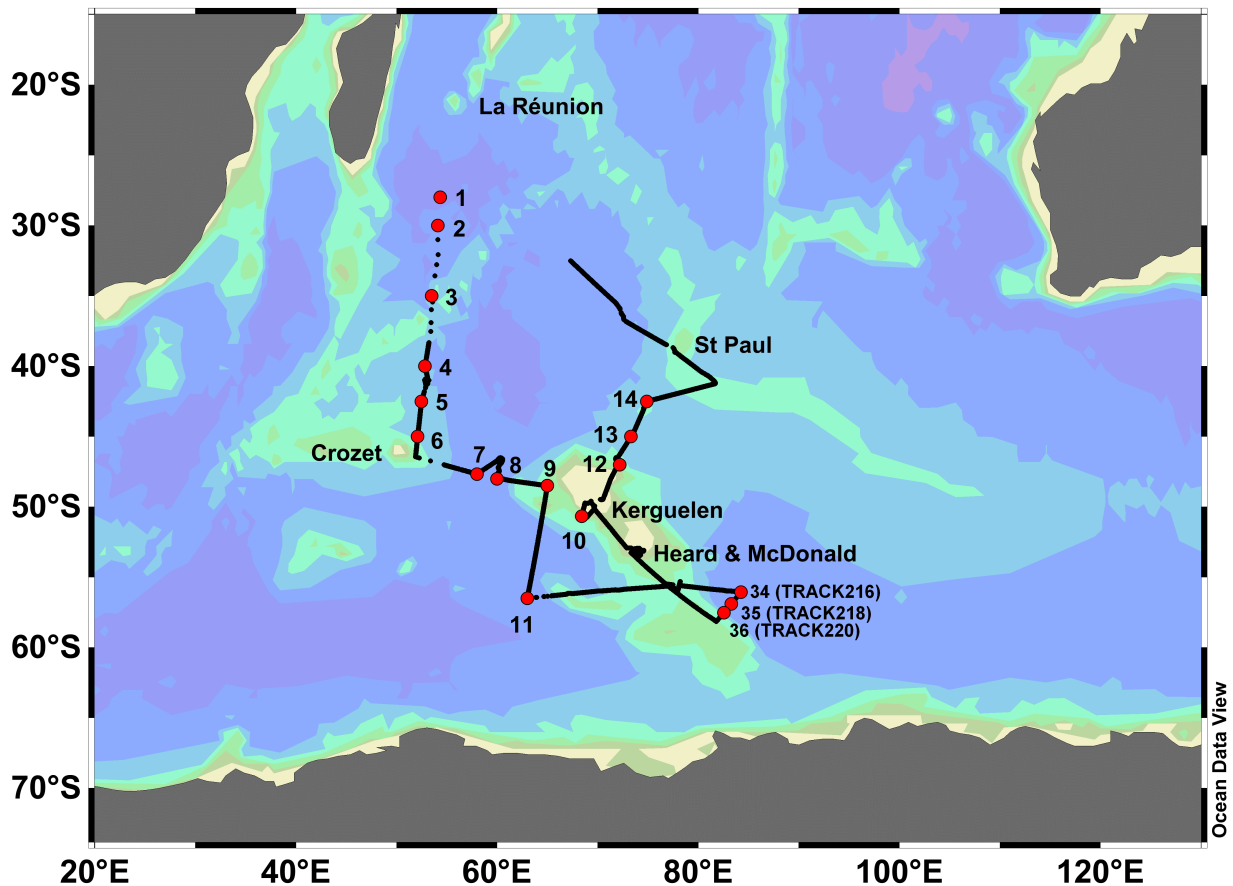


OISO18 cruise  
conducted in Dec.2009/Jan.2010  
on board *R.V. Marion Dufresne*



Map locating the observations collected during the OISO18 cruise conducted during austral summer in 2009/2010. Water column samples were collected at 17 CTD stations (shown as red dots), including three stations shared with the TRACK-2 project (H-Y. Park and F. Vivier). Also indicated are the surface underway measurements (in black, CO<sub>2</sub> and related parameters).

## Metadata for water column observations - OISO18

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### Cruise Info

Project Name: Océan Indien Service d'Observation (OISO)  
Objectives: The OISO program, started in 1998, aims at monitoring observations of the CO<sub>2</sub> system and associated properties (hydrology, biogeochemistry) in both sea surface and water column in the Southern Indian Ocean.  
Cruise Name : OISO18  
Expocode: 35MF20091219  
Region: South Indian Ocean  
Spatial Coverage: 28°S-58°S, 52°E-84°E  
Temporal Coverage: 2009, Dec, 19 – 2010, Jan, 24  
Ports of Call: Le Port, Reunion Island  
Vessel, Country: Marion Dufresne (IPEV), France

## **Dataset Info**

Submission Date: 2013, January

### **- Temperature CTD:**

Units : Degree Celsius

Method: Temperature sensor Sea-Bird SBE3, calibrated in June 2009. A different sensor was used for stations 34 to 36 (TRACK-2 project, H-Y. Park and F. Vivier).

Quality Control: Temperature data are in good agreement with previous observations collected at the same locations (INDIGO and OISO data).

