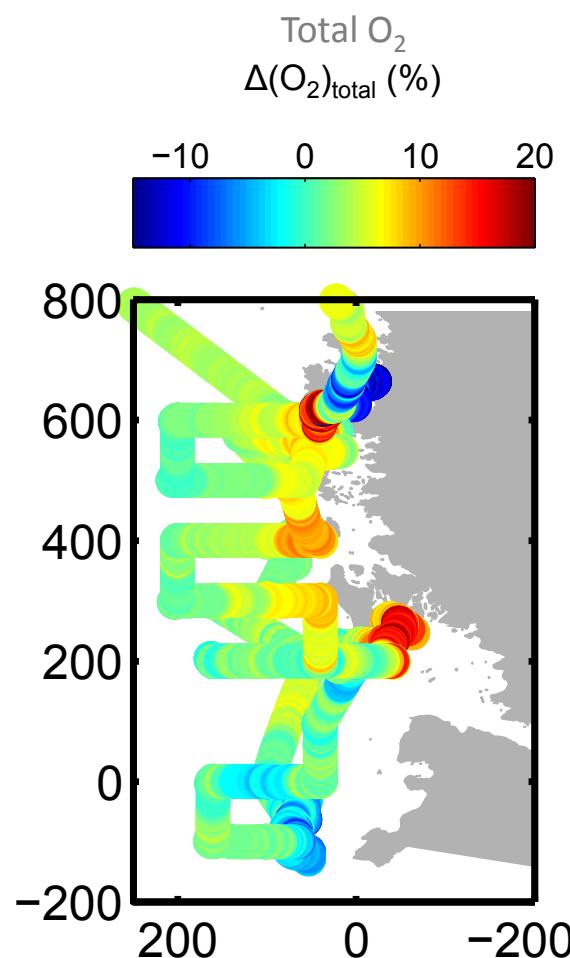
What are the biological and physical processes driving O₂ saturation and net community production variability at the Palmer LTER region?



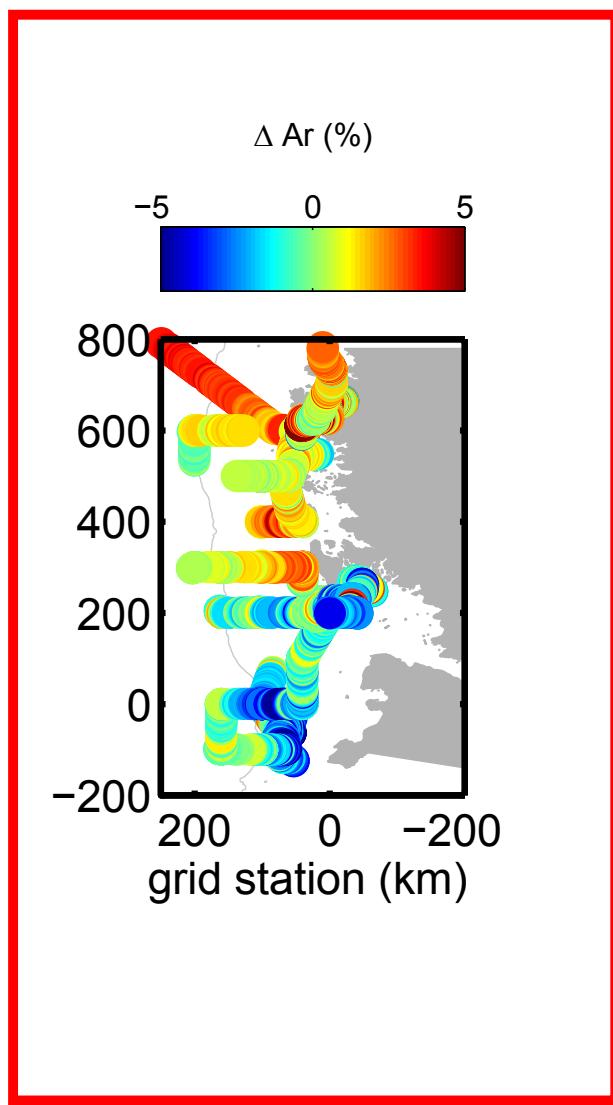
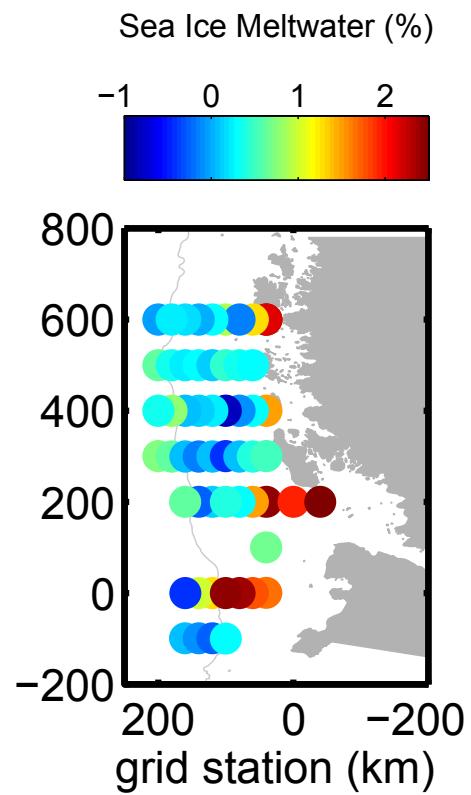
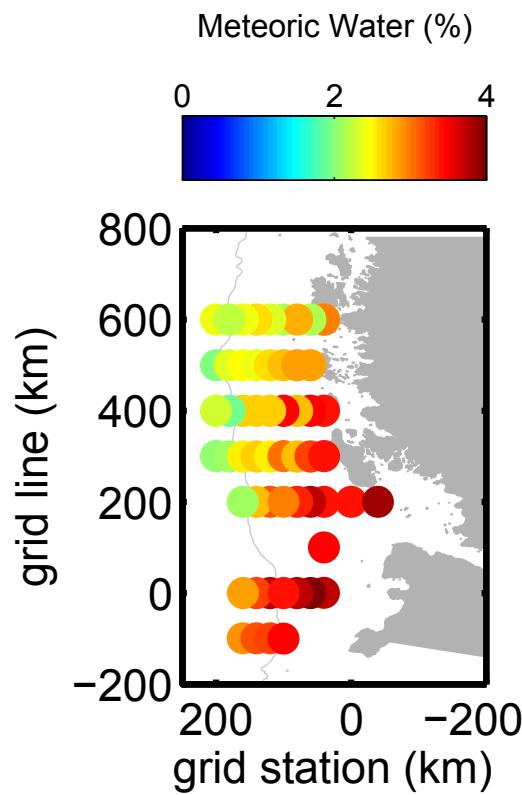
Gas saturation at the Peninsula



