

CDIAC's Ocean CO₂ Data Program

Metadata Summary

Search Criteria: text : kaneohe_158w_21n and (datasource :(oceanbt oceanuw))

[Bookmark](#)[Email](#)[Return to Search](#)[Return to Results](#)**Dataset ID:** Mooring_Kaneohe_158W_21N_Mar2013_Nov2013

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Dataset Info: Dataset ID: Mooring_Kaneohe_158W_21N_Mar2013_Nov2013

Funding Info: This work was supported in part by a grant/cooperative agreement from the National Oceanic and Atmospheric Administration, Project R/IR-3, which is sponsored by the University of Hawaii Sea Grant College Program, SOEST, under Institutional Grant No. NA09OAR4170060 from NOAA Office of Sea Grant, Department of Commerce. The views expressed herein are those of the author(s) and do not necessarily reflect the views of NOAA or any of its subagencies. Funding was also provided by Pac-IOOS in support of the MAP-CO2 monitoring program.

Submission Dates: **Initial Submission:** 20151208
Revised Submission: 20161213

Cruise: **Mooring ID:** Moored Buoy

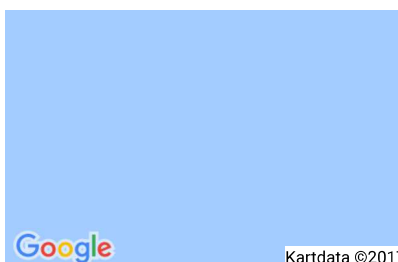
Survey/Experiment Type: Moored Buoy
Survey/Experiment Name: Mooring_Kaneohe_158W_21N_Mar2013_Nov2013

Cruise ID: KANE20130309
Cruise Info: Mooring_Kaneohe_158W_21N_Mar2013_Nov2013
Section:

Geographical Coverage:
Geographical Region: Pacific Ocean

Ports of Call:

Bounds: North West South East
21.480 -157.783 21.480 -157.783

[Locate](#)

Kartdata ©2017

-157.783 -157.783 21.480 2

Temporal Coverage: **Start Date:** 20130309 **End Date:** 20131112

Vessel: **Vessel Name:** Mooring_Kaneohe_158W_21N
Vessel ID: KANE
Country:
Vessel Owner:

Data Center URL: <http://cdiac.esd.ornl.gov/>

Download Data Sets: [Mooring_Kaneohe_158W_21N_Mar2013_Nov2013_Data](#)
Refer to cdiac.ornl.gov/oceans/Moorings/ for links to actual data

Variable Info: ↕ ↗

Variable Name	Description of Variable
Date Time	Date and Time (UTC)
xCO2 SW (wet)	(umol/mol) Mole fraction of CO2 in air in equilibrium with the seawater at sea surface temperature and measured humidity.
CO2 SW QF	Flag for xCO2 sw (wet)
H2O SW	(mmol/mol) Mole fraction of H2O in air from equilibrator.
xCO2 Air (wet)	umol/mol) Mole fraction of CO2 in air from airblock, 4 feet above the sea surface at measured humidity.
CO2 Air QF	Quality Flag for xCO2 Air (wet)
H2O Air	(mmol/mol) Mole fraction of H2O in air from airblock, 4 feet above the sea surface.
Licor Atm Pressure	(hPa) Atmospheric pressure at the airblock, 4 feet above the sea surface.
Licor Temp	(C) Temperature of the Infrared Licor 820 in degrees Celsius.
%O2	The percent oxygen of the surface seawater divided by the percent oxygen of the atmosphere at 4 feet above the sea surface. Disclaimer: The oxygen measurement is made in the equilibrated air. We have found that the oxygen does not come to complete equilibrium so any rapid changes in oxygen do not get properly captured using this system. Therefore, we tend to use the oxygen data only as a qualitative sense of the biology. It is not a quantitative measure.
SST	(C) Sea Surface Temperature.
Salinity	(PSU) Sea Surface Salinity.
xCO2 SW (dry)	(umol/mol) Mole fraction of CO2 in air in equilibrium with the seawater at sea surface temperature (dry air).
xCO2 Air (dry)	(umol/mol) Mole fraction of CO2 in air at the airblock, 4 feet above the sea surface (dry air).
fCO2 SW (sat)	(uatm) Fugacity of CO2 in air in equilibrium with the seawater at sea surface temperature (100% humidity). Since the measurements are taken at the sea surface, warming calculations are not necessary.
fCO2 Air (sat)	(uatm) Fugacity of CO2 in air at the airblock, 4 feet above the sea surface (100% humidity).
dfCO2	Difference of the fugacity of the CO2 in seawater and the fugacity of the CO2 in air (fCO2 SW - fCO2 Air).
pCO2 SW (wet)	(uatm) Partial Pressure of CO2 in air in equilibrium with the seawater at sea surface temperature (100% humidity)
pCO2 Air (wet)	(uatm) Partial Pressure of CO2 in air at the airblock, 4 feet above the sea surface (100% humidity).
dpCO2	Difference of the partial pressure of CO2 in seawater and air (pCO2 SW - pCO2 Air
PH_TOT	total hydrogen ion concentration at 25 Å°C
pH QF	PH_TOT quality flag

