



<http://ioc.unesco.org/ioccp>

## The International Ocean Carbon Coordination Project Recommended Format for pCO<sub>2</sub> Metadata and Data from Underway Systems

Developed at the Ocean Surface pCO<sub>2</sub>, Data Integration  
and Database Development Workshop, January 14-17,  
2004 Tsukuba, Japan

<http://ioc.unesco.org/ioccp/Tsukuba2004Results.htm>

(updated December 2005)

### **METADATA (Separate fields)**

(**Bold** = Required Information ; Regular Text = Additional information that is highly desirable.)

**Class of data:** Surface ocean carbon dioxide concentrations

**Dataset identifier**

**Statement of how to cite dataset** (\*see also WG III report)

**Measurement platform identifier:** Ship / Buoy / Platform

Cruise Information

Project Information

Scientist responsible for technical quality of this dataset

Full name of person

Contact information for that person

Affiliation when data were collected

**Contact person for this dataset**

Full name of person

Contact information for that person

**Timestamp for initial submission of dataset**

**Timestamp for most recent update of dataset**

**Time period the data set refers to** (generated automatically from the dataset)

**Geographic area the dataset refers to** (generated automatically from the dataset)

**List of variables that are included in this dataset** (for each variable, state units)

**Narrative description of system design including**

(1) **Sampling locations**

Location of water intake

Location of air intakes

Location of pressure sensors (e.g. height above sea-level)

(2) **Layout of measurement sub-systems (block diagram)**

**Narrative statement identifying measurement method for each required parameter**

Citation to publication documenting method used

Measurement sequence/timing/averaging information

Additional quality information?

**For measurements of carbon dioxide provide:**

**Analytical Instrument Manufacturer/Model**  
**Description of any additional environmental control**  
**Resolution of measurement**  
**Estimated overall uncertainty of measurement**

**List of calibration gases used, documenting:**

**Traceability to an internationally recognized scale**  
**(including date / place of last calibration made)**  
**Uncertainty of assigned value of each calibration gas**

**For each sensor for Pressure / Temperature / Salinity provide:**

**Manufacturer/Model**  
**Resolution**  
**Uncertainty of measured value**  
**Document traceability to an internationally recognized scale**  
**(including date / place of last calibration made)**

Bibliography

## **DATA FILE FORMAT**

(Focuses on results from underway measurement systems.)

### **I. REQUIRED ELEMENTS**

**Identifiers (information is in metadata file but should also accompany the dataset)**

Group\_ship cruise  
(example: AOML\_Explorer EX0503)

#### **Measured atmospheric information**

Date / Time of Measurement (UTC)

Position of measurement

- Latitude in decimal degrees (North is positive, South is negative)
- Longitude in decimal degrees (East is positive, West is negative)

Mole fraction of CO<sub>2</sub> in ambient atmosphere ( $\mu\text{mol mol}^{-1}$  in dry air)

Atmospheric pressure at sea-surface pressure (hPa)

#### **Measured seawater information**

Date / Time of Measurement (UTC)

Position of measurement

- Latitude in decimal degrees (North is positive, South is negative)
- Longitude in decimal degrees (East is positive, West is negative)

Mole fraction of CO<sub>2</sub> in air from equilibrator ( $\mu\text{mol mol}^{-1}$ )

Mole fraction of H<sub>2</sub>O in air from equilibrator ( $\text{mmol mol}^{-1}$ )

Pressure of equilibration = the pressure in the equilibration vessel (hPa)

Temperature of equilibration = the temperature of the seawater in equilibrator  
at the time of equilibration ( $^{\circ}\text{C}$ )

Sea surface temperature (in situ) ( $^{\circ}\text{C}$ )

Sea surface salinity (in situ) (Practical Salinity Scale)

## **II. DERIVED PARAMETERS**

### **Atmosphere**

$x(\text{CO}_2)$  value for the ambient atmosphere ( $\mu\text{mol mol}^{-1}$  in dry air);  
interpolated to match the date/time/position of the seawater  
information in this section

### **Seawater**

$f(\text{CO}_2)$  for air in equilibrium with seawater at sea surface temperature  
( $\mu\text{atm}$ )

Note: the air will be at 100% humidity

$p(\text{CO}_2)$  for air in equilibrium with seawater at sea surface temperature  
( $\mu\text{atm}$ )

Note: the air will be at 100% humidity

$x(\text{CO}_2)$  for air in equilibrium with the seawater at sea surface  
temperature and 1013.25 hPa applied pressure (expressed as  
 $\mu\text{mol mol}^{-1}$  in dry air)

## **III. OPTIONAL ANCILLARY INFORMATION**

Quality flags

Detailed Ship's Heading Information

Other measurements (chemical / physical / meteorological)