Dataset name: **Pigments**

|  |  |
| --- | --- |
| Parameters: | * **Pigment concentrations (HPLC)** * **Absorption spectra** * **CDOM fluorescence (EcoTriplet)** * **Chlorophyll fluorescence (EcoTriplet)** * **Backscattering (EcoTriplet)** |

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**

Parameter supervisor: **Céline Dimier**

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# OPERATIONS

## Sampling device(s)

Water samples for pigment determination and absorption spectra measurements were taken from rosette bottles.

A WET Labs Eco Triplet sensor was attached to the rosette frame and deployed at each rosette cast lower than 2000 m.

A BGC-Argo float was launched at station M4\_1 (02/03/2018, 18:25 UT, Lat:-52.5677 Lon:67.2734)

## List of stations sampled

**Table 1 : Sampling operations for pigments and absorption spectra**

|  |  |  |  |
| --- | --- | --- | --- |
| **Station ID** | **Type of operation** | **Cast ID** | **# of depths** |
| M2\_1 | CTD\_Stock | CTD\_007 | 11 depths |
| M4\_1 | CTD\_Stock | CTD\_013 | 11 depths |
| M4\_1 | CTD\_OMICS-P | CTD\_016 | 7 depths |
| M3 | CTD\_Stock | CTD\_023 | 11 depths |
| M2\_2 | CTD\_Stock | CTD\_030 | 11 depths |
| M1 | CTD\_Stock | CTD\_038 | 10 depths |
| M4\_2 | CTD\_Stock | CTD\_042 | 10 depths |
| M2\_3 | CTD\_Stock | CTD\_053 | 11 depths |
| M3\_3 | CTD\_Stock | CTD\_062 | 10 depths |

# INSTRUMENTS

Instrument Type: **ECO Triplet Fluorometer and Backscattering Sensor**

Manufacturer: **Sea–Bird Scientific / WET Labs**

Model: **BBFLCD**

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

Instrument Type: **Spectrophotometer**

Manufacturer: **Perkin-Elmer**

Model: **Lambda-19**

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

# DESCRIPTION of PARAMETERS

## Measurement details

**Pigments**: At each sampled station, 2.32 L water samples were taken at each depth (except at 1000m). Water was filtered onto Whatman GF/F filters in the dark and stored in cryovials. Samples were flash-frozen in liquid nitrogen and stored at –80°C. Pigment determination and quantification will be done using HPLC (High Performance Liquid Chromatography)

**Absorption spectra**: Seawater samples were collected to determine the spectral absorption coefficients of phytoplankton and non-phytoplankton particles. At each sampled station, between 1.5 and 2.32 L of water were taken at each depth (except at 1000 m). Water was filtered onto Whatman GF/F filters in the dark and stored in capsules. Samples were flash-frozen in liquid nitrogen and stored at –80°C.

**Eco Triplet** : a WET Labs ECO Triplet was mounted on the frame of the rosette and collected data independently on each CTD cast shallower than 2000 m. The WET Labs Eco Triplet sensor provided vertical profiles of fluorescence at 3 wavelengths: 695 nm (chlorophyll fluorescence), 700 nm (backscattering) and 460 nm (CDOM). This instrument is identical to the one mounted on the BGC-Argo profiling float launched at M4\_1 station and will be used for calibration/validation of the bio-optical proxies.

## Analytical procedure

**Pigments**: Phytoplankton pigment determination and quantification will be done using HPLC (High Performance Liquid Chromatography). Analyses by HPLC will be performed at the SAPIGH analytical platform at LOV, following the method of Ras *et* al. (2008) adapted from Van Heukelen & Thomas (2001).

**Absorption spectra**: Determinations of the spectral absorption coefficients of particles, phytoplankton and non-algal particles will be performed at LOV using a Perkin-Elmer Lambda-19 spectrophotometer equipped with an integrating sphere, following the method described in Bricaud *et al.* (2010).

## Units

* HPLC pigments mg m–3
* Spectral absorption coefficients m–1
* Chlorophyll *a* from fluorescence (ECO Triplet) mg m–3
* CDOM from fluorescence (ECO Triplet) ppb
* Particulate backscattering at 700 nm (ECO Triplet) m–1

## Sensor precision

N/A

## Post-cruise data analysis/treatment required

N/A

## Estimated Date of Delivery

8 months after cruise end.

# BIBLIOGRAPHY

Bricaud A., Babin M., Claustre H., Ras J., Tièche F., 2010. Light absorption properties and absorption budget of Southeast Pacific waters. *Journal of Geophysical Research: Oceans*, **115**(C8), C08009.

Ras J., Claustre H., Uitz J., 2008. Spatial variability of phytoplankton pigment distributions in the Subtropical South Pacific Ocean: comparison between in situ and predicted data. *Biogeosciences*, **5**, 353-369.

Van Heukelem L., Thomas C.S., 2001. Computer-assisted highperformance liquid chromatography method development with applications to the isolation and analysis of phytoplankton pigments, *Journal of Chromatography A*, **910**, 31–49.