Underway Metadata Form

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(* = mandatory field)

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On submission of a metadata record a notification is send to the metadata creator with a link to metadata that was created.

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Total Investigators in the Data Set: 2

Dataset Info:

- Funding Information (funder, project name, grant number, e.g. MEXT Grant-in-Aid for Scientific Research (16310018), NOAA Climate Program or European Union CarboChange FP7 264879) :
  "Observation for Monitoring Background Marine Pollution" Project of Japan Meteorological Agency
- Submission Dates:
  - Initial Submission: 20040621 (yyyymmdd)
  - Revised Submission: 20140228 (yyyymmdd)

Cruise Info:

- Cruise Information for the Expocode:
  - NODC Platform (Ship) Code List: 49RY 4 character NODC
  - Start Date (cruise or data set, for Expocode): 19891117 (yyyymmdd)
  - Cruise Information for the expocode: 49RY19891117
- Other Cruise Info:
  - Survey type (e.g. VOS Lines, Research Cruise, Moored Buoy, Drifting Buoy):
    Research Cruise
  - Vessel Name:
    R/V Ryofu Maru II
  - Vessel Owner: Ministry of Land, Infrastructure, Transport and Tourism
  - Cruise Info (e.g. SAVE, TTO-NAS, SOIREE, AMT08, Antares):
    VOS_Ryofu_Maru_1989_1995

- Cruise Name (including Leg) (e.g. ANTV-2, Biscay_979815C, D198):
  RY8911 - RY9501
- End Date: 19950307 (yyyymmdd)
- Ports of Call: (One per line)
  Tokyo, Japan
- Mooring ID if applicable:

- Geographical Coverage:
  - Geographical Region:
    Western Pacific Ocean
  - Bounds:
    - Westernmost Longitude:
      Enter decimal fractions of degrees: 124 (+ = E, - = W)
    - Easternmost Longitude:
      Enter decimal fractions of degrees: 155.25 (+ = E, - = W)
    - Northernmost Latitude:
      Enter decimal fractions of degrees: 41.683 (+ = N, - = S)
    - Southernmost Latitude:
      Enter decimal fractions of degrees: -4.4 (+ = N, - = S)

Variables Info:

- Variable:
  - Variable Name: Cruise
  - Description of Variable: (units)

  Variable #2:
  - Variable Name: Date
  - Description of Variable: (units) Observation date (yyyy/mm/dd)

  Variable #3:
  - Variable Name: Time
  - Description of Variable: (units) Observation time (hh:mm)

  Variable #4:
  - Variable Name: Lat
  - Description of Variable: (units) Latitude (degrees north)

  Variable #5:
  - Variable Name: Lon
  - Description of Variable: (units) Longitude (degrees east)

  Variable #6:
  - Variable Name: xCO2a
  - Description of Variable: (units) Mole fraction of CO2 in ambient atmosphere (micro mol/mol in dry air)

  Variable #7:
  - Variable Name: Flag_xCO2a
  - Description of Variable: (units) 2: Acceptable, 4: Not measured with missing value "-999" on the left.

  Variable #8:
  - Variable Name: xCO2eq
  - Description of Variable: (units) Mole fraction of CO2 in air from equilibrator (micro mol/mol in dry air)

  Variable #9:
  - Variable Name: Flag_xCO2eq
  - Description of Variable: (units) 2: Acceptable, 4: Not measured with missing value "-999" on the left.

  Variable #10:
  - Variable Name: AtmPrs
  - Description of Variable: (units) Atmospheric pressure at sea-surface pressure (hPa)

  Variable #11:
  - Variable Name: Flag_AtmPrs
  - Description of Variable: (units) 2: Acceptable, 4: Not measured with missing value "-999" on the left.

  Variable #12:
  - Variable Name: TmpEq
  - Description of Variable: (units) Temperature at equilibration (DEG_C)

  Variable #13:
  - Variable Name: Flag_TmpEq

- Description of Variable: (units) 2: Acceptable, 4: Not measured with missing value "-999" on the left.

Variable #14:
- Variable Name: SST
- Description of Variable: (units) In situ sea surface temperature (DEG_C)

Variable #15:
- Variable Name: Flag_SST
- Description of Variable: (units) 2: Acceptable, 4: Not measured with missing value "-999" on the left.

Variable #16:
- Variable Name: SSS
- Description of Variable: (units) Sea surface salinity (psu)

Variable #17:
- Variable Name: Flag_SSS
- Description of Variable: (units) 2: Acceptable, 4: Not measured with missing value "-999" on the left.

Total Variables in the Data Set: 17

Surface Water CO2 Method Description:

- Sampling and Equilibrator Design:
  - Depth of Seawater Intake (m): 5
  - Location of Seawater Intake: Sea-chest at the center in the longitudinal direction of a hull.
  - Equilibrator type: Shower head
  - Equilibrator volume (L): 2 (air), 20 (seawater)
  - Water_Flow_Rate (L/min): 5
  - Headspace_Gas_Flow_Rate (mL/min): 500
  - Equilibrator Vented: (•) Yes ( ) No
  - Drying method for CO2 in water and extent of drying:
    Thermoelectric cooling units followed by permeable memblane dryer and magn
  - Additional comments on equilibration:
- CO_2 in marine air method:
  - Measurement of CO2 in marine air (yes/no) & frequency:
    Yes, every 1 hour.
  - Location and height of marine air intake: Bow tip, 6m.
  - Drying method for CO2 in air and extent of drying:
- CO_2 Sensors:
  - Measurement Method CO_2: Infra-red analysis on dry gas
  - Manufacturer of CO_2 sensor: Beckman Industrial
  - Model of CO_2 sensor: Model 880
  - Frequency of CO2 measurements (e.g. Every 120 sec, except during calibration routines):
    Every 1 hour
  - Accuracy of CO_2water (specify parameter and unit):
  - Precision of CO_2water (specify parameter and unit):
    1.9 micro mol/mol (xCO2eq)
  - Accuracy of CO_2air (specify parameter and unit):
  - Precision of CO_2air (specify parameter and unit): 0.3 micro mol/mol (xCO2a)
  - Calibration of CO_2 calibration gases (document traceability to an internationally recognized scale, including frequency of calibration, and location of calibrations):
    Frequency: Every 1 hour, Scale: WMO mole fraction scale
  - CO_2 calibration gases (manufacturer, number and approximate mixing ratio of CO_2 standards, and frequency of calibration):
    Japan Fine Products Co., Ltd. (Japan)
  - Additional comments on CO_2 analysis:
    CO2 Calibration gases: 4 or 5 cylinders range from 270-420 micromol/mol

- CO_2 method references (publications describing method):

  Hirota, M., Nemoto, K., Murata, A., and Fushimi, K. 1991. Observation of carbon dioxide in air and surface seawater in the western North Pacific Ocean. Oceanogr. Mag., 41, 19-28.

- Sea Surface Temperature (SST):
  - Location and depth of SST sensor: Sea-chest at the center in the longitudinal direction of a hull. Depth 5m
  - Manufacturer SST sensor: Falmouth Scientific Inc.
  - Model SST sensor: OTM 1364
  - Accuracy SST: 0.003 degreeC
  - Precision SST:
  - Calibration of SST (document traceability to an internationally recognized scale, including dates and location of calibrations):
  - Additional comments on SST analysis:

- Equilibrator Temperature (T_{equ}):
  - Location of T_{equ} sensor: Shower head
  - Manufacturer T_{equ} sensor: M-System Co., Ltd.
  - Model T_{equ} sensor: JR-35-B
  - Accuracy T_{equ}: +-0.1 degreeC
  - Precision T_{equ}:
  - Calibration of T_{equ} (document traceability to an internationally recognized scale, including dates and location of calibrations):
  - Average warming of water from seawater inlet to equilibrator with standard deviation: 0.55 +- 0.25 DEG_C
  - Additional comments on T_{equ} analysis:

- Equilibrator Pressure (P_{equ}):
  - Location of P_{equ} sensor:
  - Manufacturer P_{equ} sensor:
  - Model P_{equ} sensor:
  - Accuracy P_{equ}:
  - Precision P_{equ}:
  - Calibration of P_{equ} (document traceability to an internationally recognized scale, including dates and location of calibrations):
  - Additional comments on P_{equ} analysis:

- Atmospheric Pressure (sea level) (P_{atm}):
  - Location and height of P_{atm} sensor: At the same laboratory in the ship
  - Manufacturer P_{atm}: Yanagi Instrument Co.,Ltd.
  - Model P_{atm}: Aneroid barograph No.670201
  - Accuracy P_{atm} (specify unit):
  - Precision P_{atm} (specify unit):
  - Calibration of P_{atm} (document traceability to an internationally recognized scale, including dates and location of calibrations):
  - Additional comments on P_{atm} analysis:

- Sea Surface Salinity (SSS):
  - Location and depth of SSS sensor:
  - Manufacturer SSS sensor:
  - Model SSS sensor:
  - Accuracy SSS:
  - Precision SSS:
  - Calibration of SSS (document traceability to an internationally recognized scale, including dates and location of calibrations):
  - Additional comments on SSS analysis:
- Other Sensors # 1:
  - Manufacturer:
  - Accuracy:
  - Model:
  - Precision:
  - Calibration (For each sensor of pressure, temperature, and salinity, document traceability to an internationally recognized scale, including date and place of the last calibration):
  - Additional Information:
- Add More Sensors: 1

Additional Information:

Data Set References: (Publication(s) describing data set)

Inoue, H. Y., Ishii, M., Matsueda, H., Saito, S., Midorikawa, T., and Nemoto, K. 1999. MRI measurements of partial pressure of CO2 in surface waters of the Pacific during 1968 to 1970: re-evaluation and comparison of data with those of 1980s and 1990s. Tellus, 51B, 830-848.

Citation: (How to cite this data set)

Saito, S. and A. Nakadate. 2014. Underway air and surface seawater pCO2 data measured on board the R/V Ryofu Maru during the 1989-1995 cruises. http://cdiac.ornl.gov/ftp/oceans/VOS_Ryofu_Maru_V2/RyofuMaru_1989_1995. Carbon Dioxide Information Analysis Center, Oak Ridge National

Append Measurement or Calibration reports here:

Data Set Link:

- URL: http://cdiac.ornl.gov/ftp/oceans/VOS_Ryofu_Maru_V2/RyofuMaru_1989_1995
- Label: R/V RyofuMaru_1989_1995 Data