Biological and Physical Oxygen (January 2012)



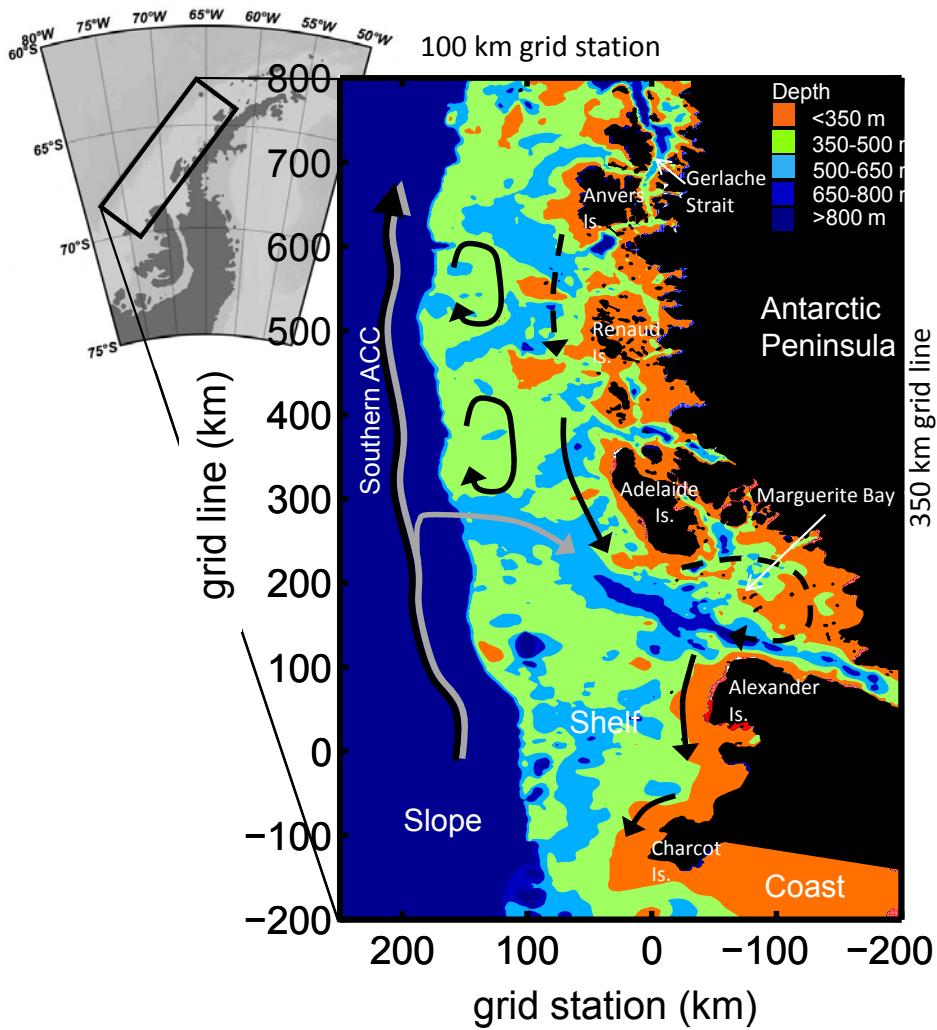
Eveleth et al. (in prep.)



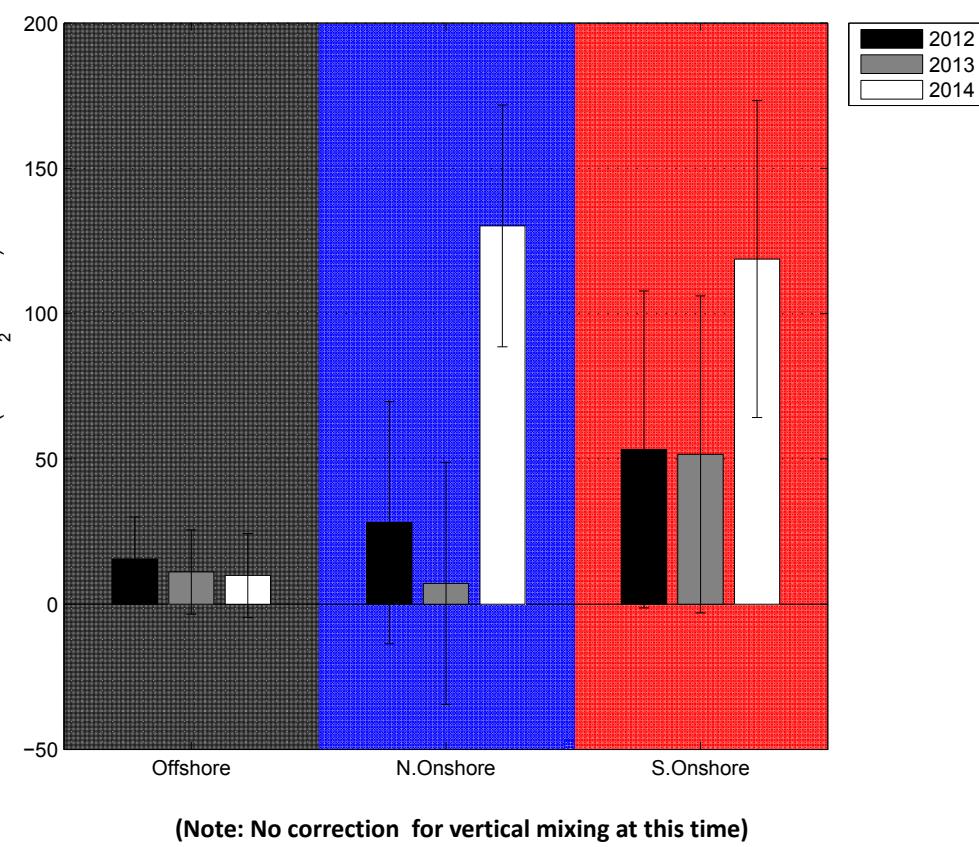
$\delta^{18}\text{O}$ data from Mike Meredith (BAS)

