

Cruise ID: 49WA20160930 (WK1610)

- Investigator(s):

- Name: Akira Kuwata
- Organization: Tohoku National Fisheries Research  
Institute/ Fisheries Research and Education Agency
- Address: 3-27-5 Shinhamacho, Shiogama 985-0001,  
Japan
- Phone: +81-22365-9929
- Email: [akuwata@affrc.go.jp](mailto:akuwata@affrc.go.jp)

- Investigator #2:

- Name: Kazuaki Tadokoro
- Organization: Tohoku National Fisheries Research  
Institute / Fisheries Research and Education Agency
- Address: 3-27-5 Shinhamacho, Shiogama 985-0001,  
Japan
- Phone: +81-22365-9913
- Email: [den@affrc.go.jp](mailto:den@affrc.go.jp)

- Investigator #3:

- Name: Tsuneo Ono
- Organization: National Research Institute for Far Seas  
Fisheries/ Fisheries Research and Education Agency
- Address: 2-12-4 Fukuura, Kanazawa-ku Yokohama  
236-8648, Japan
- Phone: +81-45788-7697
- Email: [tono@affrc.go.jp](mailto:tono@affrc.go.jp)

- Dataset Info:

- Dataset ID: 49WA20160930.csv
- Funding Info: Global Environment Research Account for  
National Institutes by the Ministry of Environment,  
Japan

- Submission Dates:
  - Initial Submission: 2018/1/14
  - Revised Submission:
- Cruise Info:
  - Survey/Experiment Type: Research Cruise
  - Survey/Experiment Name: WK1610
  - Cruise ID: 49WA20160930
  - Section:
  - Geographical Coverage:
    - Geographical Region: western North Pacific
  - Ports of Call: Shiogama
  - Bounds:
    - Westernmost Longitude:
      - +141.4 Degrees, Minutes,  
Seconds: E
    - Easternmost Longitude:
      - +142.6 Degrees, Minutes,  
Seconds: E
    - Northernmost Latitude: +41.3  
Degrees, Minutes, Seconds: N
    - Southernmost Latitude:
      - +38.2 Degrees, Minutes,  
Seconds: N
  - Temporal Coverage:
    - Start Date: 2016/9/30
    - End Date: 2016/10/13
  - Vessel:
    - Vessel Name: Wakataka-maru
    - Vessel ID: 49WA
    - Country: Japan
    - Vessel Owner: Fisheries Research and Education  
Agency

- Variables Info:

- Variable:

- Variable Name: XCO2\_EQ
    - Description of Variable: umol/mol
    - Variable Name: XH2O\_EQ
    - Description of Variable: mmol/mol
    - Variable Name: EQ\_PRE
    - Description of Variable: hPa
    - Variable Name: EQ\_TMP
    - Description of Variable: deg C
    - Variable Name: SST
    - Description of Variable: deg C
    - Variable Name: SSS
    - Description of Variable: no unit
    - Variable Name: ATM\_PRE
    - Description of Variable: hPa

- Method Description:

- Sampling and Equilibrator Design:

- Depth of sea water intake: 5m
    - Location of sea water intake: Bottom of ship
    - Equilibrator type: membrane equilibrator
    - Equilibrator volume: 0.4 L
    - Water\_Flow\_Rate: 2.0 L/min
    - Headspace\_Gas\_Flow\_Rate: 100 ml/min
    - Vented: No
    - Drying method for CO2 in water:
      - electronic dehumidifier DH109C
    - Additional information:

- System Design:

- Measurement Method: automated version of Saito et al. [1995]

- Manufacturer of Calibration Gas: Nissan-Tanaka Co. Ltd.
- CO<sub>2</sub> Sensor:
  - Measurement Method: NDIR
  - Manufacturer: Li-COR
  - Model: LI-6262
  - Environmental Control:
    - xCO<sub>2</sub> value submitted are corrected for xH<sub>2</sub>O by sensor's program
  - Frequency: every 1 min
  - Precision of CO<sub>2</sub>water: xCO<sub>2</sub> 1.6 umol/mol
  - Precision of CO<sub>2</sub>air:
  - Accuracy of CO<sub>2</sub>water: xCO<sub>2</sub> 1.6 umol/mol
  - Accuracy of CO<sub>2</sub>air:
  - CO<sub>2</sub> Sensor Calibration:
    - LI-6262 was calibrated at factory on Feb. 2012. CO<sub>2</sub> concentration in standard gas cylinder was calibrated once at purchasing against NIES standard gas cylinder, which are traceable to WMO scale
  - Manufacture of CO<sub>2</sub> Calibration gases: Nissan Tanaka Co. LTD., 0ppm and 450 ppm
  - Method References: Saito et al., A compact seawater pCO<sub>2</sub> measurement system with membrane equilibrator and nondispersive infrared gas analyzer, Deep-Sea Res., 42, 2025-2033, 1995
- CO<sub>2</sub> in Marine Air:
  - Measurement:
  - Location and Height:
  - Sea surface Temperature:

- Location: bottom of ship, just after the bottom seawater intake
- Manufacturer: JFE Advantec.
- Model: ACT-RS
- Accuracy: 0.02 deg C
- Precision: 0.02 deg C
- Calibration: last calibrated on 2015/02/16 at FRA lab., against JMO standard scale mercury thermometer
- Other comments:
- Sea surface Salinity:
- Location: branched just in front of water intake of equilibrator
- Manufacturer: Sea-Bird
- Model: SBE45
- Accuracy: 0.005
- Precision: 0.003
- Calibration: last calibrated on Jan. 2012 in manufacture factory
- Other comments:
- Equilibrator Temperature:
- Location: midst of equilibrator vessel
- Manufacturer: Rikagaku-kogyo Inc.
- Model: platinum resistance thermometer sensor, grade Pt100
- Accuracy: 0.15 deg C
- Precision: 0.15 deg C
- Calibration: last calibrated on 2015/12/9 at FRA lab., against JMO standard scale mercury thermometer
- Other comments:
- Equilibrator Pressure:

- Location: just after air outlet from equilibrator
- Manufacturer: Nagano Keiki
- Model: GC30 Digital Differential Pressure
- Gauge
- Accuracy: 0.1 hPa
- Precision: 0.1 hPa
- Calibration: last calibrated on 2015/12/9 at FRA lab., against Water pressure Gauge
- Other comments:
- Atmosphere Pressure:
- Location: just right side of equilibrator
- Manufacturer: T&D Co. LTD.
- Model: TR-73U
- Accuracy: 0.15hPa
- Precision: 0.15hPa
- Calibration: last calibrated on Nov.25 2011 at FRA lab. against JMA-calibrated aneroid barometer
- Other comments: pCO<sub>2</sub> system is settled in CTD room and open to atmosphere
- Other sensors:
- Manufacturer:
- Model:
- Resolution:
- Uncertainty:
- Calibration:
- Other comments:
- Accuracy Info:
- Method References:
- Method References:
- Data Set References:
- Additional Information:

- Citation:
- Measurement of Calibration Report:
- Measurement Type: underway measurement underway  
data underway measurements
- Metadata Source: