

Late Season Productivity in the Pacific Arctic: Carbon, Nutrients, and Gases

L. Juranek, M. Goñi, B. Hales,
Oregon State University



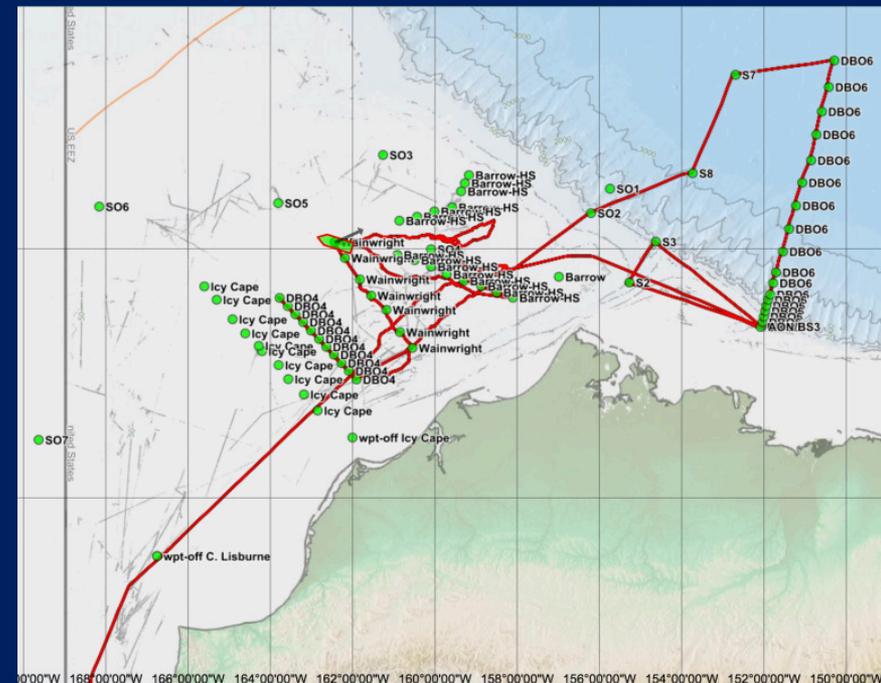
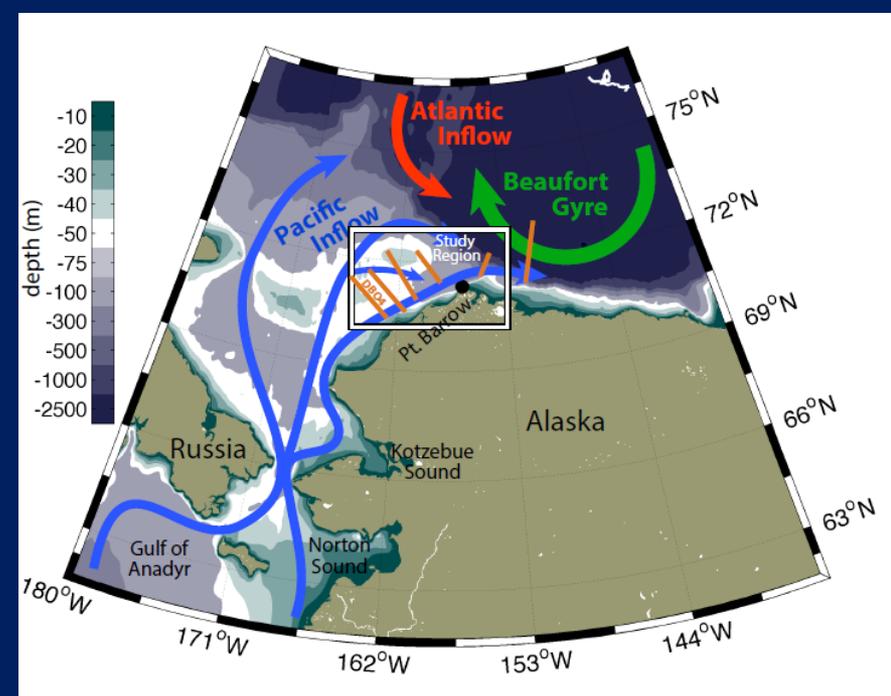
College of Earth, Ocean,
and Atmospheric Sciences



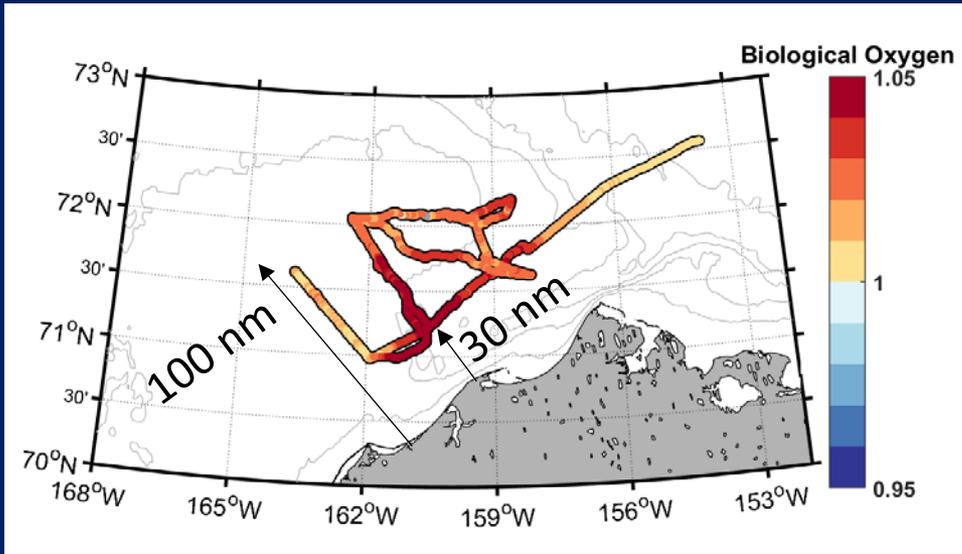
What we did...

September 2016 and August 2017:

- Continuous surface underway nutrients, TCO_2 , pCO_2 , POC, O_2/Ar
- High-resolution towed surveys with suite of sensors (O_2 , backscatter, transmission, fluorescence) as well as fast-response chem for pumped flow (nutrients, inorganic carbon)
- CTD sampling (surface, chl max, bottom)
- Multi-core sediment sampling
- In 2017 only: lowered ADCP, microstructure measurements

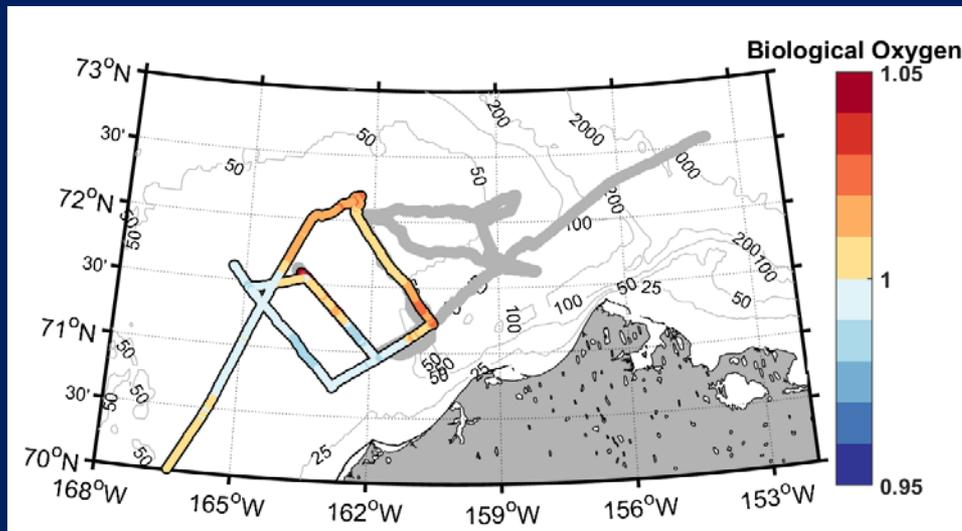


2016 research cruise highlights

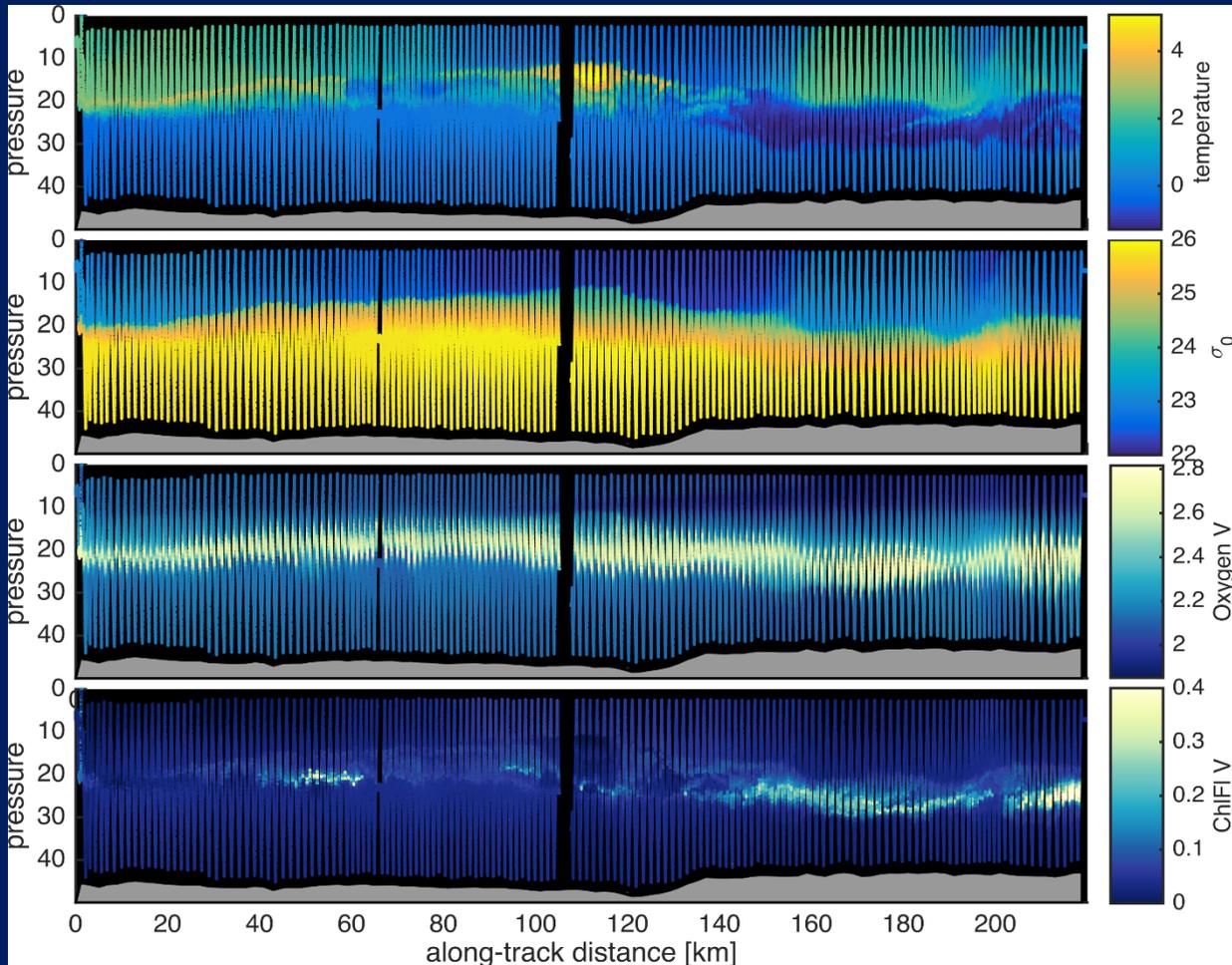


'hotspots' of biological activity apparent between Barrow and Wainwright: warm colors net autotrophy, cool colors net heterotrophy

Highest net biological oxygen saturation measured off of Wainwright 8% biological supersaturation persisted for 3 weeks
(NCP $\sim 1000 \text{ mg C m}^{-2} \text{ d}^{-1}$)