Method Description: **Sampling and Equilibrator Design:**
Depth of Sea Water Intake: 14cm - 20cm
Location of Sea Water Intake:
Equilibrator Type: Bubble Equilibrator
Equilibrator Volume: N/A
Water Flow Rate: N/A
Headspace Gas Flow Rate: ~600 cc/min
Vented: Yes
Drying Method for CO2 in Water:
Additional Information:

System Design:

Measurement Method:

Manufacturer of Calibration Gas:

CO2 Sensor:

Measurement Method: Absolute, non-dispersive infrared (NDIR) gas analyzer

Manufacturer: Licor

Model: LI-820

Environmental Control:

Frequency: 3hr cycle

Precision of CO2water: 0.7 uatm

Precision of CO2air: 0.6 uatm

Accuracy of CO2water: 2 uatm

Accuracy of CO2air: 1 uatm

CO2 Sensor Calibration: At the beginning of each sample, the instrument self-calibrates using a zero and high standard. The zero standard is generated by cycling a small amount of air through a soda lime chamber. The high standard is from a cylinder of calibrated standard reference gas, 400.98 umol/mol, from ESRL. ESRL standards are traceable to WMO x93 scale with a stated

reproducibility of 0.06 micromole/mole. For more information on estimates of accuracy and precision of the MAPCO2 system, see Sutton et al. 2014 (reference below).

Manufacturer of CO2 calibration gases: NOAA Earth System Research Laboratory (ESRL)

Method References: Sutton, A.J., Sabine, C.L., Maenner-Jones, S., Lawrence-Slavas, N., Meinig, C., Feely, R.A., Mathis, J.T., Musielewicz, S., Bott, R., McLain, P.D., Fought, J., Kozyr, A., 2014b. A high-frequency atmospheric and seawater pCO2 data set from 14 open ocean sites using a moored autonomous system. Earth Sys. Sci. Data, 6, doi: 10.5194/essd-6-353-2014, 353366.

CO2 in Marine Air:

Measurement: yes, 3hr cycle

Location and Height: unused

Sea Surface Temperature:

Location: 1m

Manufacturer: SeaBird

Model: SBE 16

Accuracy: < 0.01

Precision:

Calibration: ~ Annually by SeaBird

Other comments: Temperature data are internally recorded and collected during the equilibration period. Data are not post-calibrated. Annual drift for this deployment was minimal and does not impact the fCO2 and pCO2 calculations (within the degree of accuracy of the CO2 measurement). Contact us if you would like the CTD post-calibration information.

Sea Surface Salinity:

Location: 1m

Manufacturer: SeaBird

Model: SBE 16

Accuracy: < 0.05

Precision:

Calibration: ~ Annually by SeaBird

Other comments: Conductivity data are internally recorded and collected during the equilibration period. Data are not post-calibrated. Annual drift for this deployment was minimal and does not impact the fCO2 and pCO2 calculations (within the degree of accuracy of the CO2 measurement). Contact us if you would like the CTD post-calibration information.

Equilibrator Temperature:

Location:

Manufacturer:

Model:

Accuracy:

Precision:

Calibration:

Other comments:

Equilibrator Pressure:

Location:

Manufacturer:

Model:

Accuracy:

Precision:

Calibration:

Other comments:

Atmospheric Pressure:

Location:

Manufacturer:

Model:

Accuracy:

Precision:

Calibration:

Other comments:

Other Sensors:

Manufacturer:

Model:

Resolution:

Uncertainty:

Calibration:

Other Comments:

Manufacturer: Maxtec Oxygen Sensor

Model: Max-250

Resolution:

Uncertainty:

Calibration: Factory calibrated before purchase. Recalibrated to sea level atmospheric air every 7 days

Other Comments:

Manufacturer: Sensirion Humidity Sensor

Model: SHT71

Resolution:

Uncertainty:

Calibration: Factory calibrated before purchase.