### **- Salinity CTD:**

Method: Conductivity sensor Sea-Bird SBE4, calibrated in June 2009. A different sensor was used for stations 34 to 36 (TRACK-2 project, H-Y. Park and F. Vivier)

Quality Control: Salinity data from both sensors are in good agreement with bottle data (mean difference is  $0.003 \pm 0.004$ ), with the exception of station 1 where measured salinity is always higher than CTD data by  $0.008 \pm 0.003$ .

### **- Measured Salinity:**

Method: Water samples were collected from the Niskin bottles in 150 ml salinity bottles (Ocean Scientific International Ltd) and properly stored. Measurements were performed onboard using a Salinometer Guidline PORTASAL 8410.

Standardization: IAPSO standards were used (Ocean Scientific International Ltd).

Field Replicate: Deep replicate samples were collected from two different Niskin bottles (usually 1000m or bottom). The mean difference between two deep replicates was  $0.002 \pm 0.002$   $\mu\text{mol/kg}$  (n=12).

Accuracy:  $\pm 0.002$  based on the analysis of replicate samples.

Quality Control: A good agreement is obtained with previous observations collected at the same locations (INDIGO, WOCE and OISO data).

### **- Measured Oxygen**

Units:  $\mu\text{mol/kg}$

Method: Water samples were collected from the Niskin bottles in calibrated glass bottles (150-200ml). Measurements were performed onboard following Winkler's titration technique (Williams and Jenkinson, 1982).

Standardization: Iodate standards were used (Ocean Scientific International Ltd).

Field Replicate: Deep replicate samples were collected from two different Niskin bottles (usually 1000m or bottom). The mean difference between two deep replicates was  $2.9 \pm 2.1 \mu\text{mol/kg}$  (n=15).

Accuracy:  $\pm 3 \mu\text{mol/kg}$  based on the analysis of deep replicate samples.

Quality Control: Deep oxygen data are in good agreement with previous observations collected at the same locations (INDIGO, WOCE and OISO data).

Method References:

Williams, P. J. LeB, and N. W. Jenkinson, 1982. A transportable microprocessor-controlled precise Winkler titration suitable for field station and shipboard use. *Limnol. Oceanogr.*, 27, 576-585.

#### - Total CO<sub>2</sub> and Alkalinity

Units:  $\mu\text{mol/kg}$

Method: Water samples were collected from the Niskin bottles in 500 ml glass bottles for the simultaneous analysis of total CO<sub>2</sub> and total alkalinity. Measurements were performed onboard following a potentiometric titration method (Edmond, 1970), using an automated system with a closed cell described by Goyet et al. (1991). The equivalence point is determined using a non-linear regression method (D.O.E., 1994).

Standardization: We used Certified Referenced Materials (CRMs), batch #91 and #97, provided by Dr. A. Dickson (SIO, University of California). The precision of the titration system, based on the analysis of CRMs, was  $\pm 2.9 \mu\text{mol/kg}$  for both total CO<sub>2</sub> and alkalinity.

Field Replicate: Deep replicate samples were collected from two different Niskin bottles (usually 1000m or bottom). The mean difference between two deep replicates was  $2.1 \pm 1.9 \mu\text{mol/kg}$  for total CO<sub>2</sub> and  $2.3 \pm 2.1 \mu\text{mol/kg}$  for alkalinity (n=15).

Accuracy:  $\pm 3 \mu\text{mol/kg}$  for both total CO<sub>2</sub> and alkalinity based on CRMs analysis.

Quality Control: Total CO<sub>2</sub> and alkalinity data are in good agreement with previous observations collected north of the frontal region (INDIGO, WOCE and OISO data). South of the front, we measured high TCO<sub>2</sub> values compared to WOCE data (by  $\sim 10 \mu\text{mol/kg}$  in circumpolar deep waters), in good agreement with observations collected in January 2009 (OISO17). Consequently we attributed

these anomalies to natural variability rather than a bias in total CO<sub>2</sub> measurements.

#### Method References:

D.O.E., 1994. Handbook of methods for analysis of the various parameters of the carbon dioxide system in sea water; version 2, A.G. Dickson and C.Goyet, eds. ORNL/CDIAC-74.

Edmond J. M., 1970. High precision determination of titration of alkalinity and total CO<sub>2</sub> of seawater by potentiometric titration, Deep-Sea Research, 17, 737-750.

Goyet C., C. Beauverger, C. Brunet and A. Poisson, 1991. Distribution of carbon dioxide partial pressure in surface waters of the southwest Indian Ocean, Tellus, 43B, 1-11.

#### Additional information:

Acknowledgments: The OISO program is supported by the French agency INSU, IPEV and IPSL. We are grateful to the captain and crew of R.V. *Marion Dufresne*, the cruises participants, as well as on-land technicians for their help in producing these data.

Other data: More parameters were measured during the OISO18 cruise: (contact PIs above)

- Water column measurements of nutrients (silicate, nitrate, and phosphate), isotopes ( $\delta^{13}\text{C}_{\text{DIC}}$  and  $\delta^{18}\text{O}_{\text{H}_2\text{O}}$ ), chlorophyll-a, light attenuation (PAR).
- Incubation for measurements of primary production and N<sub>2</sub> fixation.
- Underway surface measurements of temperature, salinity, pCO<sub>2</sub> and related parameters.
- Atmospheric pCO<sub>2</sub> and meteorological observations
- Underway Current Profiler (ADCP)

Project URL: <http://caraus.ipsl.jussieu.fr/oiso-accueil.html>