GOCART: Novel use of gliders for biological carbon pump research

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Without the ocean's biological carbon pump, atmospheric CO_2 would be ~50% higher than it is now. The depth at which sinking organic matter is remineralised is the main factor affecting the amount of organic C stored in the ocean. Currently we do not understand how or why remineralisation depth varies in time, which limits our ability to model the ocean's C cycle. This is mainly due to the challenges of measuring remineralisation depth using conventional methods – a barrier which autonomous underwater vehicles can overcome by providing high frequency data over long periods.

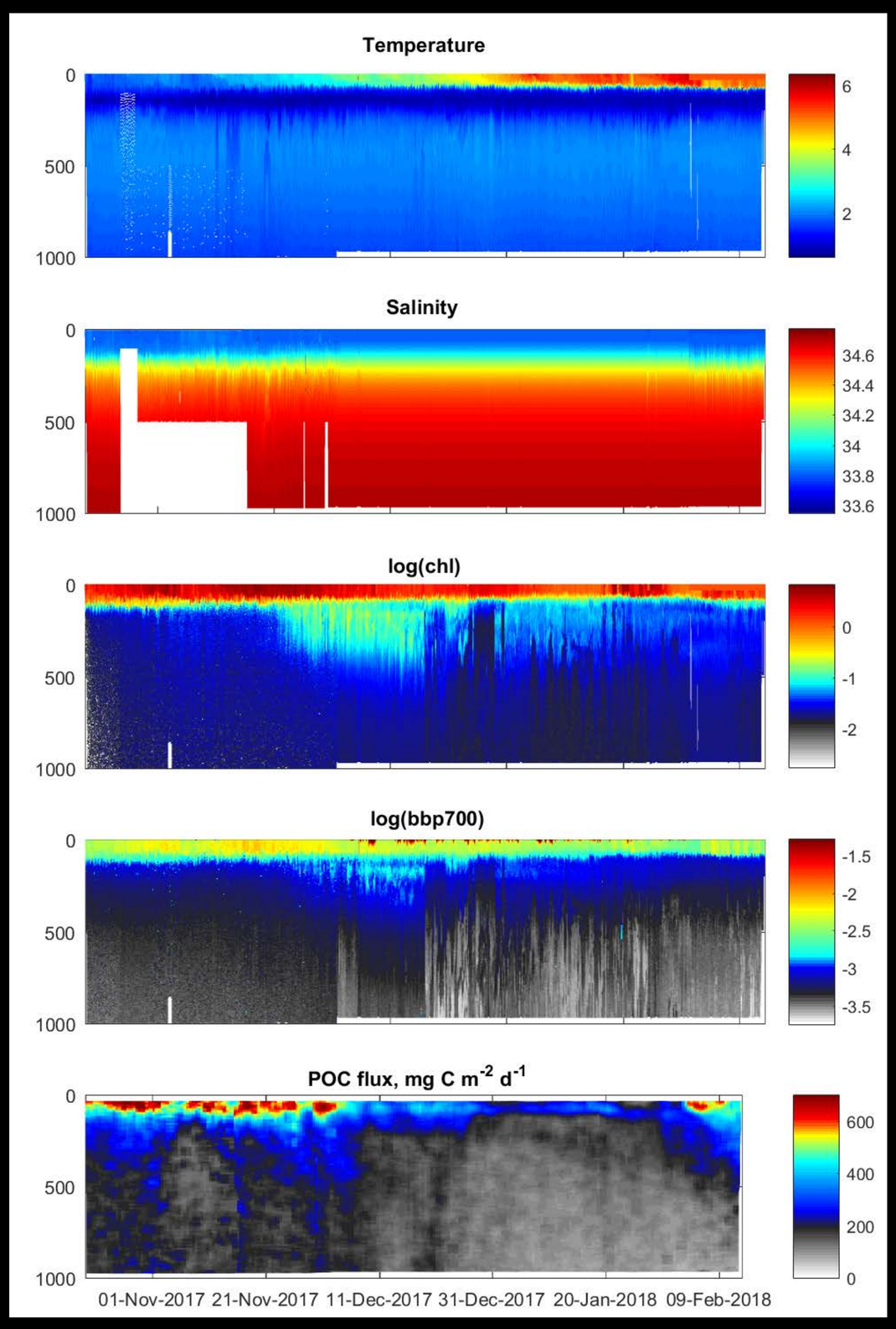
GOCART (Gauging Ocean organic Carbon fluxes using Autonomous Robotic Technologies) has completed two 4 month long deployments at South Georgia and in the Benguela upwelling region. The contrasting conditions in temperature, oxygen and community structure are hypothesised to drive temporal variability in organic carbon fluxes and remineralisation depth. We plan to use the data to answer the questions:

- How does remineralisation depth vary during the course of the spring bloom?
- Does change happen smoothly, or is it interspersed with episodic events?
- How frequent are these events and do they contribute significantly to total carbon flux?
- What factors drive the temporal variability and episodic pulses?

Current work is focusing on:

- Analysing spikes in backscatter to assess large particle sinking speed and contribution to total carbon flux
- Analysing short time scale mixing/stratification events in spring, and subsequent impact on bloom development
- Analysing diel cycles in oxygen concentration to diagnose primary production
- Analysing characteristic time scales of variability in the backscatter to assess episodicity in carbon flux

South Georgia dataset



http://projects.noc.ac.uk/gocart/ @GOCARTcarbon

GOCART

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