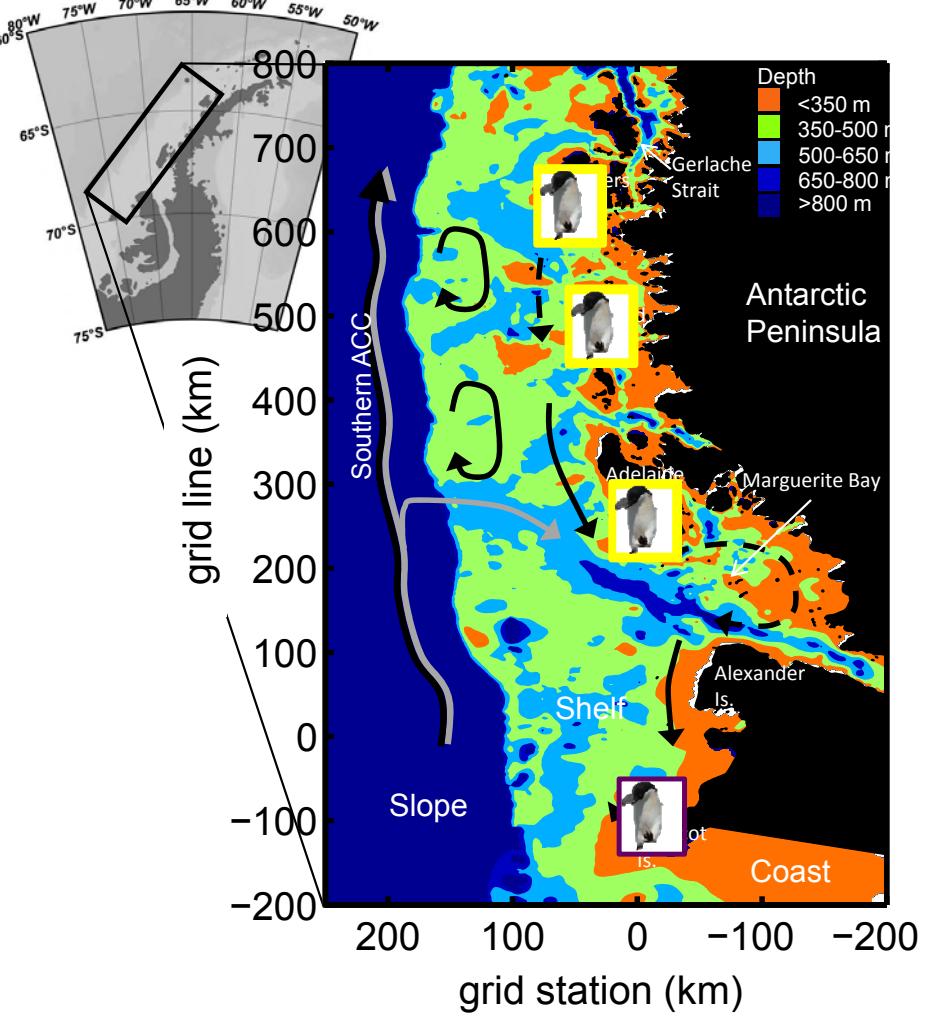
Eveleth et al. (in prep.)

