Ocean Carbon Dioxide: Importance of Observations, Data Management, and Data Synthesis Projects in the Ocean processes predictions

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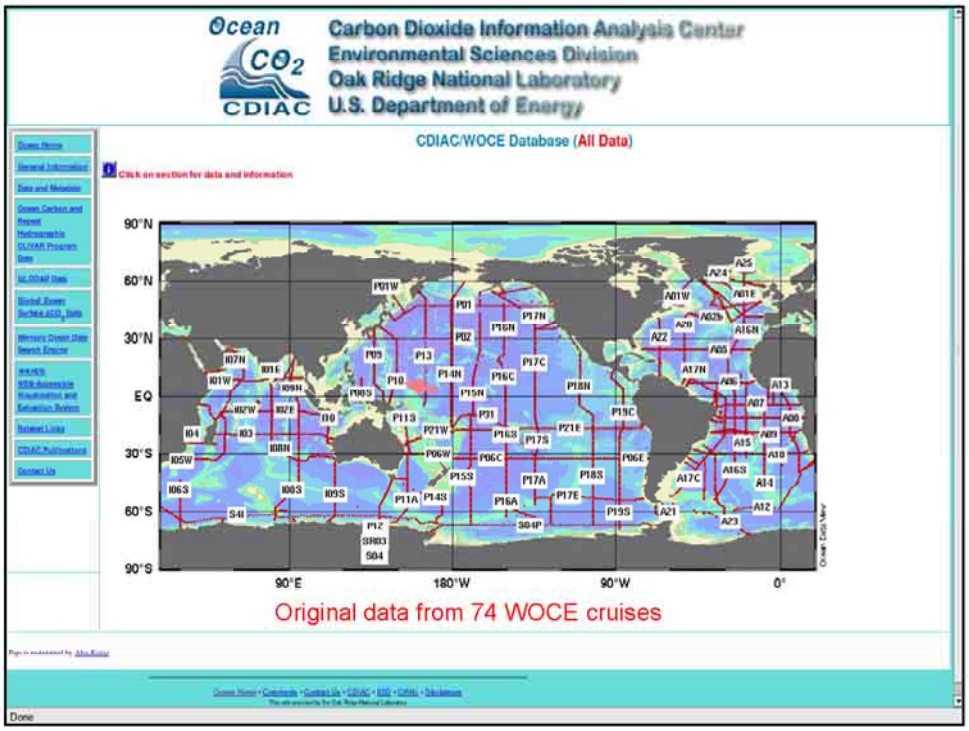
USA

Strategic Workshop on "Impacts of Ocean Acidification"
Gran Canary, Spain, 28-30 January 2008

CDIAC Global Ocean CO_2 Database Components

- WOCE Database

Kozyr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CDIAC/WOCE Database (All Data)
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90°N
60°N
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60°S
90°S
90°E
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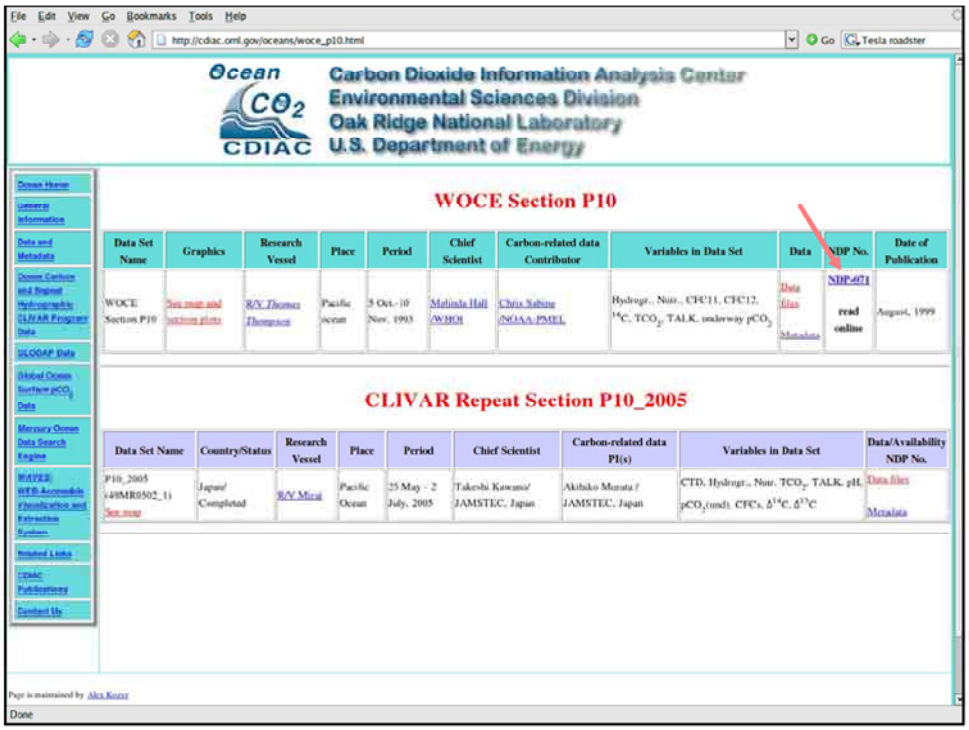
Original data from 74 WOCE cruises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WOCE Section P10
CLIVAR Repeat Section P10_2005

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NDP-071 (1999)

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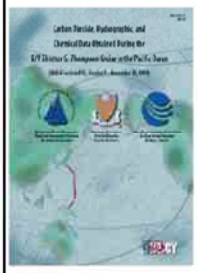
Carbon Dioxide, Hydrographic, and Chemical Data Obtained During the R/V *Thomas G. Thompson* Cruise in the Pacific Ocean (WOCE Section P10, October 5 - November 10, 1993)



Contributed by
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and Melinda Hall[2]

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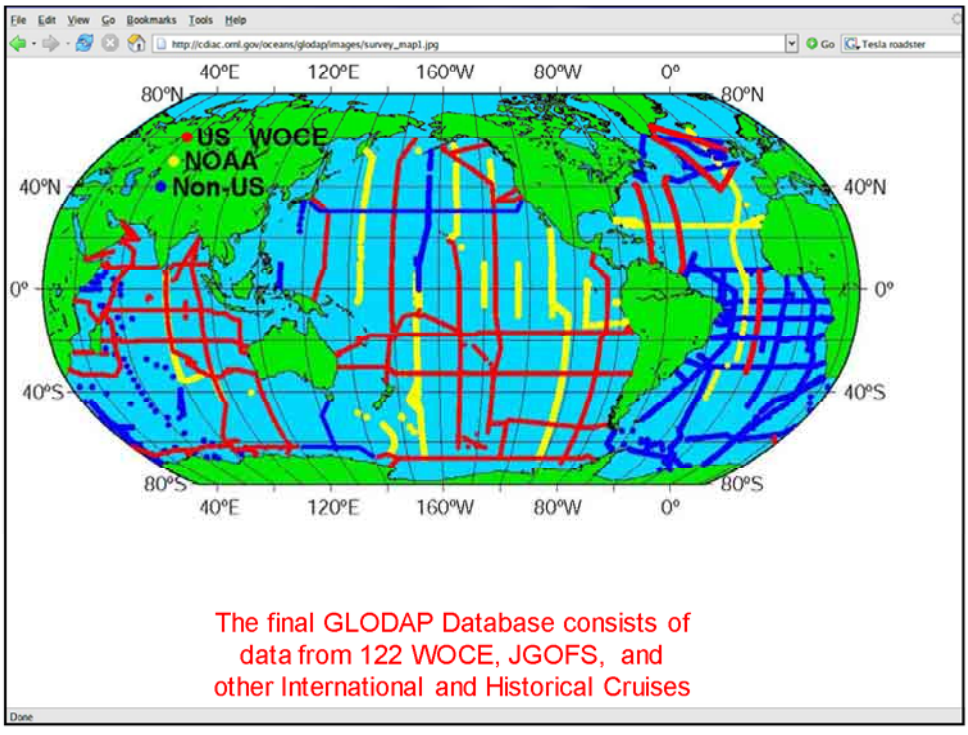
CDIAC Global Ocean CO_2 Database Components

- WOCE Database
- GLODAP Database

GLobal Ocean Data Analysis Project

A cooperative effort to coordinate global synthesis projects funded through the National Oceanic and Atmospheric Administration (NOAA), the U.S. Department of Energy (DOE), and the National Science Foundation (NSF)

- First task of the GLODAP synthesis project was to assemble a merged data set for each basin
- The quality assurance/quality control (QA/QC) procedure involved a careful examination using the following techniques:
  - ANALYTICAL AND CALIBRATION TECHNIQUES
  - RESULTS OF SHIPBOARD ANALYSIS OF CERTIFIED REFERENCE MATERIALS
  - REPLICATE SAMPLES
  - CONSISTENCY OF DEEP CARBON DATA AT THE LOCATIONS WHERE CRUISES CROSS OR OVERLAP
  - MULTIPLE LINEAR REGRESSION ANALYSIS
  - ISOPYCNAL ANALYSES
  - INTERNAL CONSISTENCY OF MULTIPLE CARBON MEASUREMENTS
  - FINAL EVALUATION OF OFFSETS AND DETERMINATION OF CORRECTION TO BE APPLIED



The final GLODAP Database consists of data from 122 WOCE, JGOFS, and other International and Historical Cruises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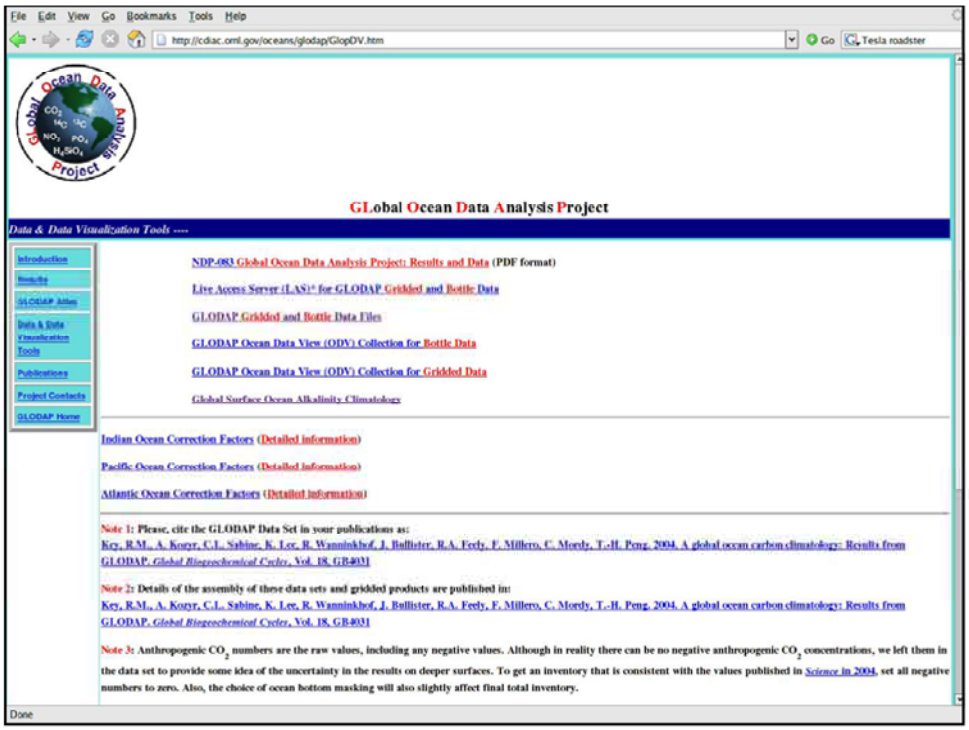
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Data & Data Visualization Tools
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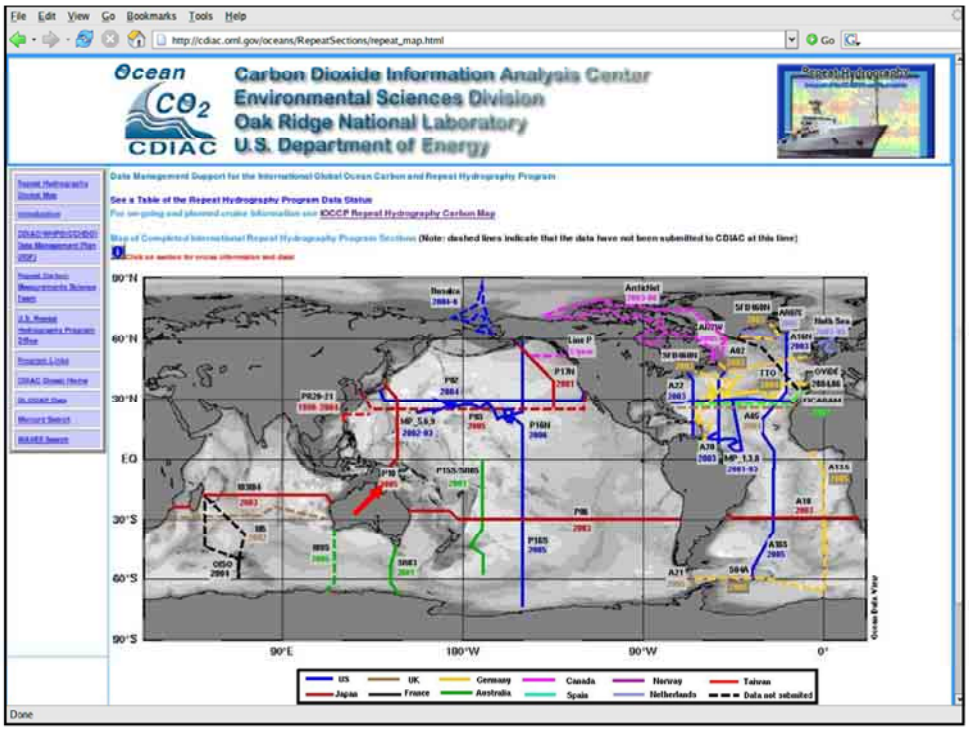
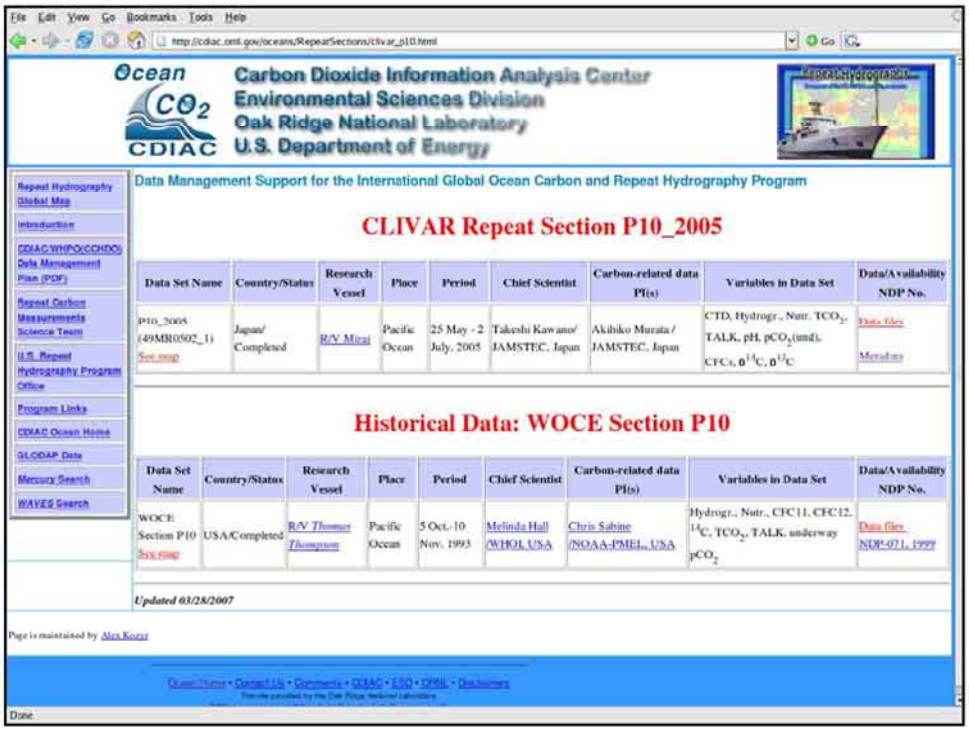
Project Contacts
GLODAP Home
NDP-083 Global Ocean Data Analysis Project: Results and Data (PDF format)
Live Access Server (LAS)* for GLODAP Gridded and Bottle Data
GLODAP Gridded and Bottle Data Files
GLODAP Ocean Data View (ODV) Collection for Bottle Data
GLODAP Ocean Data View (ODV) Collection for Gridded Data
Global Surface Ocean Alkalinity Climatology
Indian Ocean Correction Factors (Detailed information)
Pacific Ocean Correction Factors (Detailed information)
Atlantic Ocean Correction Factors (Detailed information)
Note 1: Please, cite the GLODAP Data Set in your publications as:
Key, R.M., A. Kozyr, C.L. Sabine, K. Lee, R. Wanninkhof, J. Bullister, R.A. Feely, F. Millero, C. Mordy, T.-H. Peng, 2004. A global ocean carbon climatology: Results from GLODAP, Global Biogeochemical Cycles, Vol. 18, GB4031
Note 2: Details of the assembly of these data sets and gridded products are published in:
Key, R.M., A. Kozyr, C.L. Sabine, K. Lee, R. Wanninkhof, J. Bullister, R.A. Feely, F. Millero, C. Mordy, T.-H. Peng, 2004. A global ocean carbon climatology: Results from GLODAP, Global Biogeochemical Cycles, Vol. 18, GB4031
Note 3: Anthropogenic CO2 numbers are the raw values, including any negative values. Although in reality there can be no negative anthropogenic CO2 concentrations, we left them in the data set to provide some idea of the uncertainty in the results on deeper surfaces. To get an inventory that is consistent with the values published in Science in 2004, set all negative numbers to zero. Also, the choice of ocean bottom masking will also slightly affect final total inventory.
Done