Supersucker observations along DBO4

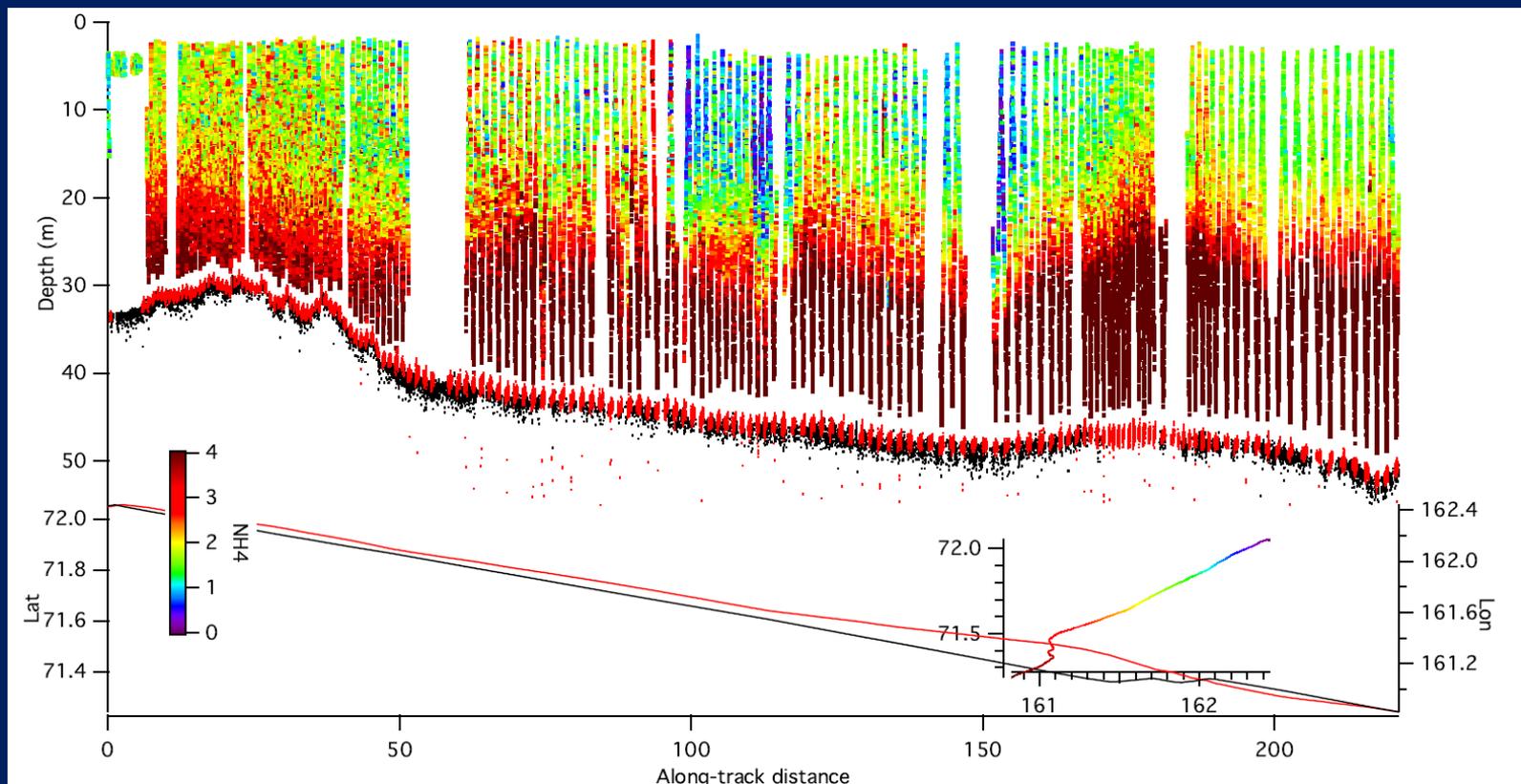


DBO4 line, figure courtesy N. Beaird

Section of NH_4 from towed survey on WT line (9/18/16) – 3rd WT pass

NH_4 in surface waters at $\sim 1 \mu\text{M}$

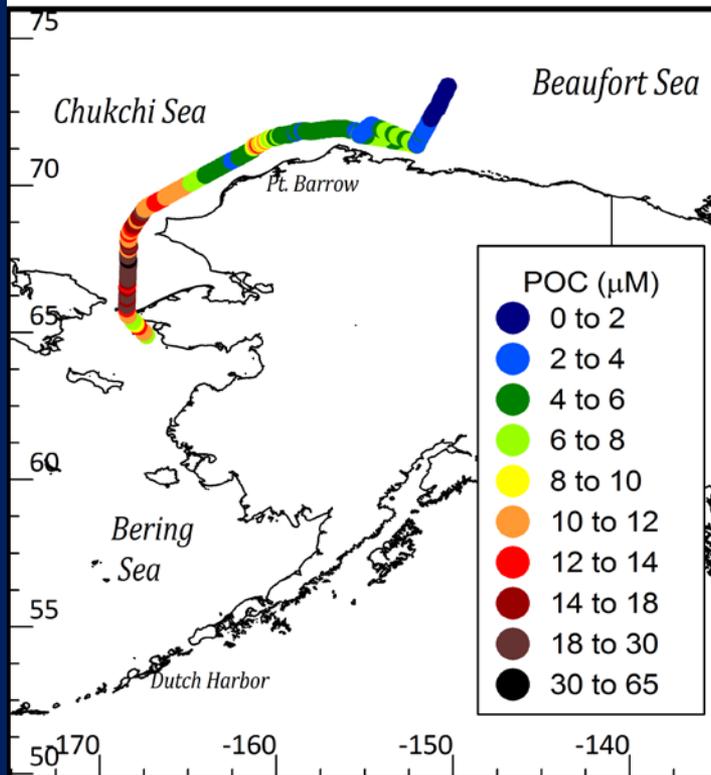