January NCP Grid Variability

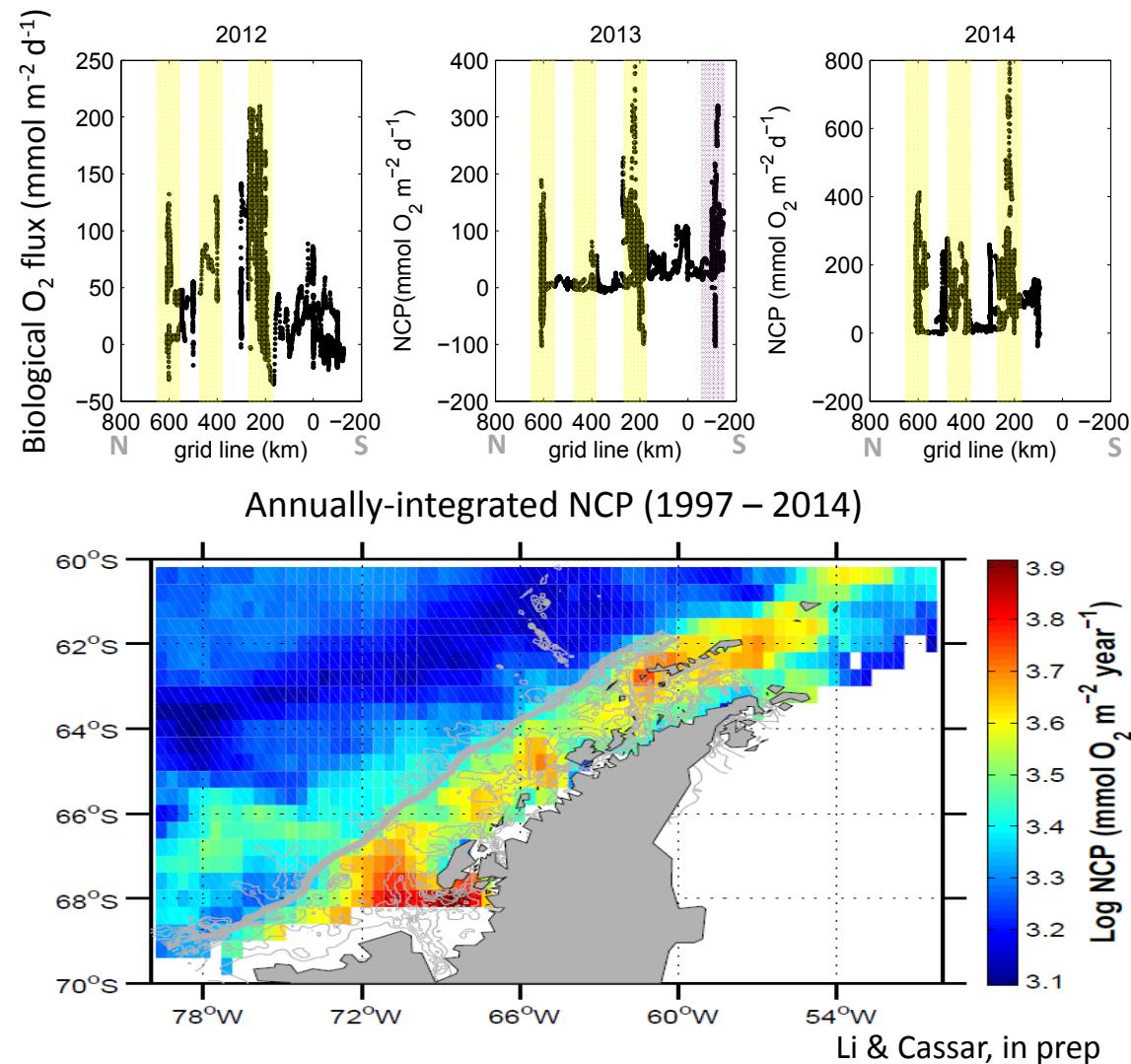


Regional Mean NCP

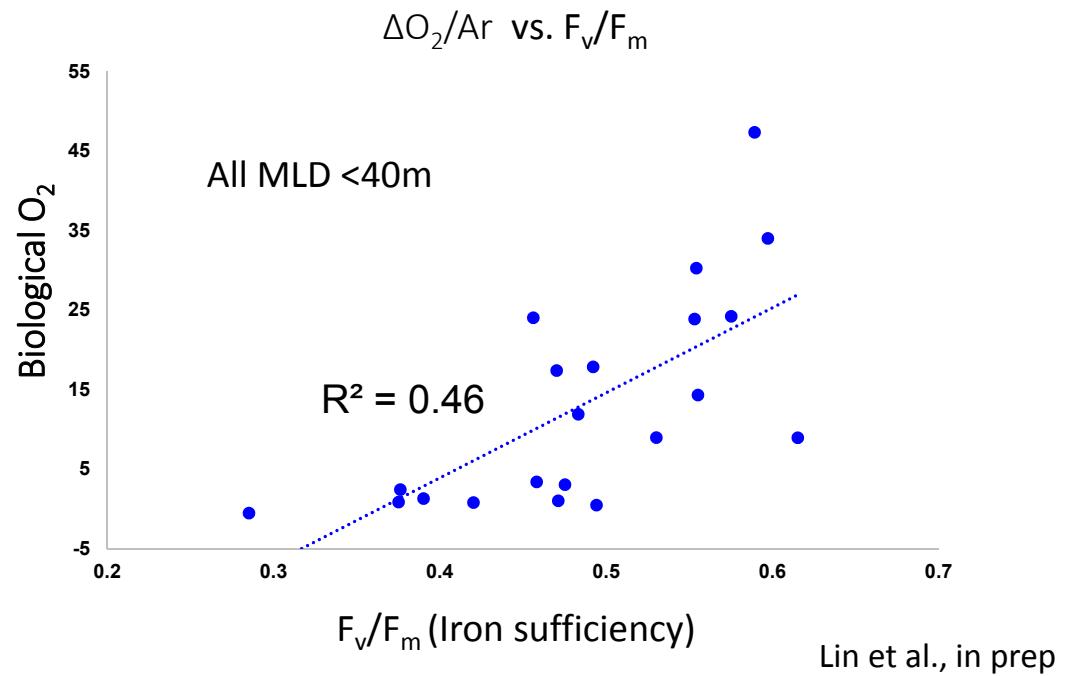
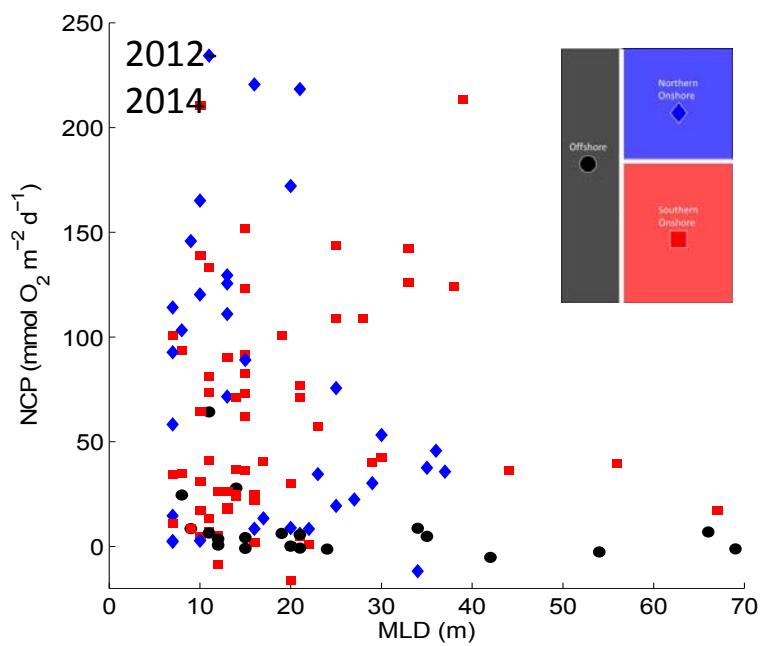