CDIAC Global Ocean CO_2 Database Components

- WOCE Database
- GLODAP Database
- CLIVAR Repeat Hydrography and Carbon Database





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Data Management Support for the International Global Ocean Carbon and Repeat Hydrography Program

CLIVAR Repeat Section P10_2005

Data Set Name	Country/Status	Research Vessel	Place	Period	Chief Scientist	Carbon-related data PI(s)	Variables in Data Set	Data/Availability NDP No.
P10_2005 (49MR0502_1) See map	Japan/ Completed	R/V Mirai	Pacific Ocean	25 May - 2 July, 2005	Takeshi Kawano/ JAMSTEC, Japan	Akihiko Murata / JAMSTEC, Japan	CTD, Hydrogr., Nutr. TCO_2, TALK, pH, pCO_2(und), CFCs, $\delta^{14}C$, $\delta^{13}C$	Data files Metadata

Historical Data: WOCE Section P10

Data Set Name	Country/Status	Research Vessel	Place	Period	Chief Scientist	Carbon-related data PI(s)	Variables in Data Set	Data/Availability NDP No.
WOCE Section P10 See map	USA/Completed	R/V Thomas Thompson	Pacific Ocean	5 Oct.-10 Nov. 1993	Melinda Hall /WHOI, USA	Chris Sabine /NOAA-PMEL, USA	Hydrogr., Nutr., CFC11, CFC12, ^{14}C, TCO_2, TALK, underway pCO_2	Data files NDP-071, 1999

Updated 03/28/2007

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CDIAC Global Ocean CO_2 Database Components

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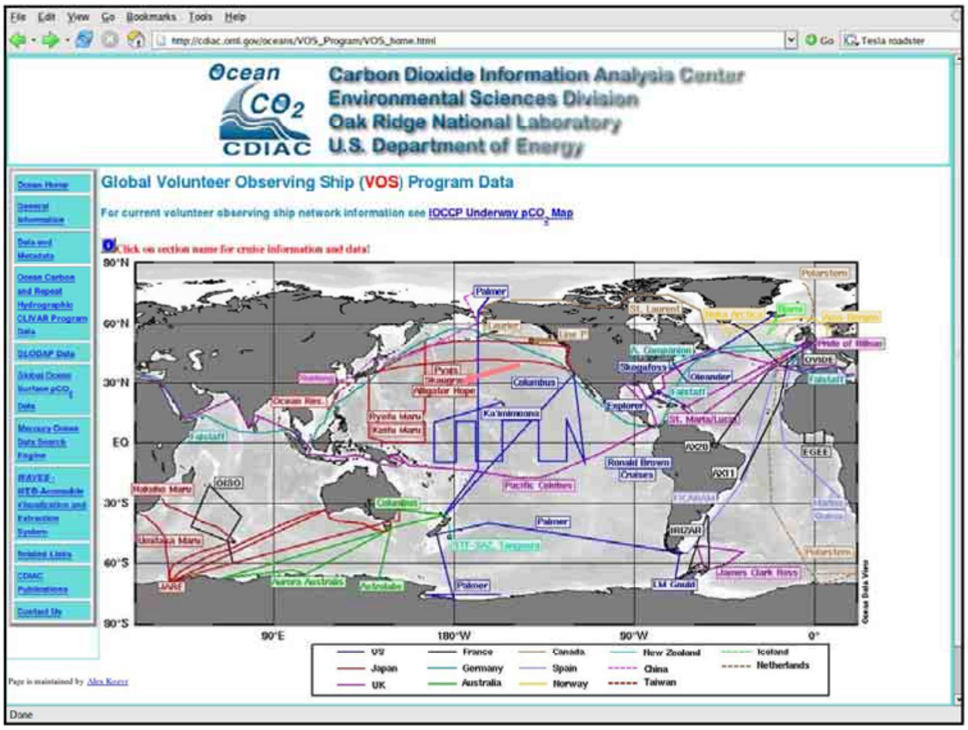
- VOS Underway pCO_2 Database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Global Volunteer Observing Ship (VOS) Program Data
For current volunteer observing ship network information see IOCCP Underway pCO2 Map
Click on section name for cruise information and data!
90°N
60°N
30°N
EQ
30°S
60°S
90°S
90°E
180°W
90°W
0°
US
Japan
UK
France
Germany
Australia
Canada
Spain
Norway
New Zealand
China
Taiwan
Iceland
Netherlands
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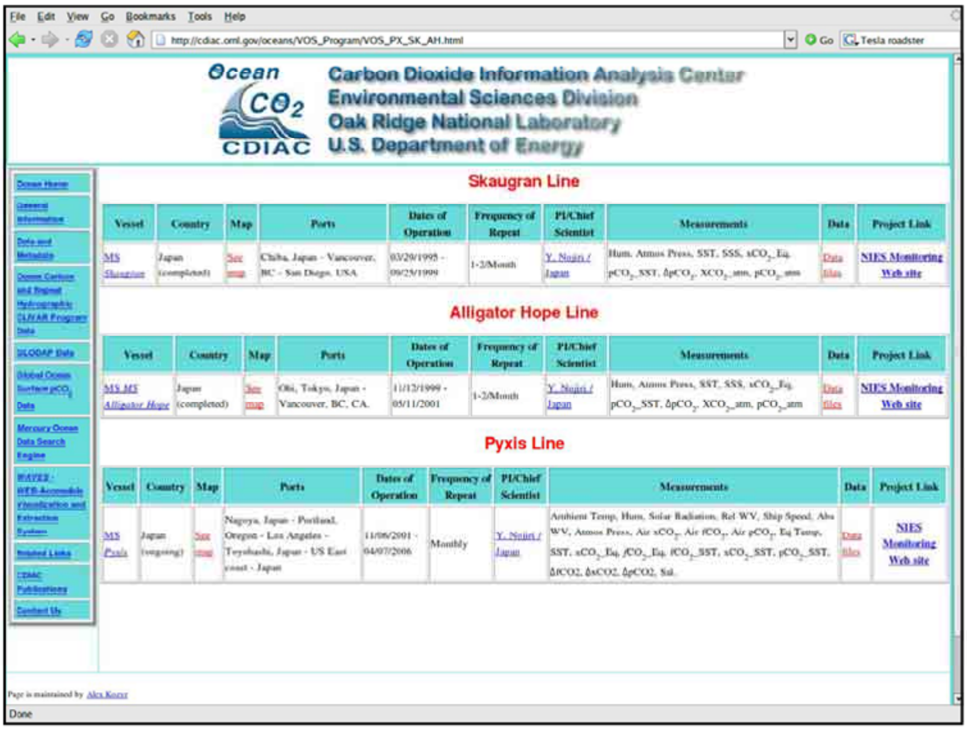
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Skaugran Line
Vessel | Country | Map | Ports | Dates of Operation | Frequency of Repeat | PI/Chief Scientist | Measurements | Data | Project Link
MS Skaugran | Japan (completed) | See map | Chiba, Japan - Vancouver, BC - San Diego, USA | 03/29/1995 - 09/25/1999 | 1-2/Month | Y. Nojiri / Japan | Hum, Atmos Press, SST, SSS, xCO2_Eq, pCO2_SST, ΔpCO2, XCO2_atm, pCO2_atm | Data files | NIES Monitoring Web site
Alligator Hope Line
Vessel | Country | Map | Ports | Dates of Operation | Frequency of Repeat | PI/Chief Scientist | Measurements | Data | Project Link
MS MS Alligator Hope | Japan (completed) | See map | Oi, Tokyo, Japan - Vancouver, BC, CA. | 11/12/1999 - 05/11/2001 | 1-2/Month | Y. Nojiri / Japan | Hum, Atmos Press, SST, SSS, xCO2_Eq, pCO2_SST, ΔpCO2, XCO2_atm, pCO2_atm | Data files | NIES Monitoring Web site
Pyxis Line
Vessel | Country | Map | Ports | Dates of Operation | Frequency of Repeat | PI/Chief Scientist | Measurements | Data | Project Link
MS Pyxis | Japan (ongoing) | See map | Nagoya, Japan - Portland, Oregon - Los Angeles - Toyohashi, Japan - US East coast - Japan | 11/06/2001 - 04/07/2006 | Monthly | Y. Nojiri / Japan | Ambient Temp, Hum, Solar Radiation, Rel WV, Ship Speed, Abs WV, Atmos Press, Air xCO2, Air fCO2, Air pCO2, Eq Temp, SST, xCO2_Eq, fCO2_Eq, fCO2_SST, xCO2_SST, pCO2_SST, ΔfCO2, ΔxCO2, ΔpCO2, Sal | Data files | NIES Monitoring Web site
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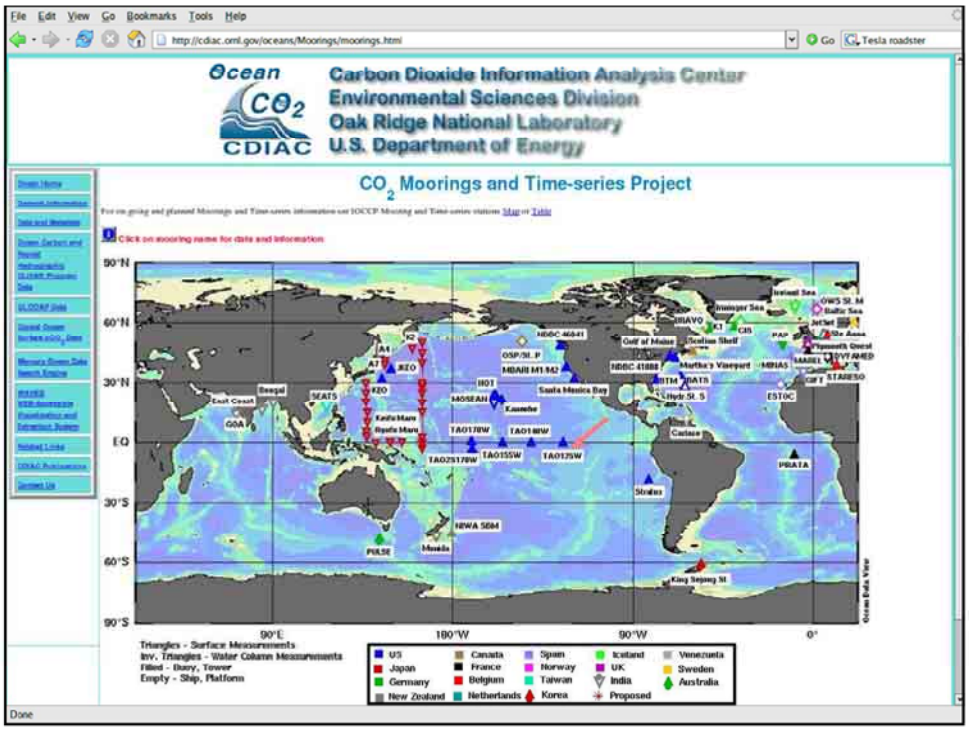
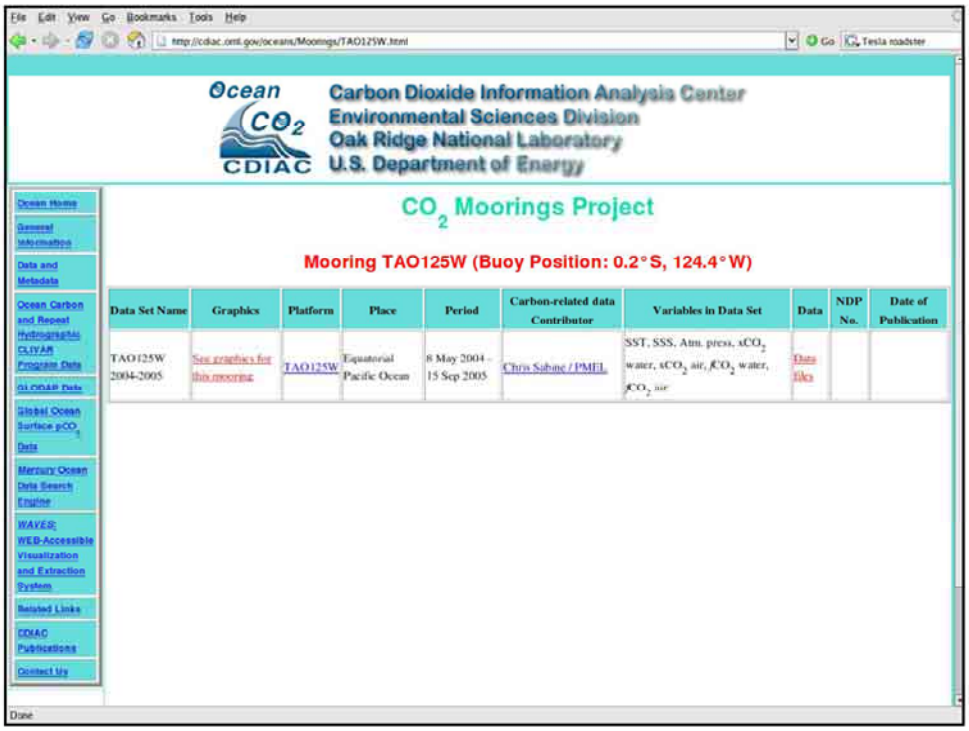
- Moorings and Time Series Database

