Dataset name: **NanoSIMS DIC fixation**

|  |  |
| --- | --- |
| Parameters: | * **single cell fixation**
 |

PROJECT TITLE: **MOBYDICK**

Oceanographic cruise: **MOBYDICK**

Start date: **18/02/2018**

End date: **27/03/2018**

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 Geographic information: **Indian sector of the Southern Ocean**

 Latitude: **49.5°S – 52.5°S**

 Longitude: **67,0°E – 74.5°E**

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# OPERATIONS

## Sampling device(s)

Samples (surface water : 10 or 15 m) were taken from rosette bottles during CTD NCP casts.

## List of stations sampled

M2\_1, M4\_1, M3, M2\_2, M1, M4\_2, M2\_3, M3\_2

# INSTRUMENTS

Instrument Type: **Nanometer-scale secondary-ion mass spectrometer**

Manufacturer: **CAMERA**

Model: **NanoSIMS 50**

Instrument Features / Calibration: **N/A**

# DESCRIPTION of PARAMETERS

## Measurement details

To quantify the carbon uptake of different functional and phylogenetical groups at the single cell level and to evaluate the relative contribution of these groups to the global carbon uptake, samples from the same bottles as for global carbon uptake measurement (13C incubations) have been collected for NanoSIMS analysis.

For unfixed samples, between 500 mL and 1 500 mL were filtered in duplicates within an hour onto 0,65 µm Durapore PVDF hydrophilic filters and directly stored at –80°C. For fixed samples, 300 mL and 2 x 2 L were filtered onto 0,65 µm Durapore PVDF hydrophilic filters.

## Analytical procedure

For single cell DIC uptake, cells will be detached from the PVDF filters by sonication and sorted with flow cytometry to recover phytoplankton cells from different size groups (pico- nano and microphytoplankton). Carbon uptake of the different phylogenetical and functional groups will then be analyzed with NanoSIMS following a method developed by Jardillier and Christaki (ActivEuk INSU project) that is modified after Chapleur *et al.* (2013) and Berthelot *et al.* (2016). Analyses will be performed by end of 2019.

## Units

pmol C cell-1 L-1 d-1

## Sensor precision

The instrument combines high spatial resolution (50 nm) and sensitivity (detecting 1 out of 20 nitrogen atoms and 1 out of 200 carbon atoms).

## Post-cruise data analysis/treatment required

N/A

## Estimated Date of Delivery

* NanoSIMS results: end of 2019.

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Chapleur O., Wu T.-D., Guerquin-Kern J.-L., Mazéas L., Bouchez T., 2013. SIMSISH technique does not alter the apparent isotopic composition of bacterial cells. PLOS ONE *8*, e77522.

Jardillier L., Zubkov M.V., Pearman J., Scanlan D.J., 2010. Significant CO2 fixation by small prymnesiophytes in the subtropical and tropical northeast Atlantic Ocean. *The ISME Journal*, **4**, 1180–1192.

Maugendre L., Gattuso J.-P., de Kluijver A., Soetaert K., van Oevelen D., Middelburg J.J., Gazeau F., 2015. Carbon-13 labelling shows no effect of ocean acidification on carbon transfer in Mediterranean plankton communities. *Estuarine, Coastal and Shelf Science*, **186, Part A**, 100-111.