

Observations from the schooner Tara's recent mission to the Western Weddell Sea in early 2022

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Introduction

On January 25th 2022, the schooner from the Tara Ocean Foundation left King Georges Island for the 11th leg of the Mission Microbiome in the Weddell Sea. With for ambitious goal to characterize the region's microbiome and interaction with its surroundings, this mission objective is two-fold:

- Sample across well-established physical and biogeochemical gradients, from the Weddell Gyre onto the shelf toward Joinville Island
- Conduct a multi-day process study around an iceberg and sample the sea ice edge



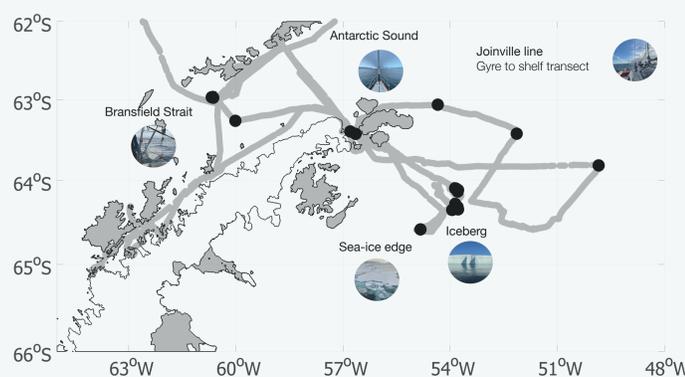
Questions

How do the microbiome responds to variability in the seascape introduced by topography, frontal system and freshwater ?

How do iceberg impacts the local physics, biogeochemistry and biology?

The cruise

From January 25th to February 22nd Tara sampled mainly 5 areas, before sailing back through the Drake passage. 19 stations were sampled, including 9 around the iceberg. In between stations, many underway instruments (optic, pCO₂, TSG) collected data and oxygen isotopes samples were taken. A towed CTD was deployed in the iceberg area.



Data



~70 protocols
> 1300 samples



Physics

repeated CTD profiles on station
VMP, towed CTD



Biogeochemistry

DIC/TA - underway pCO₂
Trace metals (Fe, Mg, Zn...)

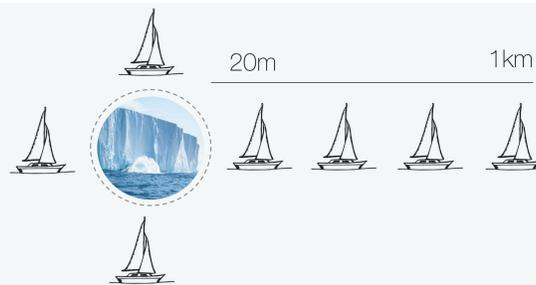


Biology

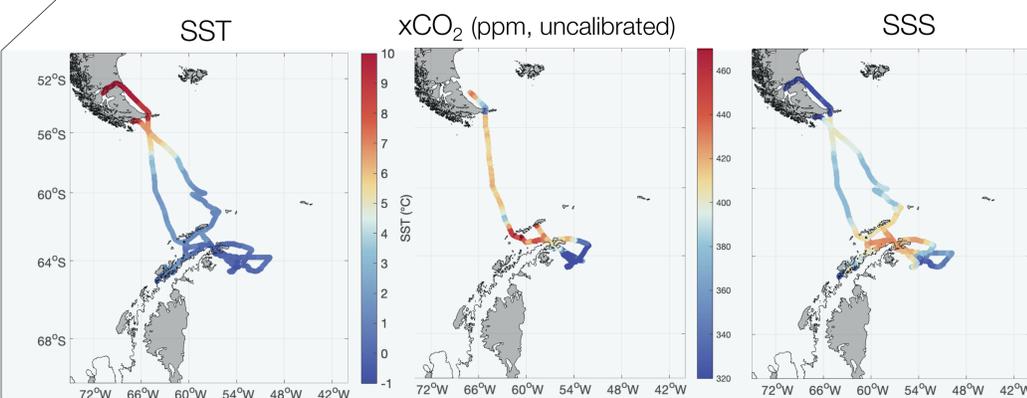
Genomics (short & long read sequencing), proteomics, imaging...

Iceberg

A dedicated 1 week sampling plan around an iceberg has been developed. The iceberg was identified by satellite imagery. Tara circumnavigated around the iceberg during the night, and sampled at different depth and positions during the day, following an intricate plan. Trace metals (including iron), genomics, nets, oxygen isotopes and carbonate chemistry were the priority data to unveil the role of iceberg melt on the Weddell sea.



Carbon



The pCO₂ system from UNH sampled the southern ocean from Jan 27th to Feb 22nd. It highlights strong coastal gradients, a strong carbon sink in the Weddell Sea and a distinct iceberg signature. Data is under calibration, but already shows a promising dataset.

Perspectives

During its journey to Antarctica, Tara used its sailing capabilities to collect a unique set of data. It intersects physics, biogeochemistry and biology, in areas close to the coast, the sea-ice and an iceberg. Over the next few months, the data will be calibrated and the samples analysed to shed new light on this complex area.