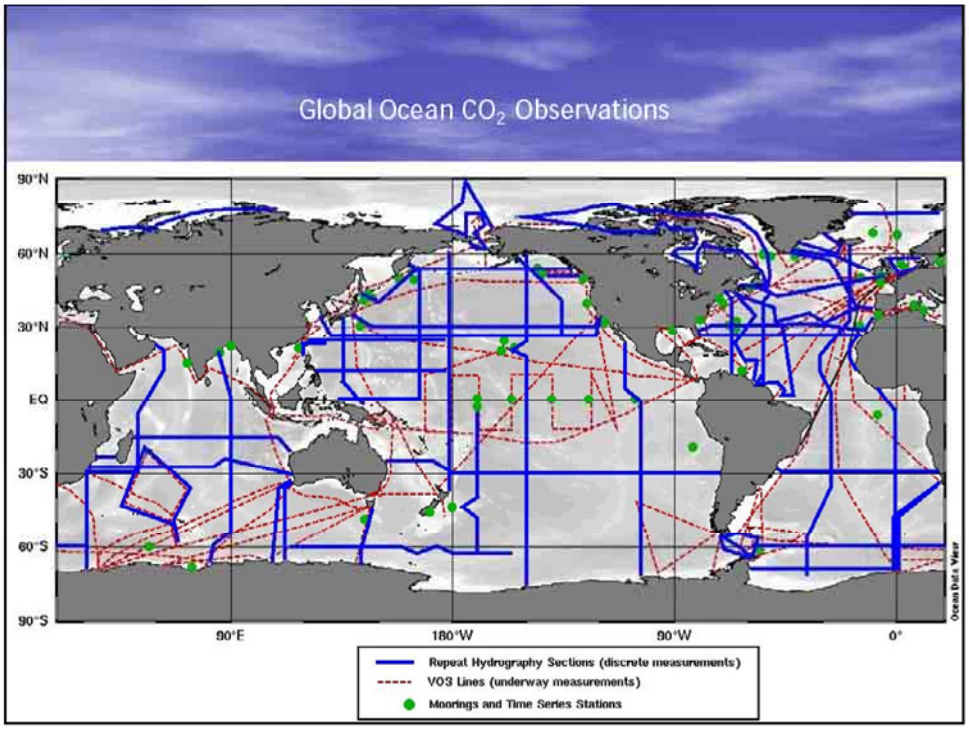




CO_2 Moorings Project

Mooring TAO125W (Buoy Position: 0.2°S, 124.4°W)

Data Set Name	Graphics	Platform	Place	Period	Carbon-related data Contributor	Variables in Data Set	Data	NDP No.	Date of Publication
TAO125W 2004-2005	See graphics for this mooring	TAO125W	Equatorial Pacific Ocean	8 May 2004 - 15 Sep 2005	Chris Sabine / PMEL	SST, SSS, Atm. press, xCO_2 water, xCO_2 air, fCO_2 water, fCO_2 air	Data files		



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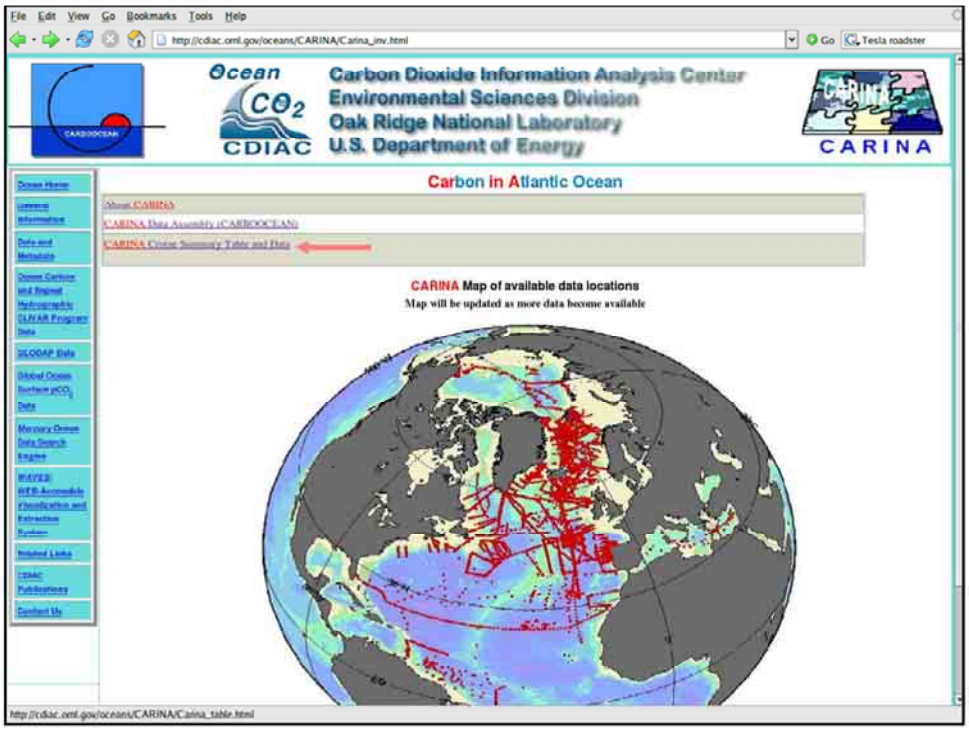

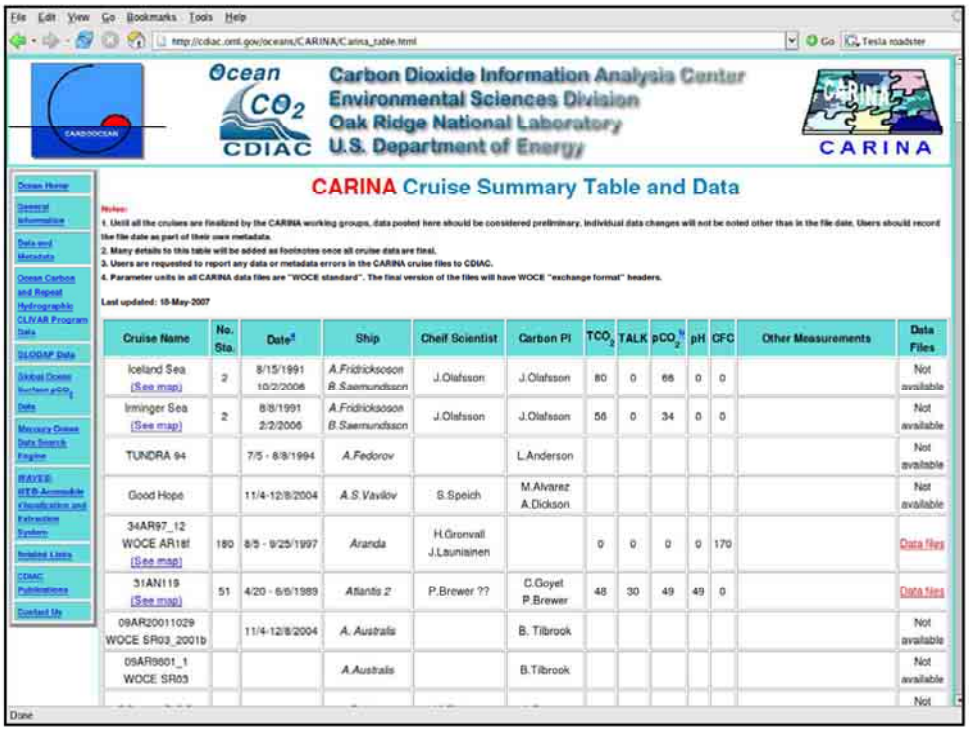

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CARINA Cruise Summary Table and Data

Notes:
1. Until all the cruises are finalized by the CARINA working groups, data posted here should be considered preliminary. Individual data changes will not be noted other than in the file date. Users should record the file date as part of their own metadata.
2. Many details to this table will be added as footnotes once all cruise data are final.
3. Users are requested to report any data or metadata errors in the CARINA cruise files to CDIAC.
4. Parameter units in all CARINA data files are "WOCE standard". The final version of the files will have WOCE "exchange format" headers.

Last updated: 10-May-2007

Cruise Name	No. Sta.	Date[1]	Ship	Cheif Scientist	Carbon PI	TCO_2	TALK	pCO_2[b]	pH	CFC	Other Measurements	Data Files
Iceland Sea (See map)	2	8/15/1991 10/2/2006	A.Fridriksson B.Saemundsson	J.Olafsson	J.Olafsson	80	0	66	0	0		Not available
Irminger Sea (See map)	2	8/8/1991 2/2/2006	A.Fridriksson B.Saemundsson	J.Olafsson	J.Olafsson	56	0	34	0	0		Not available
TUNDRA 94		7/5 - 8/8/1994	A.Fedorov		L.Anderson							Not available
Good Hope		11/4-12/8/2004	A.S.Vavilov	S.Speich	M.Alvarez A.Dickson							Not available
34AR97_12 WOCE AR1st (See map)	180	8/5 - 9/25/1997	Aranda	H.Gronvall J.Launiainen		0	0	0	0	170		Data files
31AN119 (See map)	51	4/20 - 6/6/1989	Atlantis 2	P.Brewer ??	C.Goyet P.Brewer	48	30	49	49	0		Data files
09AR20011029 WOCE SR03_2001b		11/4-12/8/2004	A. Australis		B. Tilbrook							Not available
09AR9601_1 WOCE SR03			A.Australis		B.Tilbrook							Not available
												Not

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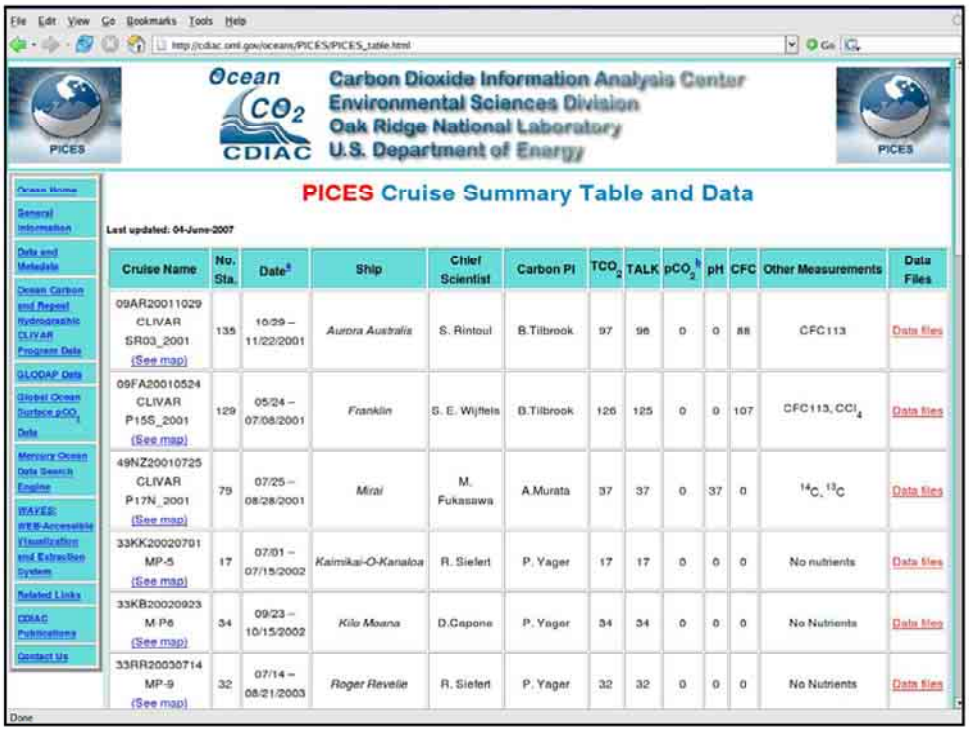
- PICES Database



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PICES Cruise Summary Table and Data

Last updated: 04-June-2007

Cruise Name	No. Sta.	Date[a]	Ship	Chief Scientist	Carbon PI	TCO_2	TALK	pCO_2[b]	pH	CFC	Other Measurements	Data Files
09AR20011029 CLIVAR SR03_2001 (See map)	135	10/29 – 11/22/2001	*Aurora Australis*	S. Rintoul	B.Tilbrook	97	96	0	0	88	CFC113	Data files
09FA20010524 CLIVAR P15S_2001 (See map)	129	05/24 – 07/08/2001	*Franklin*	S. E. Wijffels	B.Tilbrook	126	125	0	0	107	CFC113, CCl_4	Data files
49NZ20010725 CLIVAR P17N_2001 (See map)	79	07/25 – 08/28/2001	*Mirai*	M. Fukasawa	A.Murata	37	37	0	37	0	^{14}C, ^{13}C	Data files
33KK20020701 MP-5 (See map)	17	07/01 – 07/15/2002	*Kaimikai-O-Kanaloa*	R. Sielert	P. Yager	17	17	0	0	0	No nutrients	Data files
33KB20020923 M P6 (See map)	34	09/23 – 10/15/2002	*Kilo Moana*	D.Capone	P. Yager	34	34	0	0	0	No Nutrients	Data files
33RR20030714 MP-9 (See map)	32	07/14 – 08/21/2003	*Roger Revelle*	R. Sielert	P. Yager	32	32	0	0	0	No Nutrients	Data files