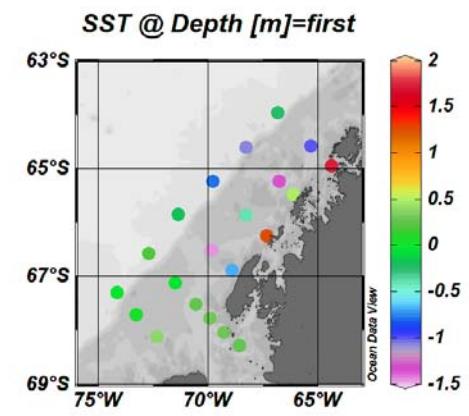
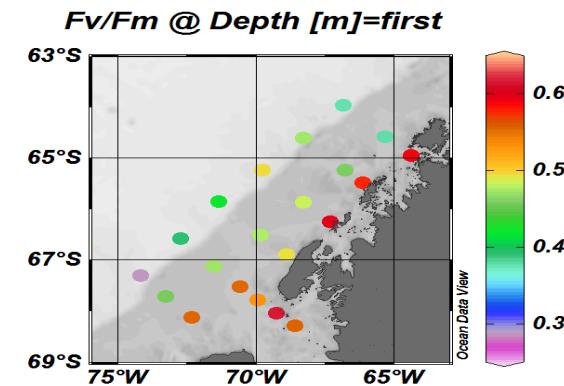
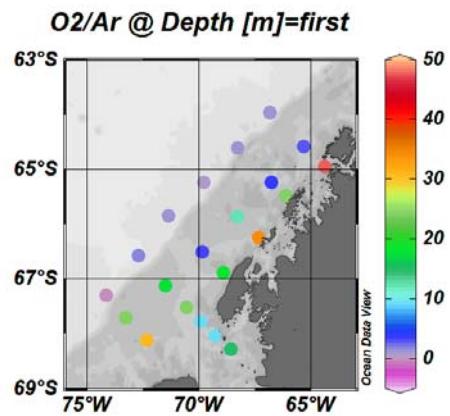
Schoefield et al. 2013, Kavanaugh et al. 2015, in press



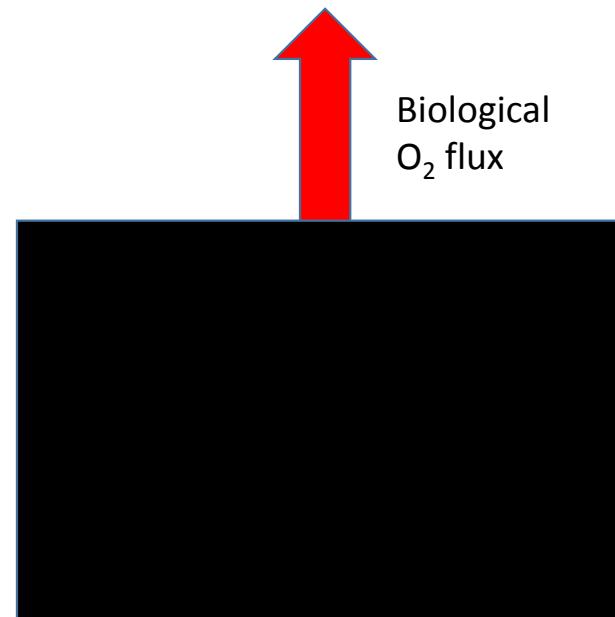
Li & Cassar, in prep



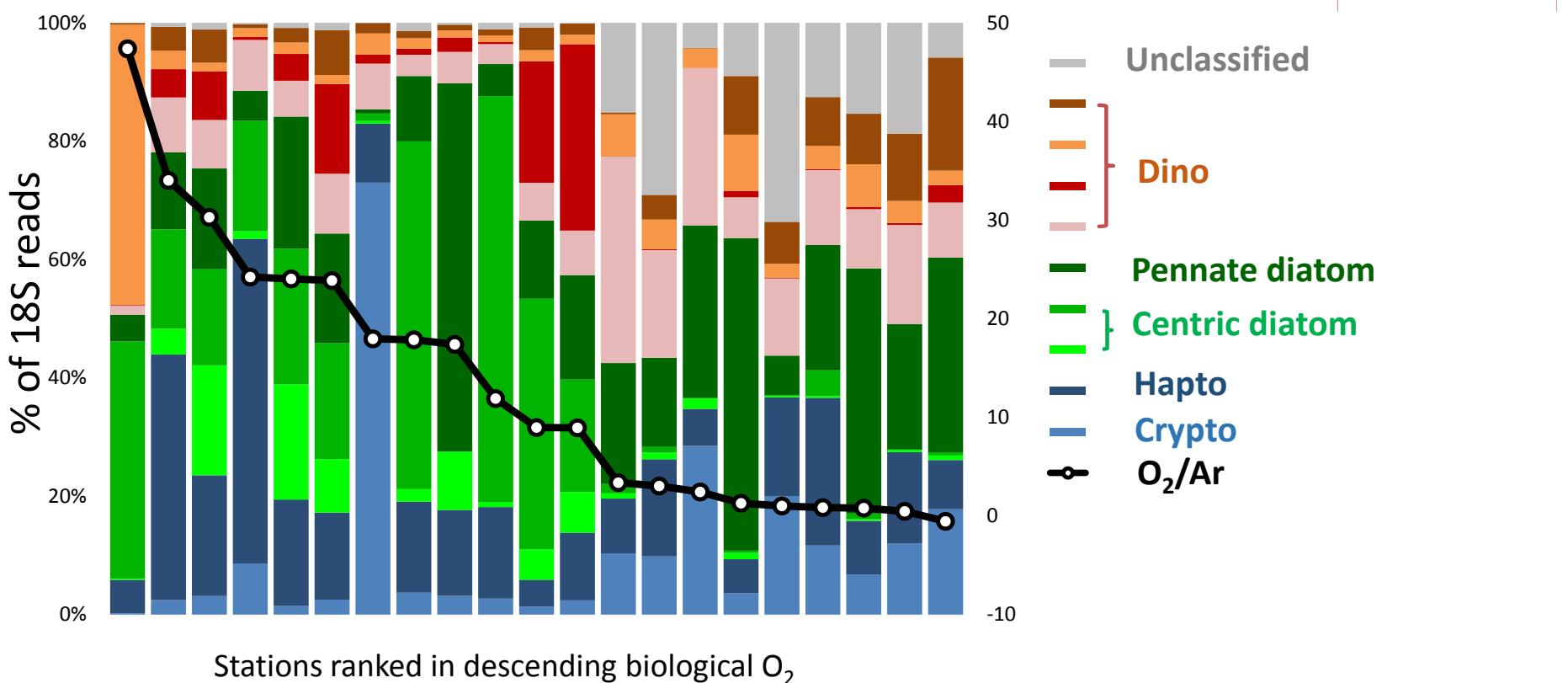
Lin et al., in prep



Cracking the black box...