NH_4 in deeper waters $> 3 \mu\text{M}$



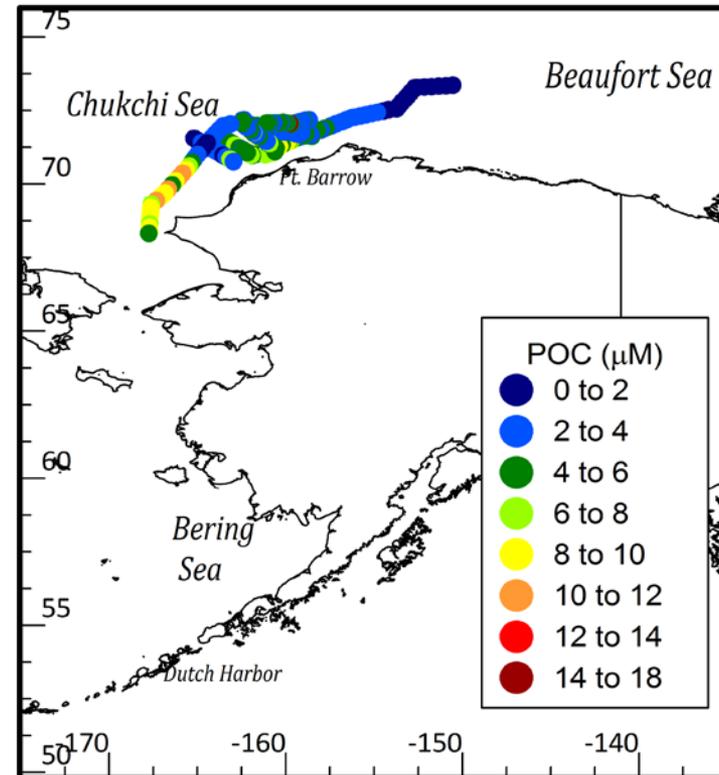
offshore \longrightarrow onshore

Surface POC concentrations

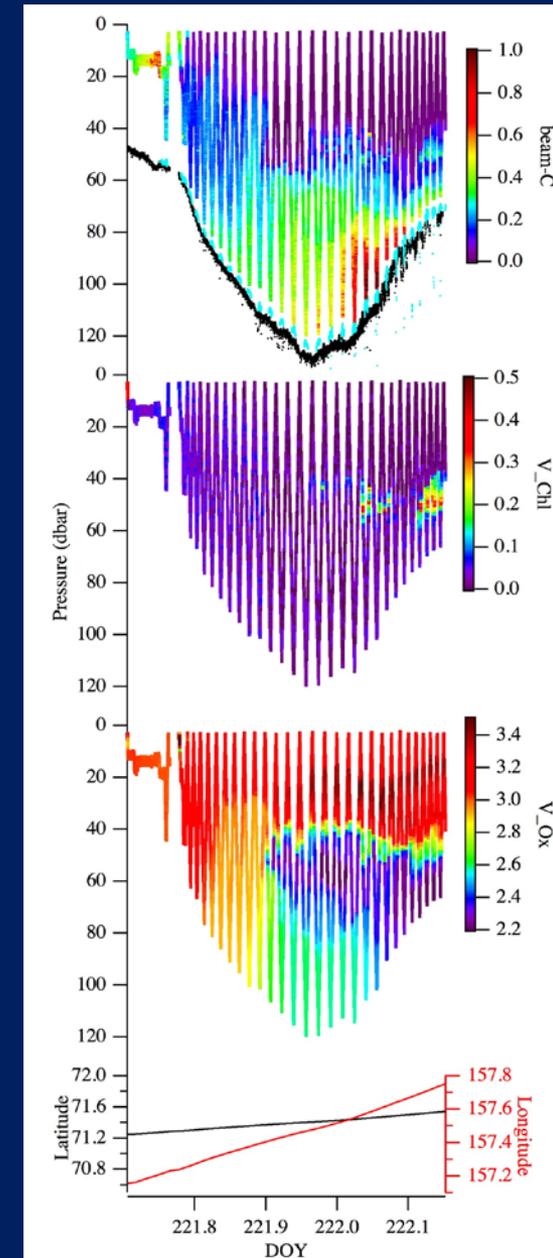
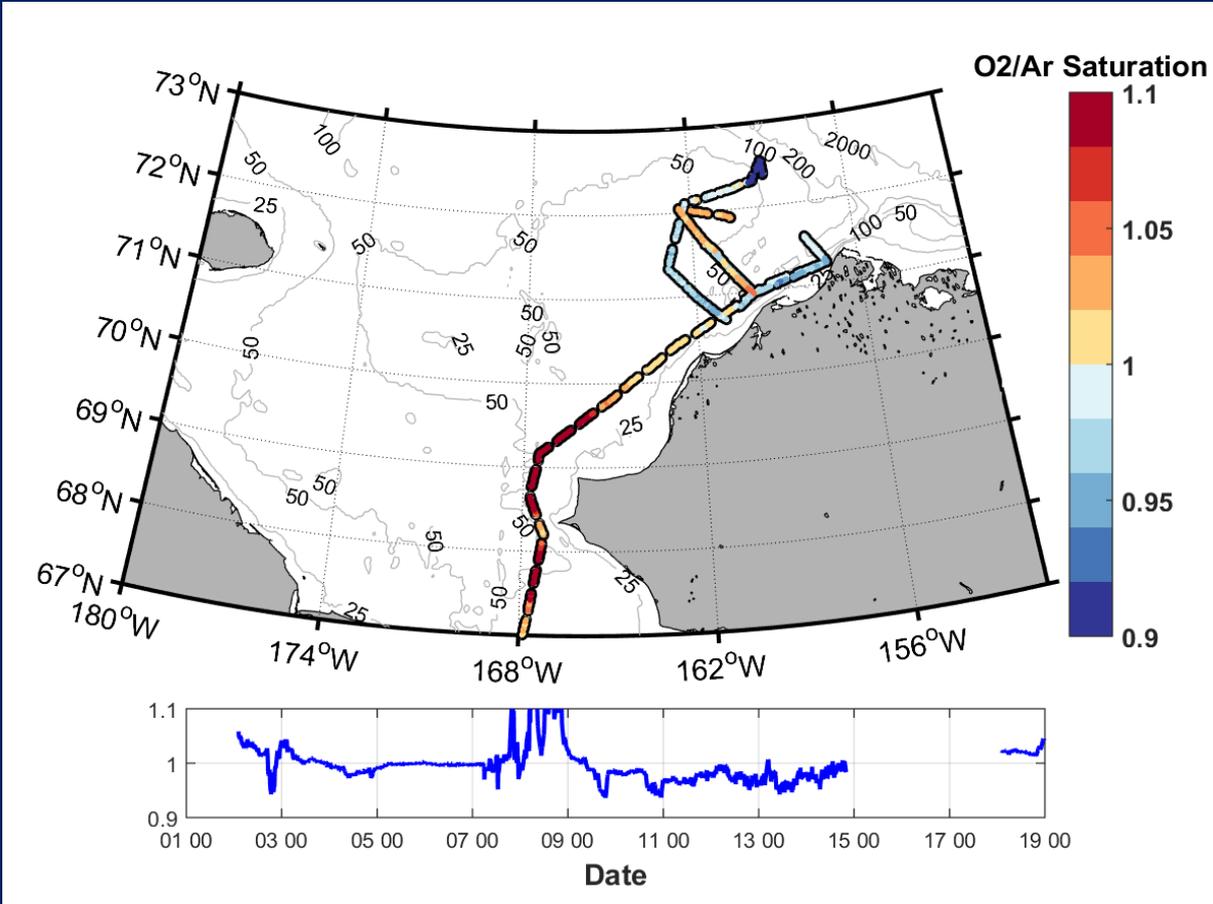
[A] R/V Sikuliaq (Sep 3-10, 2016)



[B] R/V Sikuliaq (Sep 10-26, 2016)



Data collected this year, hot off the press



A few quick observations/conclusions...

- Evidence of episodic activity
- Significant temporal change in observations between repeat occupations
- Evidence of substantial net surface oxygen production (implies export) in 2016, less so in 2017