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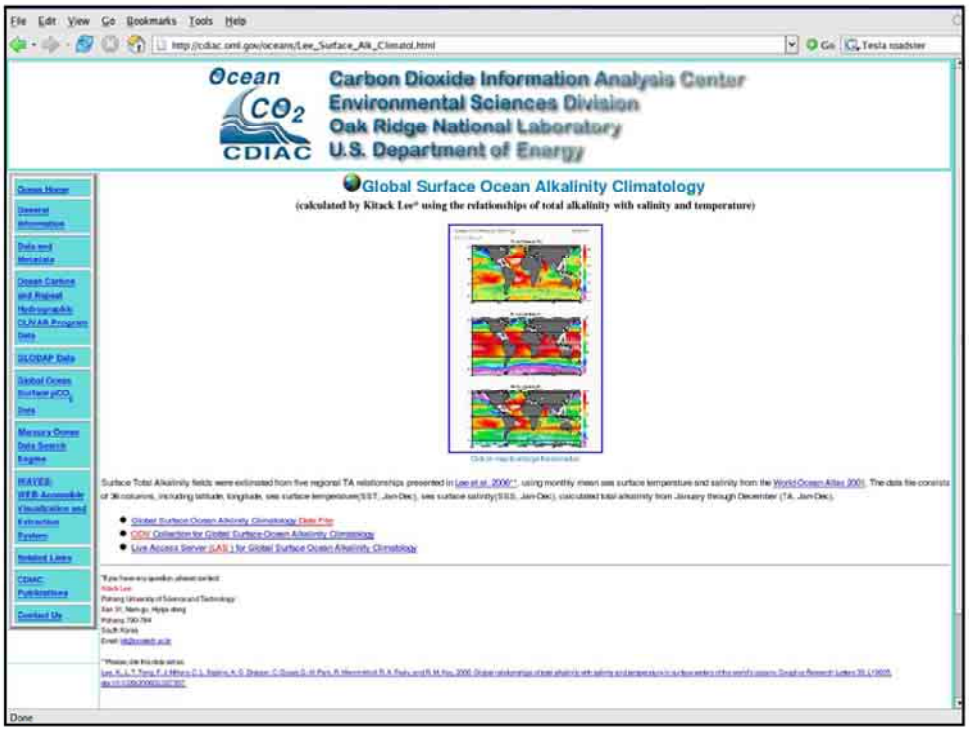
- PICES Database
- Global Surface Ocean Alkalinity Climatology Database
  (calculated by Kitack Lee using the relationships of total alkalinity with salinity and temperature)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(calculated by Kitack Lee* using the relationships of total alkalinity with salinity and temperature)
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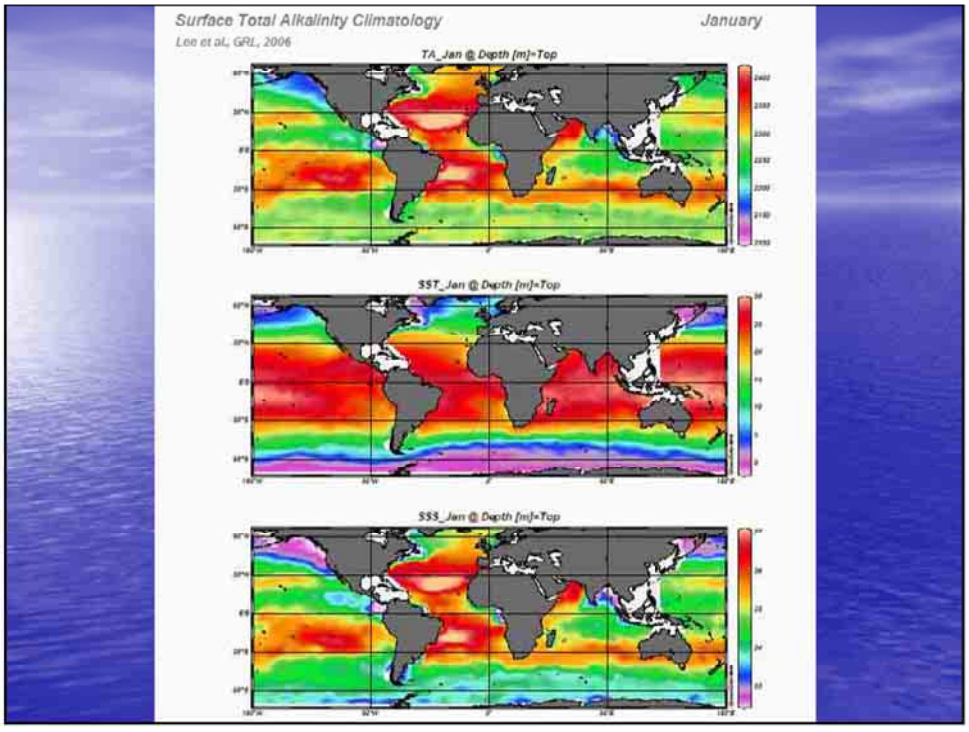
Surface Total Alkalinity Climatology
January
Lee et al, GRL, 2006
TA_Jan @ Depth [m]=Top
SST_Jan @ Depth [m]=Top
SSS_Jan @ Depth [m]=Top

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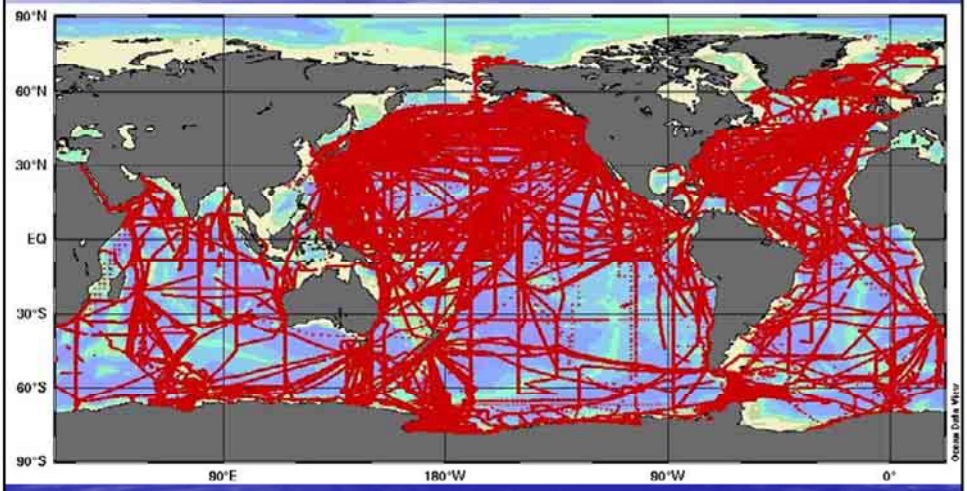
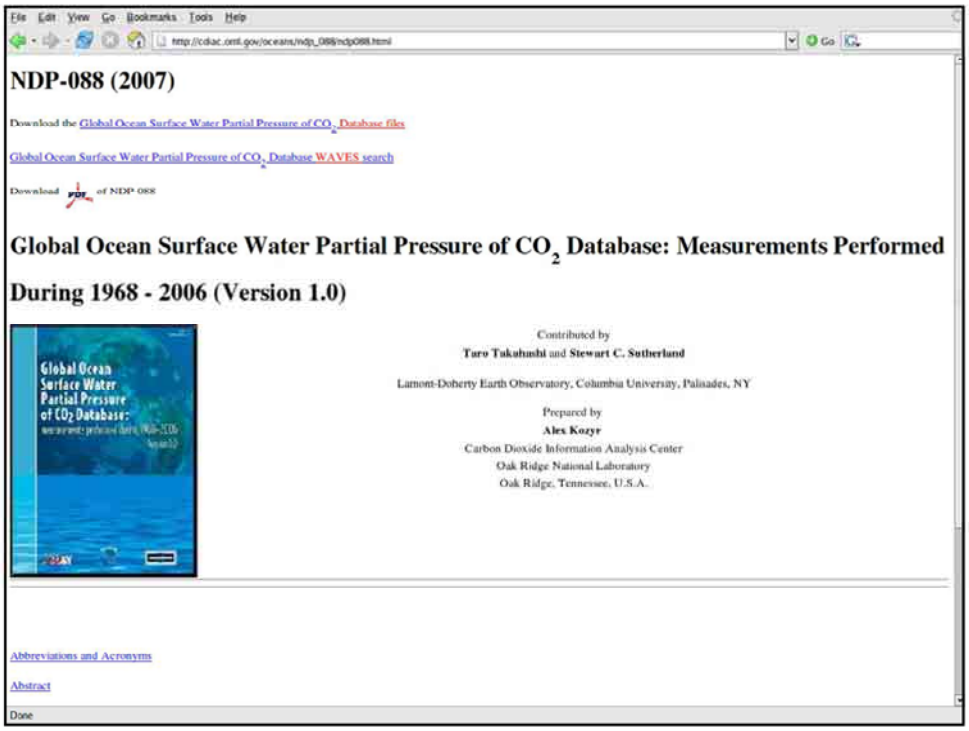
- Global Surface Ocean Alkalinity Climatology Database (K. Lee)
- LDEO (Takahashi) Global Surface pCO_2 Database

LDEO Underway pCO_2 Database
(> 3,200,000 points)





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NDP-088 (2007)

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Global Ocean Surface Water Partial Pressure of CO_2 Database: Measurements Performed During 1968 - 2006 (Version 1.0)

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Prepared by

Alex Kozyr

Carbon Dioxide Information Analysis Center

Oak Ridge National Laboratory

Oak Ridge, Tennessee, U.S.A.