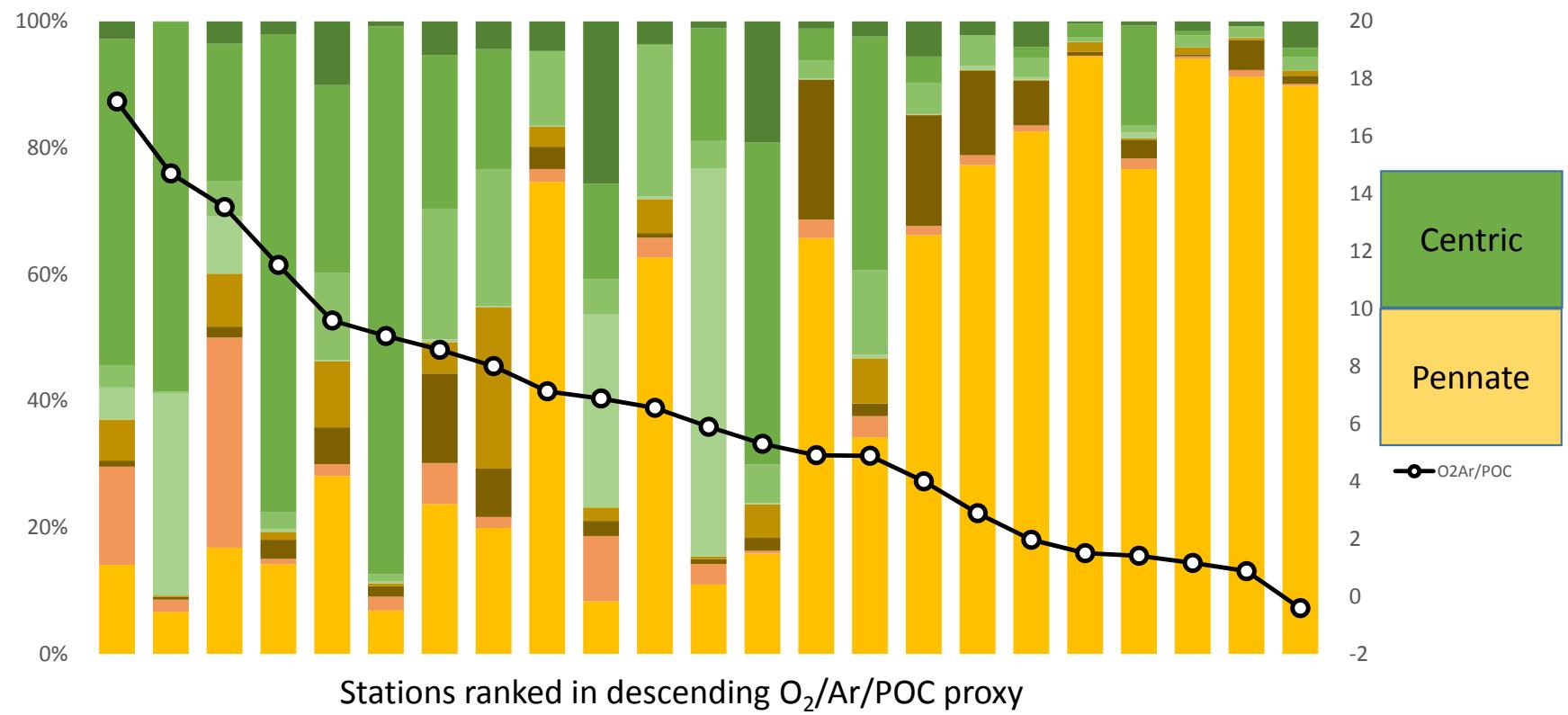


Cracking the black box...