Other Comments:

Manufacturer: Sunburst Sensors, LLC

Model: SAMI2 pH

Resolution:

Uncertainty:

Calibration: ~ Annually by Sunburst Sensors

Other Comments: pH data are collected and internally recorded during the CO2 equilibration period. Data are salinity compensated with salinity collected by the Seabird SBE16, using the program Sunburst Sensors QC_PH_02. Spaulding, R.,

2010. Salinity Measurement and SAMI-pH Accuracy. Tech Notes, 1. Accuracy Info: Method References:	
Method References:	
Data Set References:	None
Additioanal Information:	<ul style="list-style-type: none">o All measurements are at sea surface temperature and atmospheric pressure.o During the equilibration cycle, a closed loop of air equilibrates with seawater for 10 minutes. Once the equilibration period is complete, the pump stops and the system opens to the atmosphere allowing the pressure to equilibrate with atmospheric pressure. Measurements are recorded for 30 seconds at 2 hertz and then averaged.o During the air cycle, fresh air is pumped through the detector for 1 minute. Once the pump stops, the system opens to the atmosphere allowing the pressure to equilibrate with atmospheric pressure. Measurements are recorded for 30 seconds at 2 hertz and then averaged.o The gas streams for both the air cycle and equilibrator cycle are partially dried before entering the detector. The values listed as wet xCO₂ generally have relative humidity levels ranging from 40 to 80 percent. The humidity levels increase over the course of a deployment.o Sampling occurs every 3 hours. The infrared detector is calibrated at the beginning of every sampling period. Averaged data and standard deviations for each measurement are transmitted back daily.o To calculate the dry measurements, the water mole fraction in the Licor detector must be known. A relative humidity sensor is located immediately downstream of the detector.o As part of the QC process, xCO₂ air measurements are compared to the following data sets when available: previous MAPCO₂ deployment if overlap on recovery/deployment, following MAPCO₂ deployment if overlap on recovery/deployment, and Marine Boundary Layer (MBL) xCO₂ air data from GlobalView-CO₂. The available comparison data sets are in good agreement with the MAPCO₂ air data and no adjustment was made. <p>GLOBALVIEW-CO 2: Cooperative Atmospheric Data Integration Project - Carbon Dioxide. CD-ROM, NOAA ESRL, Boulder, Colorado [Also available on Internet via anonymous FTP to ftp.cmdl.noaa.gov, Path: ccg/co2/GLOBALVIEW], 2010</p> <ul style="list-style-type: none">o During the QC process, an adjustment to the Licor pressure is also made based on each sensor's bias to barometric pressure as measured in the lab. This system has Licor pressure bias of +0.000 applied. <p>The standard reference gas ran out between 03/09/2013 00:00 and 03/13/2013 03:00. Missing reference gas coefficients were computed using the correlation between Licor temperature and the coefficients in the time range of good span values. xCO₂ air and sw (wet) from 03/09/2013 00:00 to 11/12/2013 00:18 were then recalculated using these computed coefficients. Post calculation correlation between Licor temperature and coefficient is: Licor coef = -0.001260 * Temp + 0.7819 r² = 0.79</p> <ul style="list-style-type: none">o No data = -9.999 or -999o These data are made freely available to the public and the scientific community in the belief that their wide dissemination will lead to greater understanding and new scientific insights. The availability of these data does not constitute publication of the data. We rely on the ethics and integrity of the user to assure that PMEL receives fair credit for our work. Please send manuscripts using this data to PMEL for review before they are submitted for publication so we can insure that the quality and limitations of the data are accurately represented.
Citation:	Sutton, A., C. Sabine, E. De Carlo, S. Musielewicz, S. Maenner, C. Dietrich, R. Bott, and J. Osborne. 2015. High-resolution ocean and atmosphere pCO ₂ time-series measurements from mooring Kaneohe_158W_21N. http://cdiac.esd.ornl.gov/ftp/oceans/Moorings/Kaneohe_158W_21N/ . Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, US Department of Energy, Oak Ridge, Tennessee. doi: 10.3334/CDIAC/OTG.TSM_Kaneohe_158W_21N
Measurement or Calibration Report:	
Measurement Type:	underway measurement underway data underway measurements
Metadata Source:	http://mercury-ops2.ornl.gov/OceanOME/admin/OceanMetadata/underway/Mooring_Kaneohe_158W_21N_Mar2013_Nov2013.xml