Abbreviations and Acronyms

Abstract

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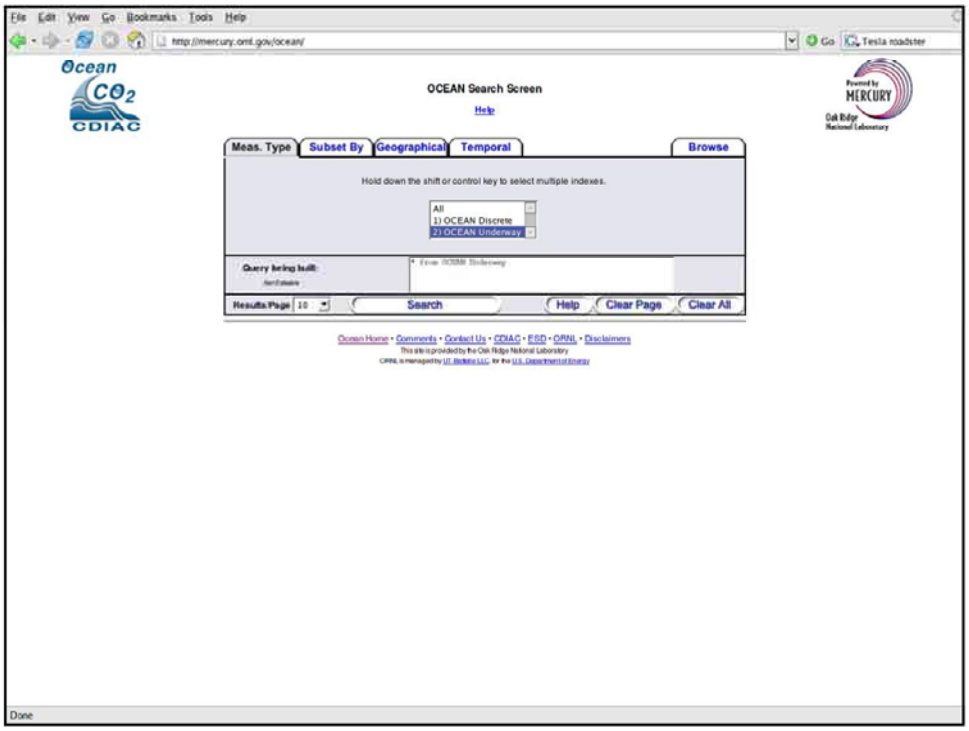
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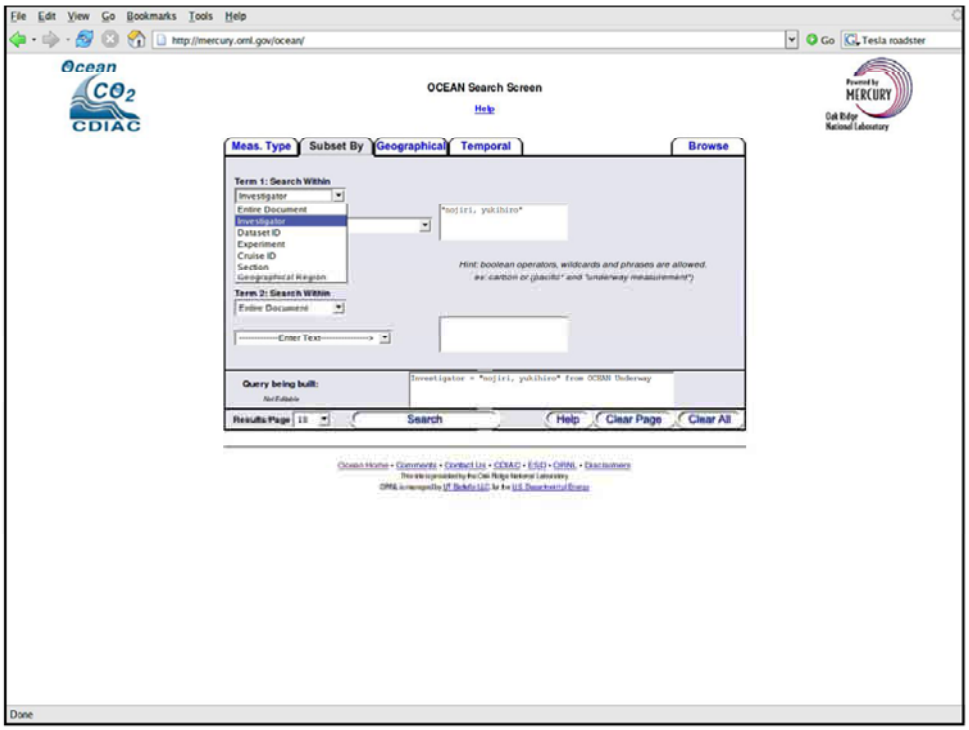
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Geographical Region
"nojiri, yukihiro"
Hint: boolean operators, wildcards and phrases are allowed.
ex: carbon or (pacific* and "underway measurement")
Term 2: Search Within
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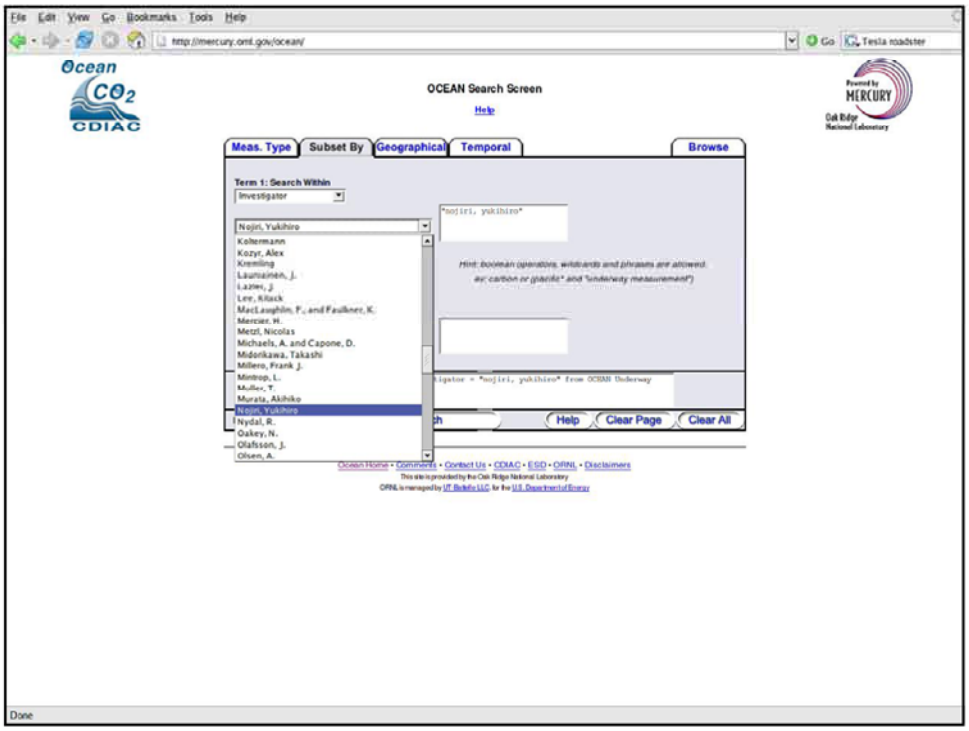
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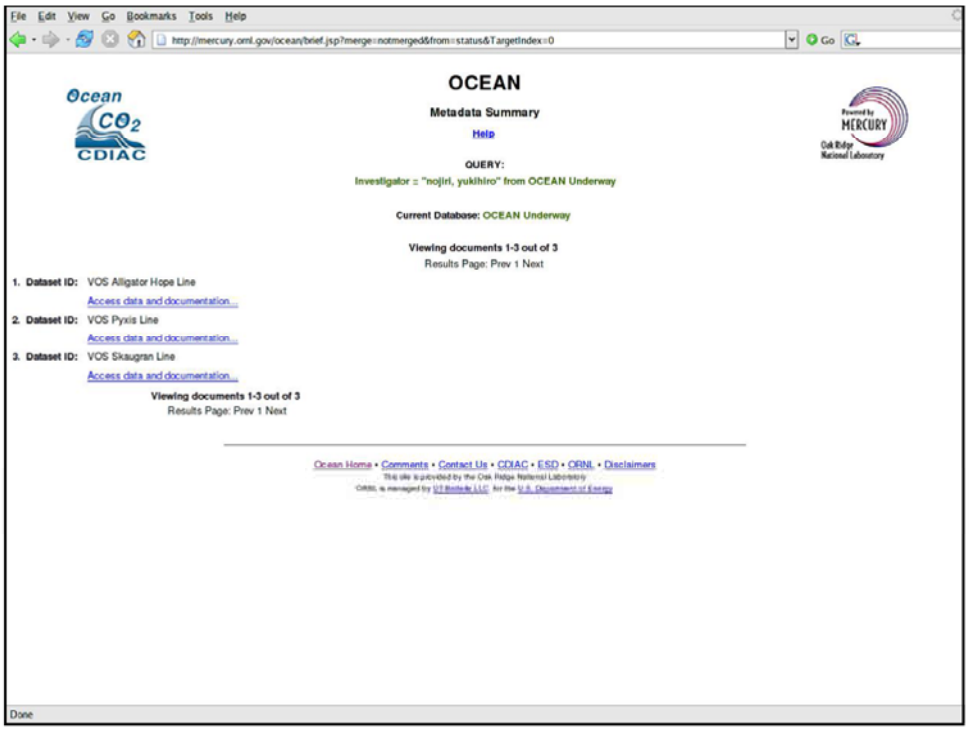
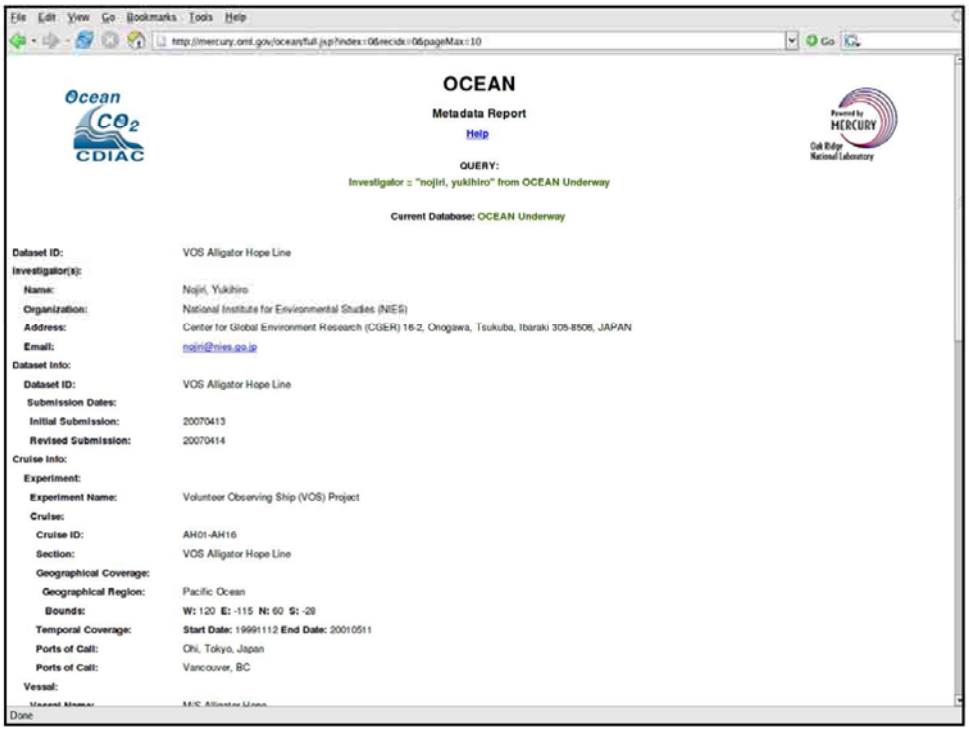
Nojiri, Yukihiro
"nojiri, yukihiro"
Hint: boolean operators, wildcards and phrases are allowed.
ex: carbon or (plankt* and "underway measurement")
Kohlermann
Kozyr, Alex
Kremling
Lauvsaimeh, J.
Lazier, J.
Lee, Kitack
MacLaughlin, F., and Faulkner, K.
Mercier, H.
Metzl, Nicolas
Michaels, A. and Capone, D.
Midorikawa, Takashi
Millero, Frank J.
Mintrop, L.
Muller, T.
Murata, Akihiko
Nojiri, Yukihiro
Nydal, R.
Oakey, N.
Olafsson, J.
Olsen, A.
Help
Clear Page
Clear All
Ocean Home • Comments • Contact Us • CDIAC • ESD • ORNL • Disclaimers
Done


File Edit View Go Bookmarks Tools Help
http://mercury.ornl.gov/ocean/brief.jsp?merge=notmerged&from=status&TargetIndex=0
Ocean CO2 CDIAC
OCEAN
Metadata Summary
Help
Powered by MERCURY
Oak Ridge National Laboratory
QUERY:
Investigator = "nojiri, yukihiro" from OCEAN Underway
Current Database: OCEAN Underway
Viewing documents 1-3 out of 3
Results Page: Prev 1 Next
1. Dataset ID: VOS Alligator Hope Line
Access data and documentation...
2. Dataset ID: VOS Pyxis Line
Access data and documentation...
3. Dataset ID: VOS Skaugran Line
Access data and documentation...
Viewing documents 1-3 out of 3
Results Page: Prev 1 Next
Ocean Home • Comments • Contact Us • CDIAC • ESD • ORNL • Disclaimers
Done



File Edit View Go Bookmarks Tools Help

http://mercury.ornl.gov/ocean/full.jsp?index=0&recidx=0&pageMax=10

Go

OCEAN

Metadata Report

Help

QUERY:

Investigator = "nojiri, yukihiro" from OCEAN Underway

Current Database: OCEAN Underway

Dataset ID: VOS Alligator Hope Line

Investigator(s):

Name: Nojiri, Yukihiro

Organization: National Institute for Environmental Studies (NIES)

Address: Center for Global Environment Research (CGER) 16-2, Onogawa, Tsukuba, Ibaraki 305-8506, JAPAN

Email: nojiri@nies.go.jp

Dataset Info:

Dataset ID: VOS Alligator Hope Line

Submission Dates:

Initial Submission: 20070413

Revised Submission: 20070414

Cruise Info:

Experiment:

Experiment Name: Volunteer Observing Ship (VOS) Project

Cruise:

Cruise ID: AH01-AH16

Section: VOS Alligator Hope Line

Geographical Coverage:

Geographical Region: Pacific Ocean

Bounds: **W:** 120 **E:** -115 **N:** 60 **S:** -28

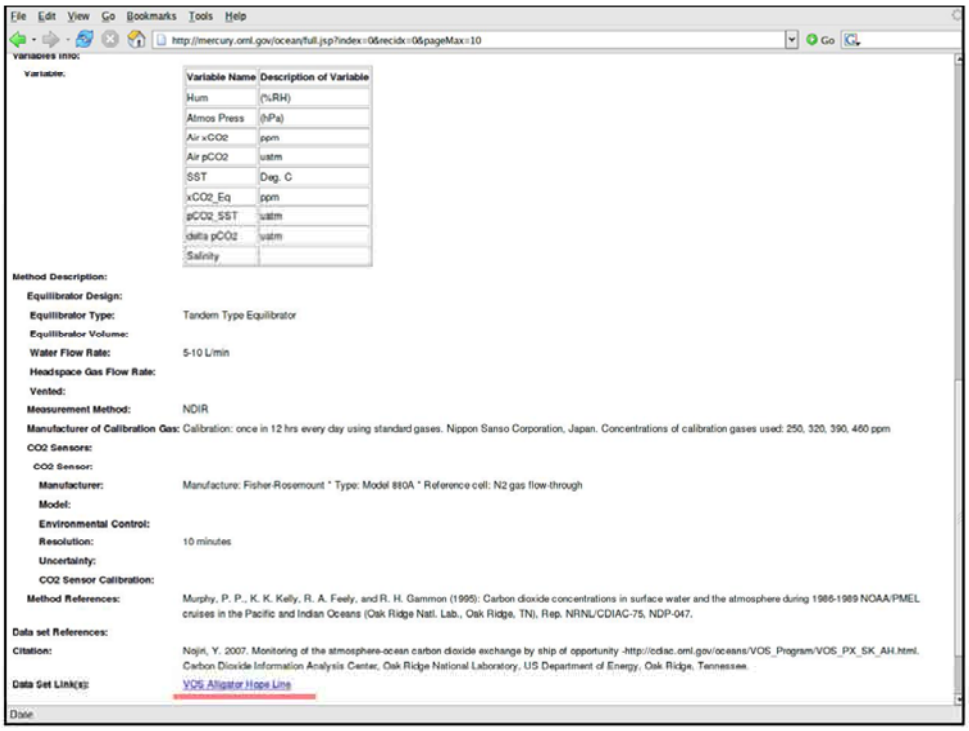
Temporal Coverage: **Start Date:** 19991112 **End Date:** 20010511

Ports of Call: Ohi, Tokyo, Japan

Ports of Call: Vancouver, BC

Vessel:

Done



File Edit View Go Bookmarks Tools Help

http://mercury.ornl.gov/ocean/full.jsp?index=0&recidx=0&pageMax=10

Go

Variables Info:

Variable:

Variable Name	Description of Variable
Hum	(%RH)
Atmos Press	(hPa)
Air xCO2	ppm
Air pCO2	uatm
SST	Deg. C
xCO2_Eq	ppm
pCO2_SST	uatm
delta pCO2	uatm
Salinity	

Method Description:

Equilibrator Design:

Equilibrator Type: Tandem Type Equilibrator

Equilibrator Volume:

Water Flow Rate: 5-10 L/min

Headspace Gas Flow Rate:

Vented:

Measurement Method: NDIR

Manufacturer of Calibration Gas: Calibration: once in 12 hrs every day using standard gases. Nippon Sanso Corporation, Japan. Concentrations of calibration gases used: 250, 320, 390, 460 ppm

CO2 Sensors:

CO2 Sensor:

Manufacturer: Manufacture: Fisher-Rosemount * Type: Model 880A * Reference cell: N2 gas flow-through

Model:

Environmental Control:

Resolution: 10 minutes

Uncertainty:

CO2 Sensor Calibration:

Method References: Murphy, P. P., K. K. Kelly, R. A. Feely, and R. H. Gammon (1995): Carbon dioxide concentrations in surface water and the atmosphere during 1986-1989 NOAA/PMEL cruises in the Pacific and Indian Oceans (Oak Ridge Natl. Lab., Oak Ridge, TN), Rep. NRNL/CDIAC-75, NDP-047.