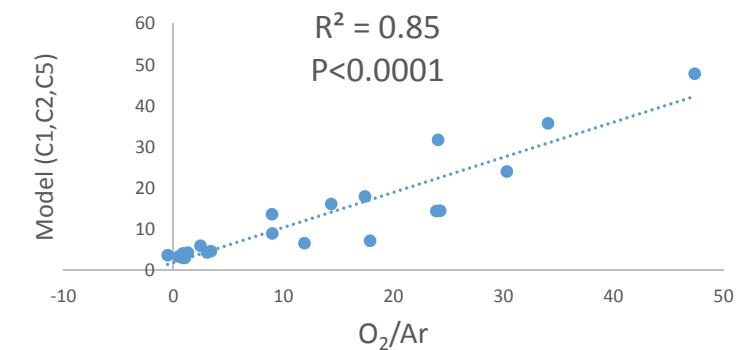
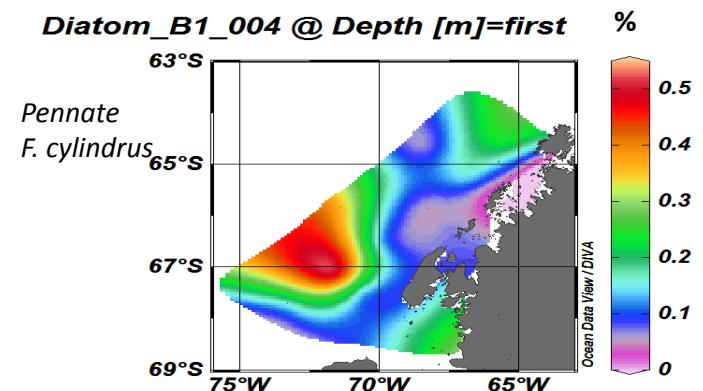
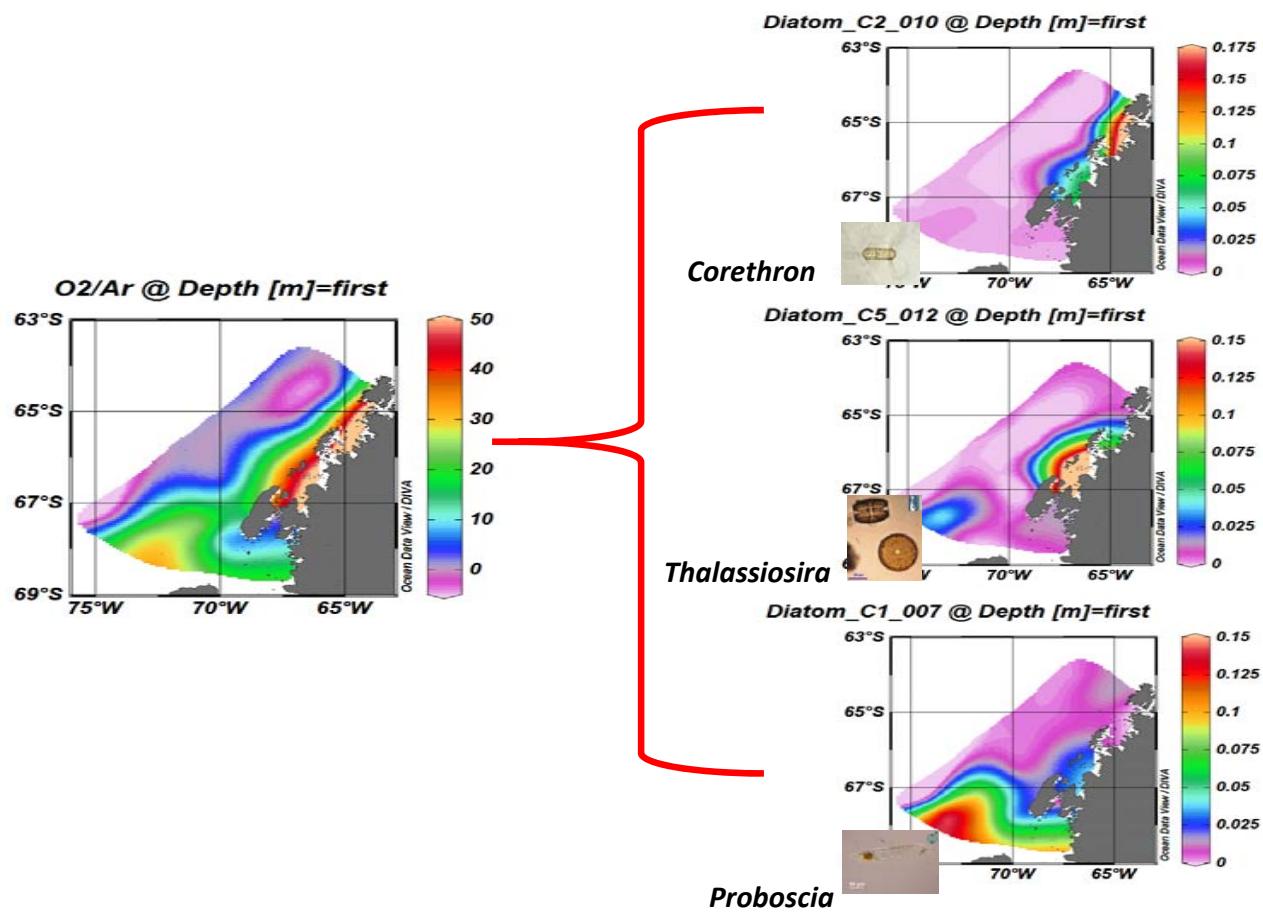


Lin et al., in prep.

Paleo-proxy of NCP?



Which Diatoms?



Linear model - stepwise regression:

$$NCP \sim 1.63C1 + 2.49C2 + 1.37C5$$

❖ 3 of 5 most dominant Diatom OTUs show strong correlation ~ NCP

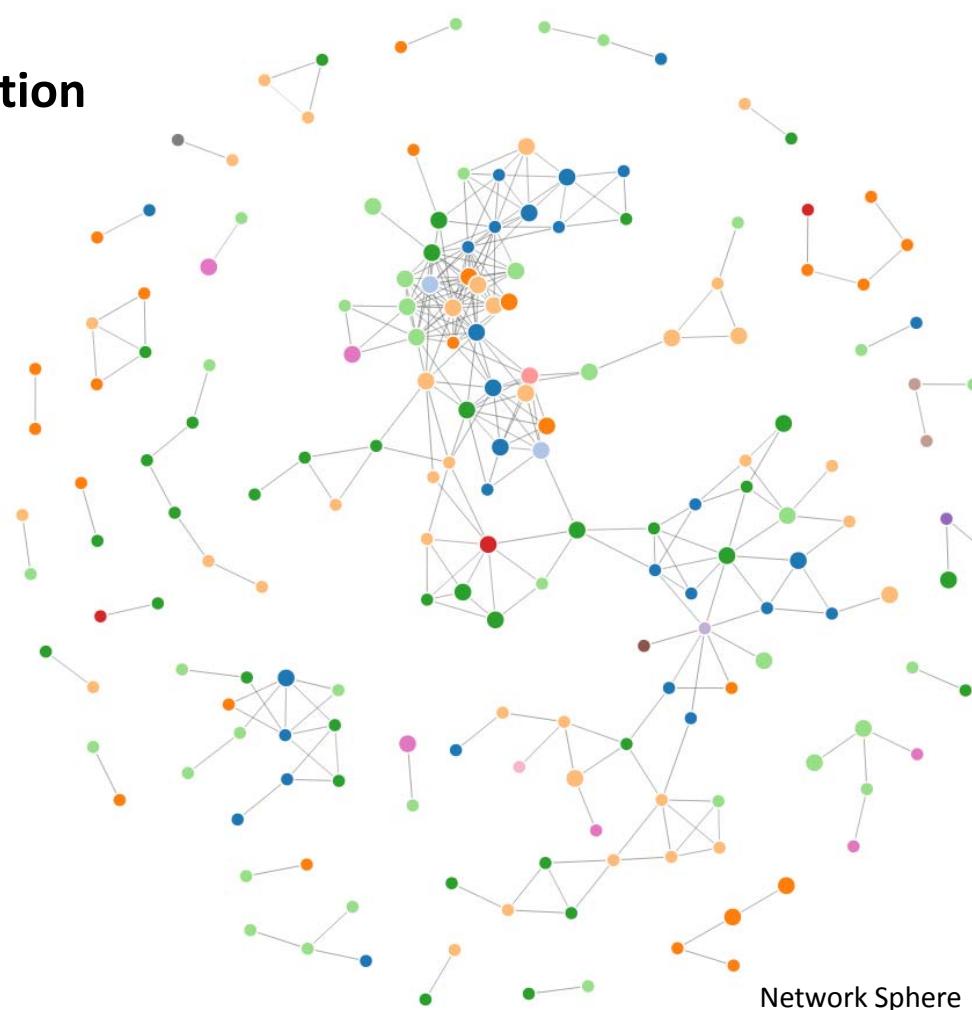
How interactions influence NCP?

NCP = Photosynthesis - Respiration

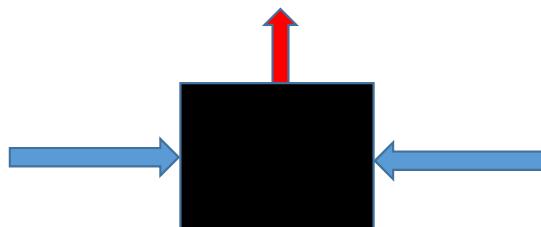
Autotrophs

Heterotrophs

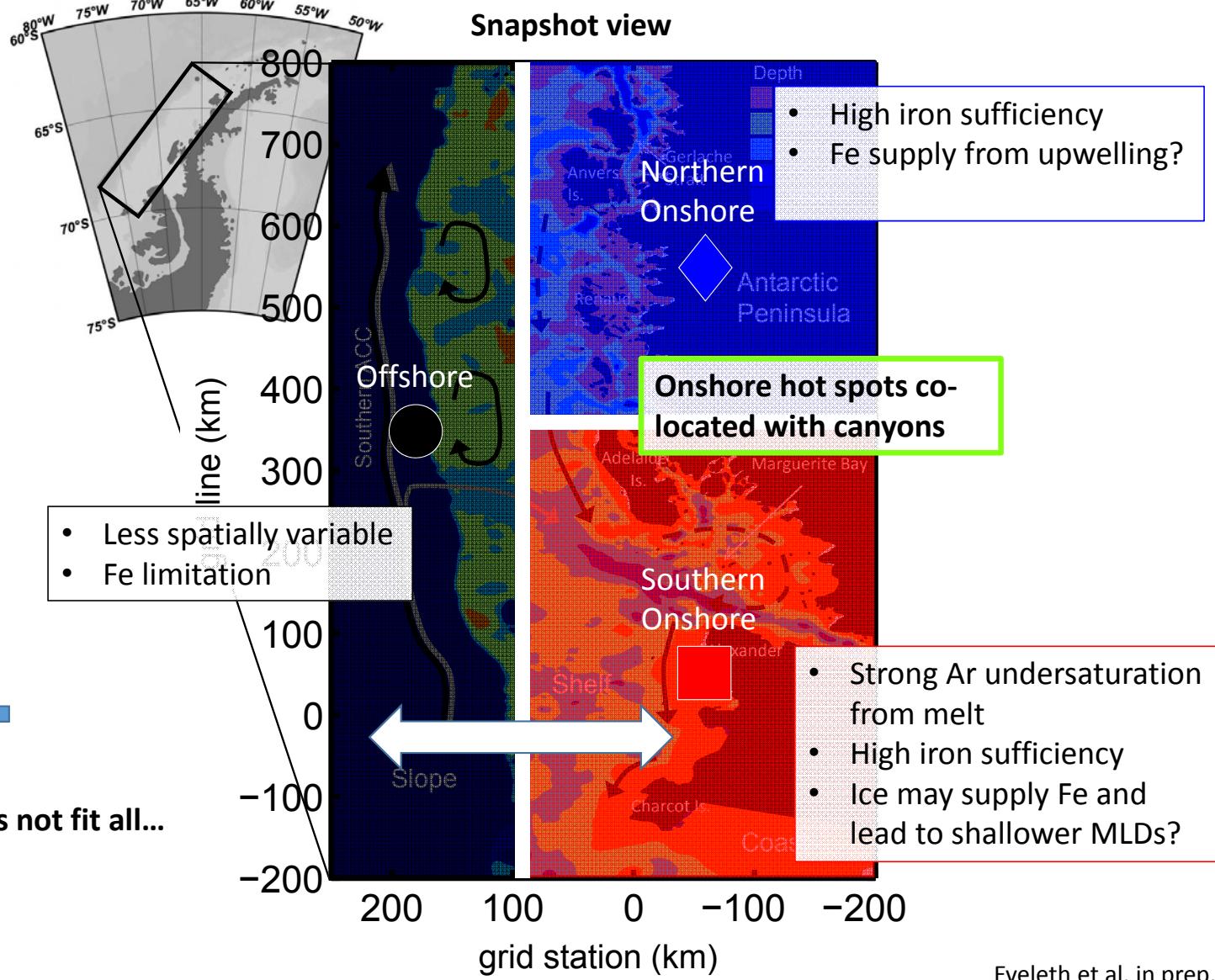
- Gamma
- Unclassified
- Flavo
- Alpha
- Beta



Preliminary Conclusions:



One (biological/physical) solution does not fit all...



Preliminary Conclusions

- **Grid** region: **Biology** dominates O₂ saturation (strong anti-correlation O₂/Ar vs. pCO₂)
- However, large **physical** Ar undersaturation at the ice edge in **Grid** (**Drake**: **Physics** dominates O₂)
- **NCP**: **Diatoms** are not equal, not just **Crypto** vs. **Diatoms**
- Light vs. Fe modulating NCP (Grazing?)
- Role of canyons in NCP (field, satellite observations & penguin colonies)
- Winter priming is important, biological response varies

Questions?

Wish list:

More winter measurements

Increased joint use of biogeochemical & molecular tools

Physical circulation in the canyons

Relation of NCP to carbon and other nutrients attenuation at depth