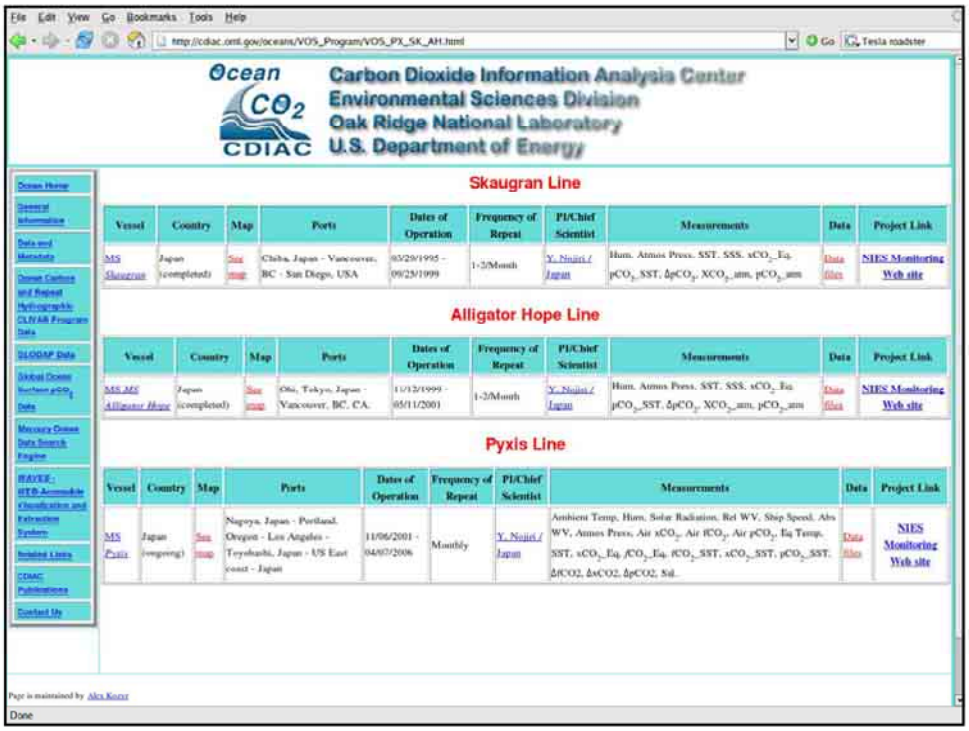
Data set References:

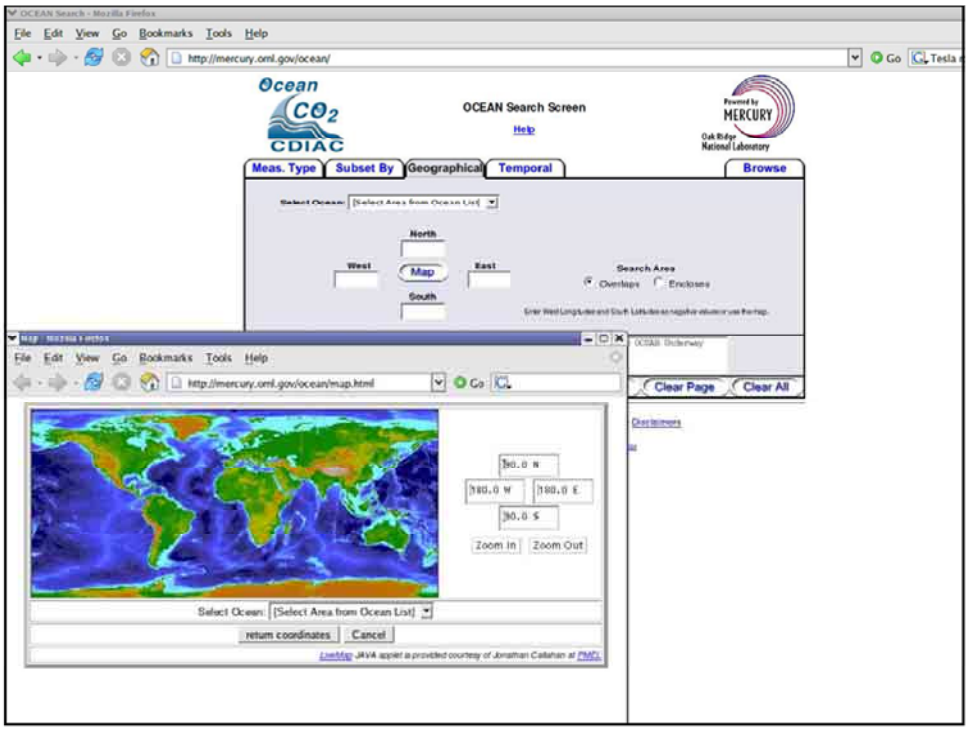
Citation: Nojiri, Y. 2007. Monitoring of the atmosphere-ocean carbon dioxide exchange by ship of opportunity -http://cdiac.ornl.gov/oceans/VOS_Program/VOS_PX_SK_AH.html. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, US Department of Energy, Oak Ridge, Tennessee.

Data Set Link(s): VOS Alligator Hope Line

Done

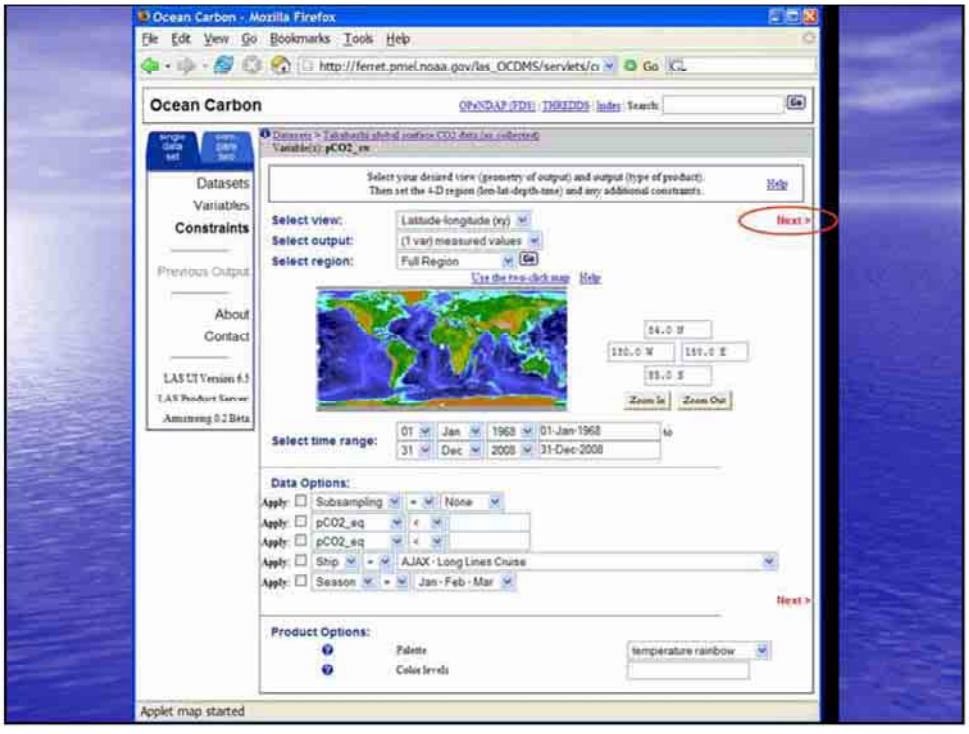
Kozyr


Ocean CO2 CDIAC
Carbon Dioxide Information Analysis Center
Environmental Sciences Division
Oak Ridge National Laboratory
U.S. Department of Energy
Skaugran Line
Alligator Hope Line
Pyxis Line


OCEAN Search Screen
Help
Meas. Type
Subset By
Geographical
Temporal
Browse
North
West
East
South
Map
Search Area
Overlaps
Enclosed
Clear Page
Clear All
Zoom In
Zoom Out
Select Ocean:
return coordinates
Cancel

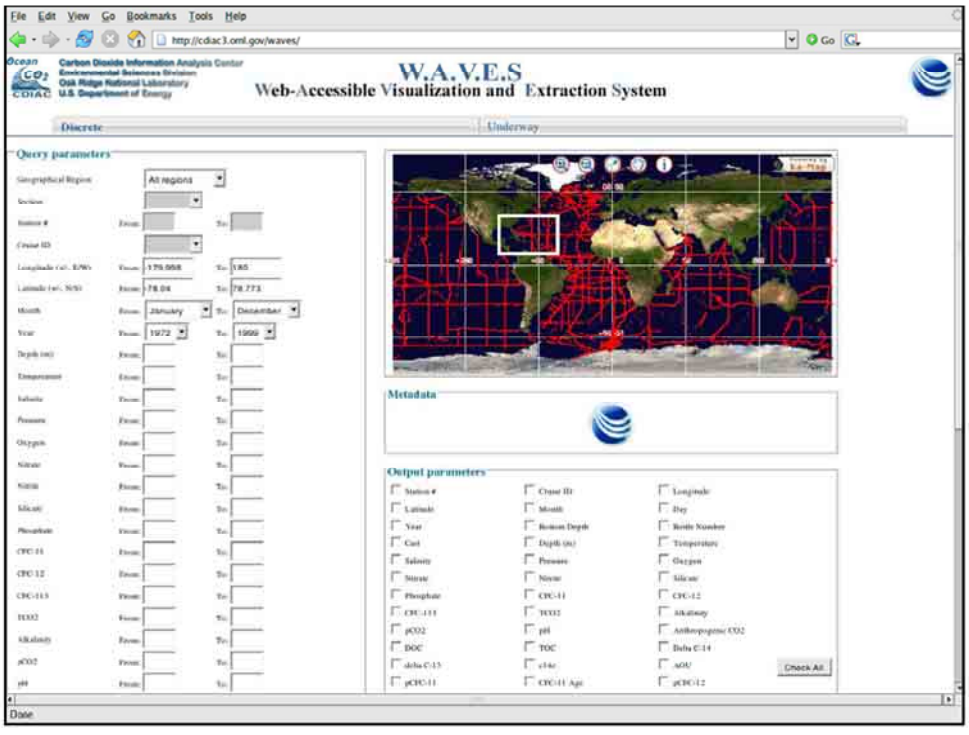
CDIAC Ocean Data Search Engines

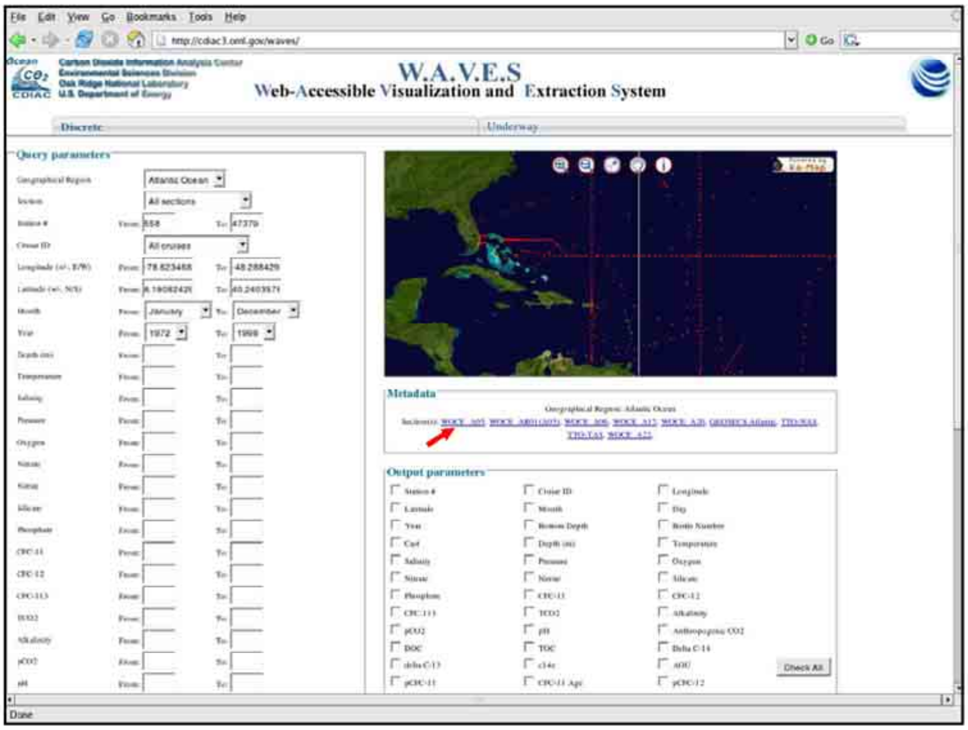
- *Mercury*
- Live Access Server (*LAS*)

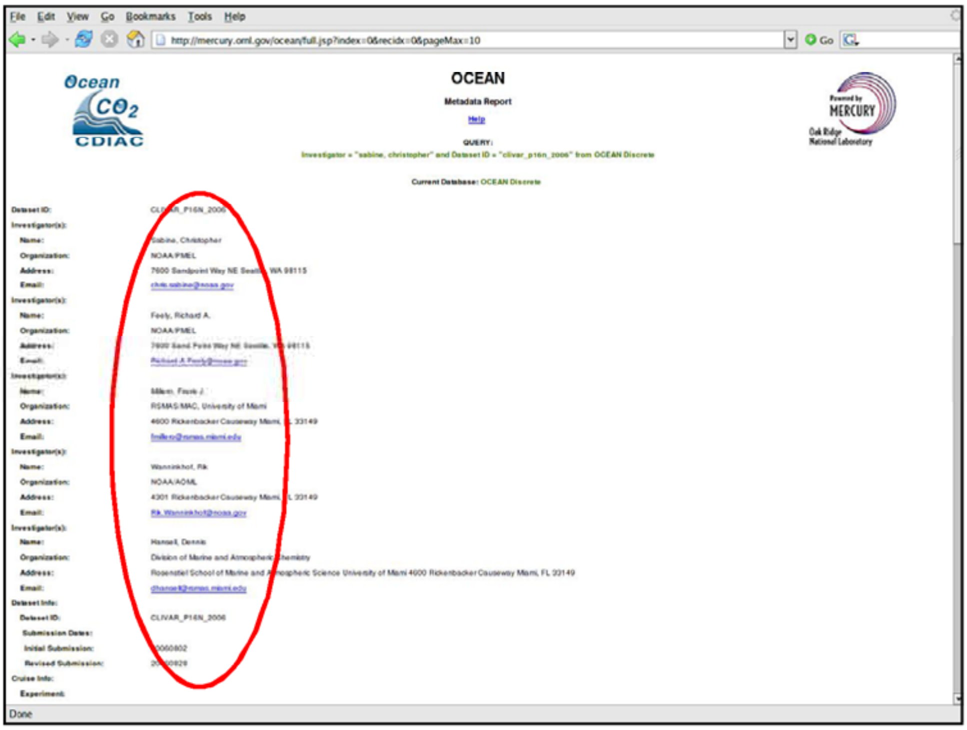


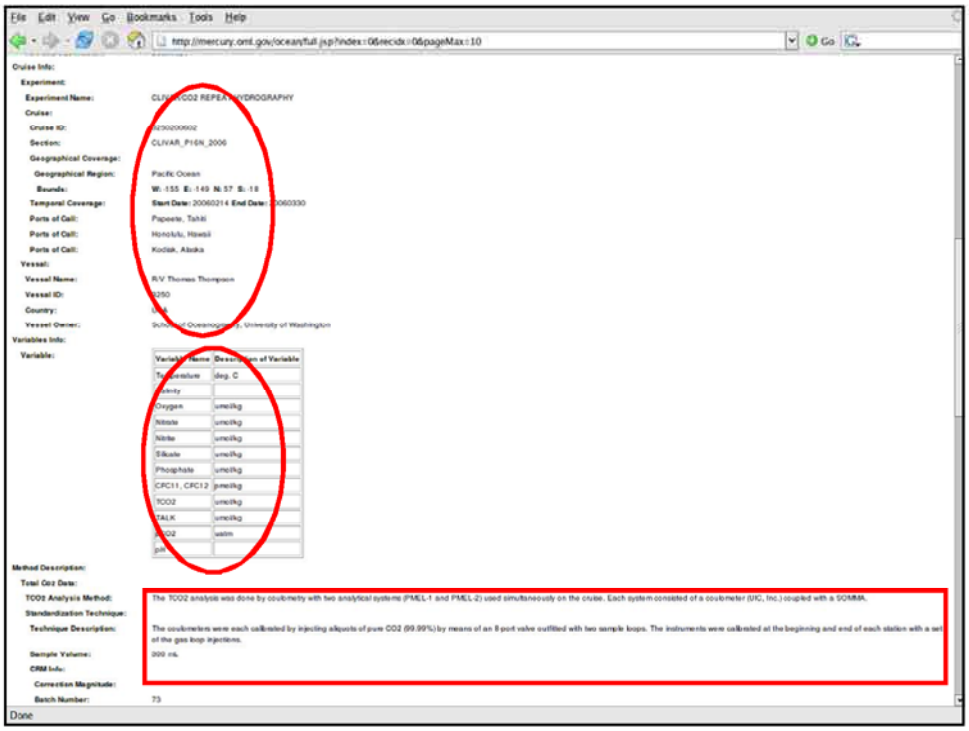
CDIAC Ocean Data Search Engines

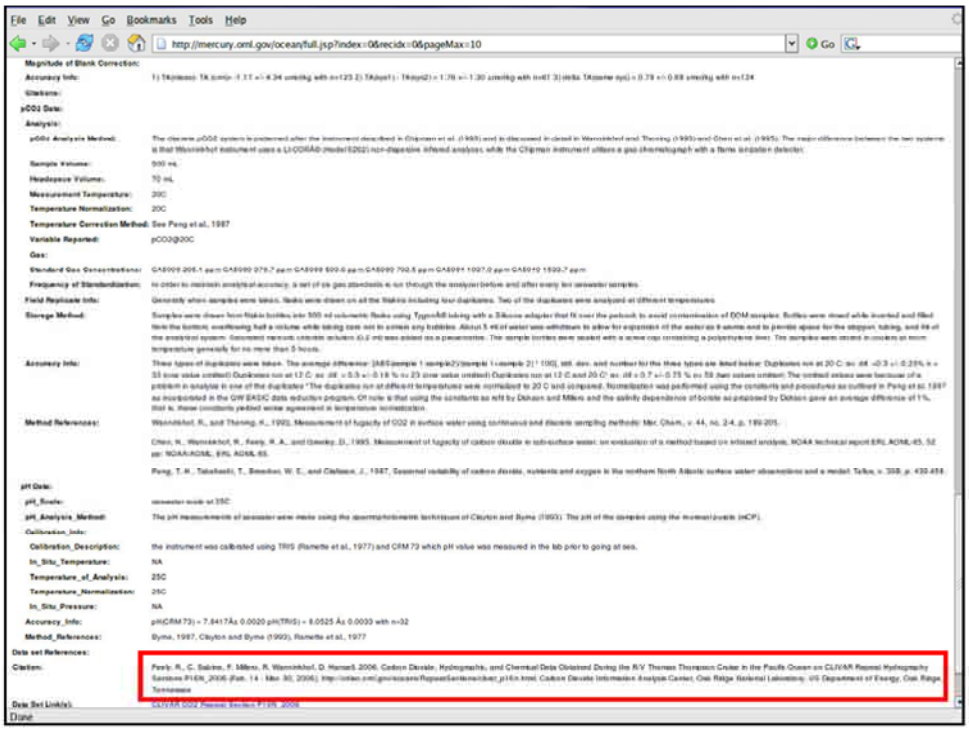
- *Mercury*
- Live Access Server (*LAS*)
- Web Accessible Visualization and Extraction System (*WAVES*) for discrete and underway data

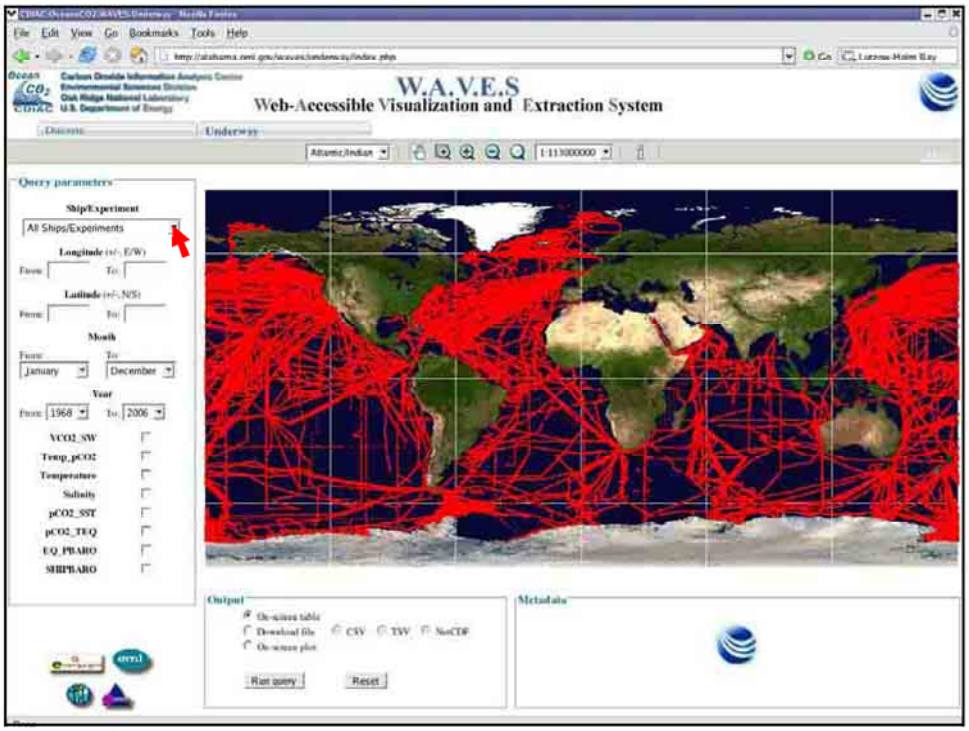


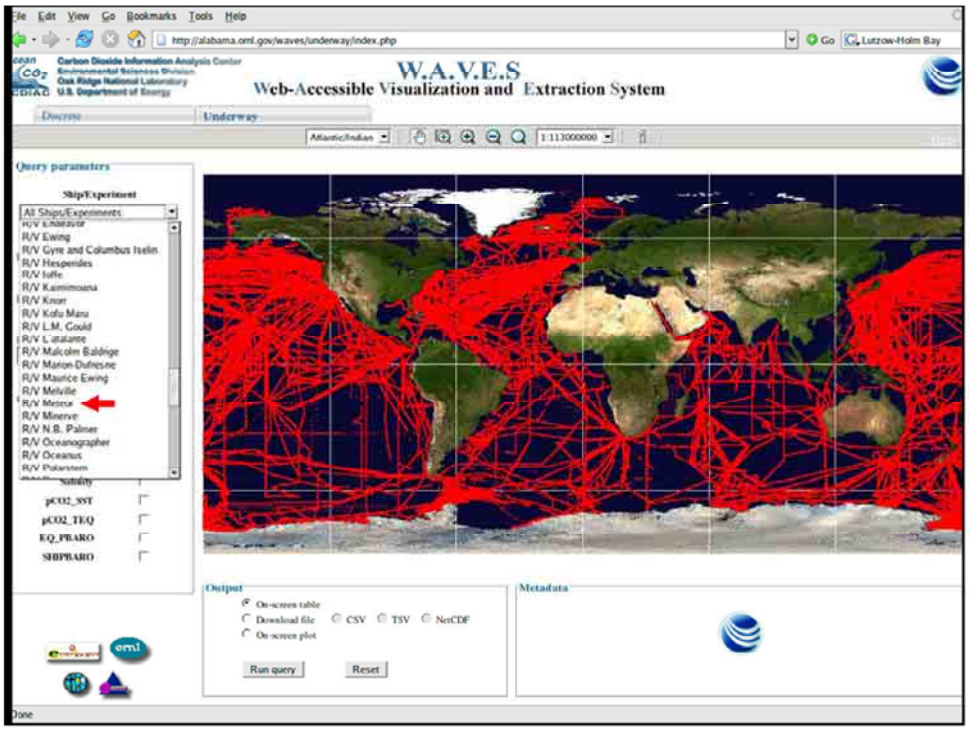

File Edit View Go Bookmarks Tools Help
http://cdiac3.ornl.gov/waves/
W.A.V.E.S
Web-Accessible Visualization and Extraction System
Discrete
Underway
Query parameters
Metadata
Output parameters
Check All
Done

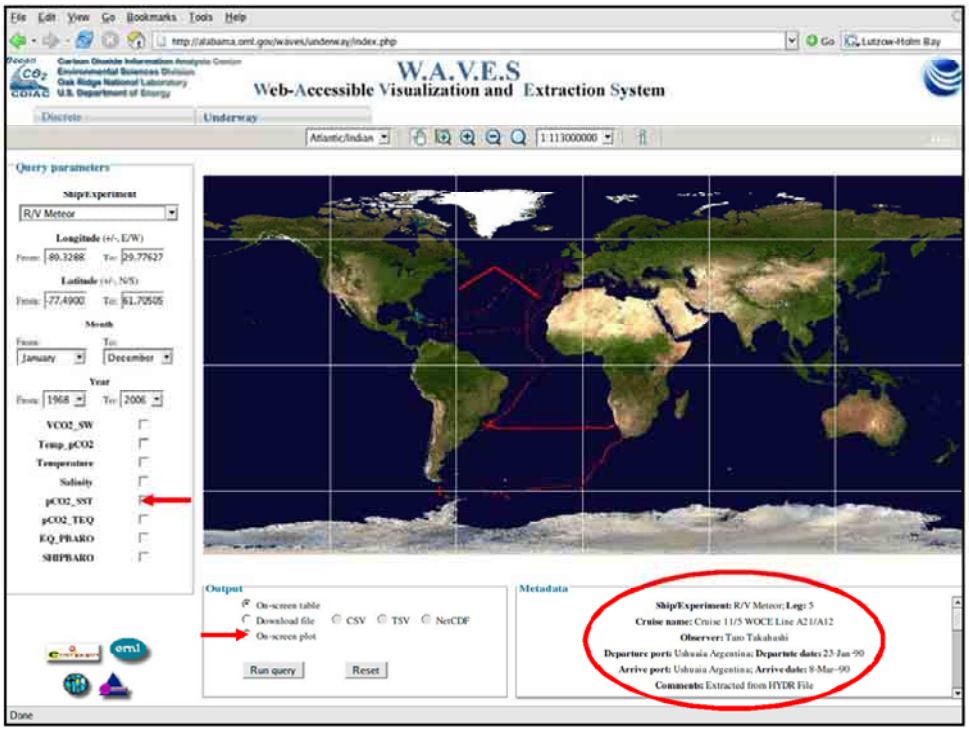

File Edit View Go Bookmarks Tools Help
Ocean CO2 CDIAC
OCEAN
Metadata Report
Help
MERCURY
Done

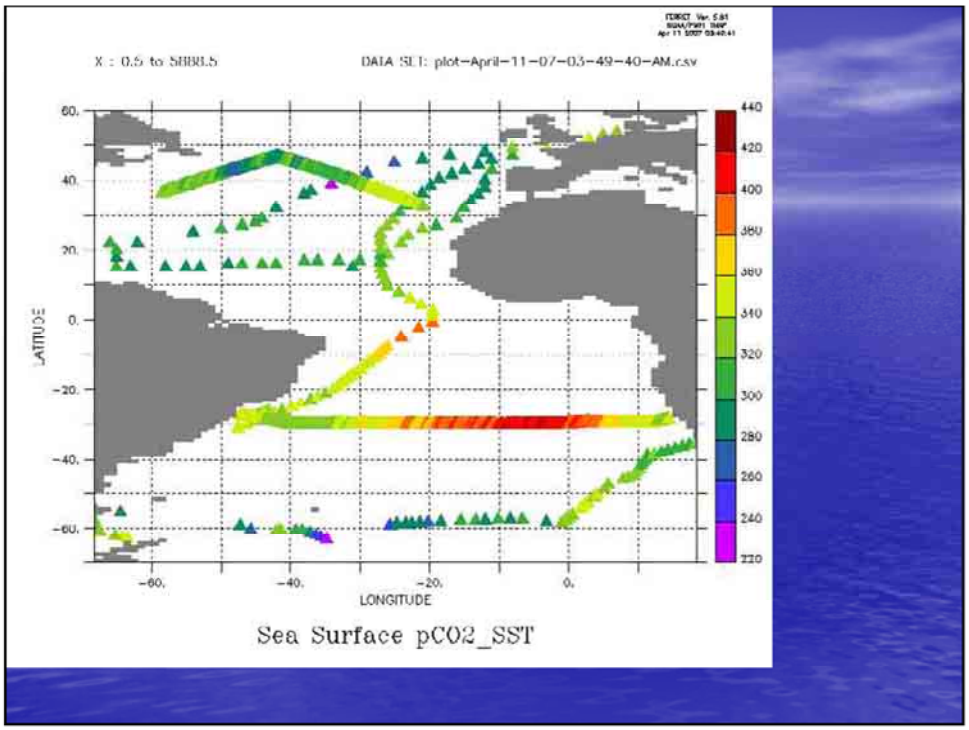

File Edit View Go Bookmarks Tools Help
http://mercury.ornl.gov/ocean/full.jsp?index=0&recidx=0&pageMax=10
Go
Cruise Info:
Experiment:
Experiment Name:
Cruise:
Cruise ID:
Section:
CLIVAR_P16N_2006
Geographical Coverage:
Geographical Region:
Pacific Ocean
Bounds:
W: 155 E: 149 N: 57 S: 18
Temporal Coverage:
Start Date: 20060214 End Date: 20060330
Ports of Call:
Papeete, Tahiti
Ports of Call:
Honolulu, Hawaii
Ports of Call:
Kodiak, Alaska
Vessel:
Vessel Name:
R/V Thomas Thompson
Vessel ID:
3250
Country:
USA
Vessel Owner:
University of Washington
Variables Info:
Variable:
Variable Name
Description of Variable
Temperature
deg. C
Salinity
Oxygen
umol/kg
Nitrate
umol/kg
Nitrite
umol/kg
Silicate
umol/kg
Phosphate
umol/kg
CFC11, CFC12
pmol/kg
TCO2
umol/kg
TALK
umol/kg
fCO2
latm
pH
Method Description:
Total Co2 Data:
TCO2 Analysis Method:
The TCO2 analysis was done by coulometry with two analytical systems (PMEL-1 and PMEL-2) used simultaneously on the cruise. Each system consisted of a coulometer (UIC, Inc.) coupled with a SOMMA.
Standardization Technique:
Technique Description:
The coulometers were each calibrated by injecting aliquots of pure CO2 (99.99%) by means of an 8 port valve outfitted with two sample loops. The instruments were calibrated at the beginning and end of each station with a set of the gas loop injections.
Sample Volume:
CRM Info:
Correction Magnitude:
Batch Number:
73
Done

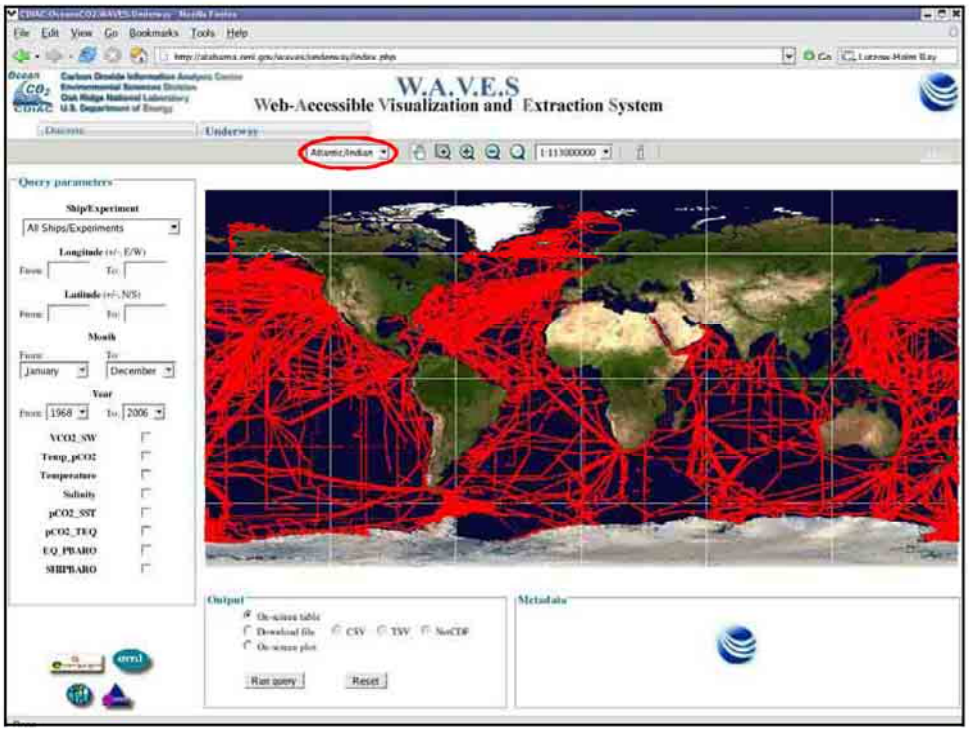

File Edit View Go Bookmarks Tools Help
http://mercury.ornl.gov/ocean/full.jsp?index=0&recidx=0&pageMax=10
Go
Magnitude of Blank Correction:
Accuracy Info:
Citations:
pCO2 Data:
Analysis:
pCO2 Analysis Method:
Sample Volume:
Headspace Volume:
Measurement Temperature:
Temperature Normalization:
Temperature Correction Method:
See Peng et al., 1987
Variable Reported:
pCO2@20C
Gas:
Standard Gas Concentrations:
Frequency of Standardization:
Field Replicate Info:
Storage Method:
Accuracy Info:
Method References:
pH Data:
pH_Scale:
pH_Analysis_Method:
Calibration_Info:
Calibration_Description:
the instrument was calibrated using TRIS (Ramette et al., 1977) and CRM 73 which pH value was measured in the lab prior to going at sea.
In_Situ_Temperature:
NA
Temperature_of_Analysis:
25C
Temperature_Normalization:
25C
In_Situ_Pressure:
NA
Accuracy_Info:
Method_References:
Byrne, 1987, Clayton and Byrne (1993), Ramette et al., 1977
Data set References:
Citation:
Feely, R., C. Sabine, F. Millero, R. Wanninkhof, D. Hansell, 2006. Carbon Dioxide, Hydrographic, and Chemical Data Obtained During the R/V Thomas Thompson Cruise in the Pacific Ocean on CLIVAR Repeat Hydrography Sections P16N_2006 (Feb. 14 - Mar. 30, 2006), http://cdiac.ornl.gov/oceans/RepeatSections/clivar_p16n.html. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, US Department of Energy, Oak Ridge, Tennessee
Data Set Link(s):
CLIVAR CO2 Repeat Section P16N_2006
Done

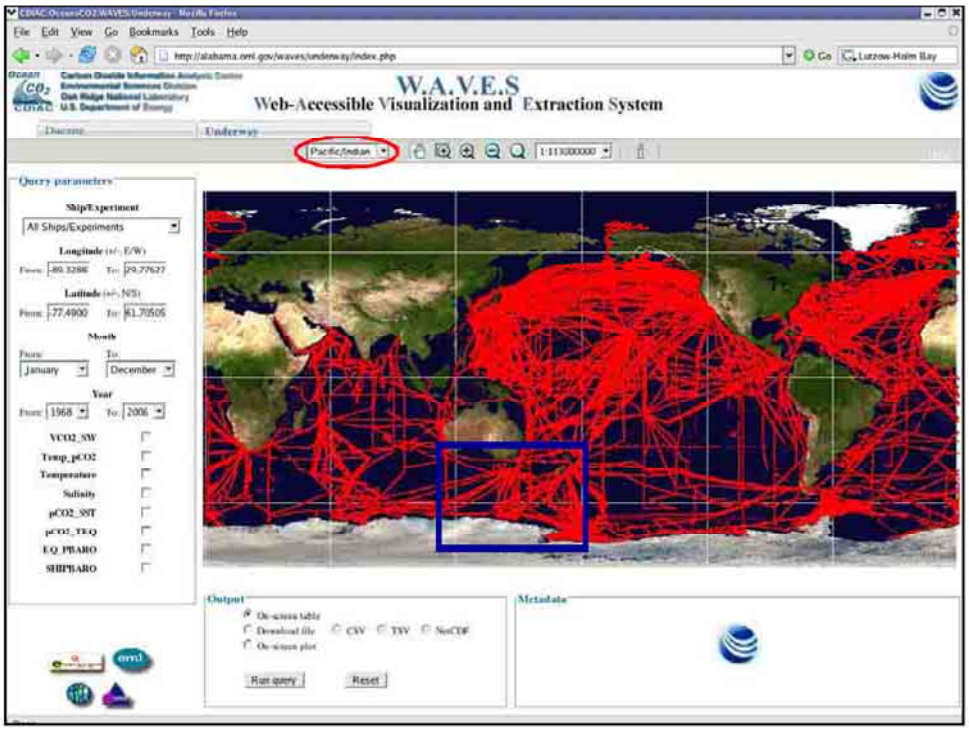

W.A.V.E.S
Web-Accessible Visualization and Extraction System
Underway
Query parameters
Ship/Experiment
All Ships/Experiments
Longitude (+/- E/W)
Latitude (+/- N/S)
Month
January
December
Year
1968
2006
VCO2_SW
Temp_pCO2
Temperature
Salinity
pCO2_SST
pCO2_TEQ
EQ_PBARO
SHIPBARO
Output
On-screen table
Download file
CSV
TSV
NetCDF
On-screen plot
Run query
Reset
Metadata

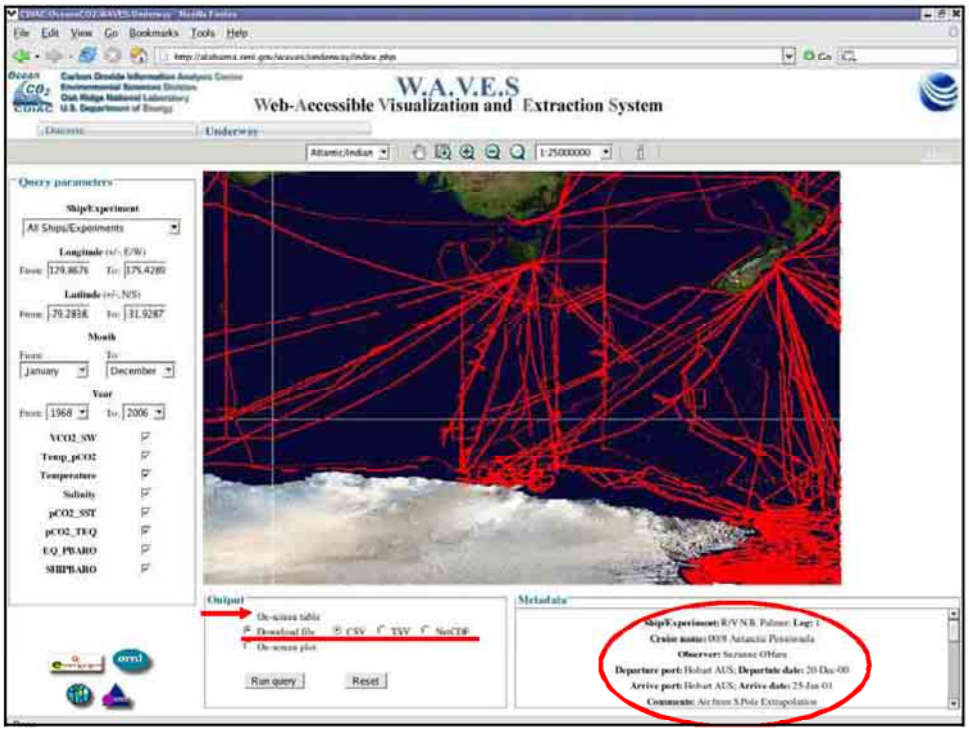

W.A.V.E.S
Web-Accessible Visualization and Extraction System
Underway
Query parameters
Ship/Experiment
All Ships/Experiments
R/V Ewing
R/V Gyre and Columbus Iselin
R/V Hesperides
R/V Iselin
R/V Kaimimoana
R/V Knorr
R/V Kofu Maru
R/V L.M. Gould
R/V L'atalante
R/V Malcolm Baldrige
R/V Marion Dufresne
R/V Maurice Ewing
R/V Melville
R/V Minerve
R/V N.B. Palmer
R/V Oceanographer
R/V Oceanus
pCO2_SST
pCO2_TEQ
EQ_PBARO
SHIPBARO
Output
On-screen table
Download file
CSV
TSV
NetCDF
On-screen plot
Run query
Reset
Metadata

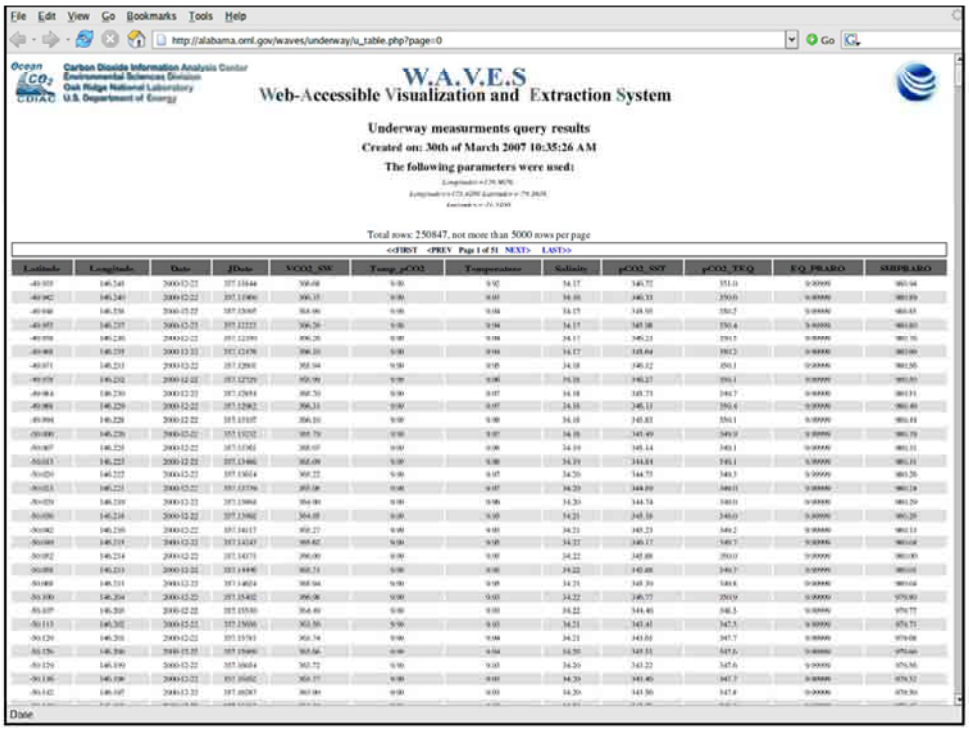

W.A.V.E.S
Web-Accessible Visualization and Extraction System
Query parameters
Ship/Experiment
R/V Meteor
Longitude (+/- E/W)
From: 80.3288 To: 29.77627
Latitude (+/- N/S)
From: 77.4900 To: 61.70505
Month
From: January To: December
Year
From: 1968 To: 2006
VCO2_SW
Temp_pCO2
Temperature
Salinity
pCO2_SST
pCO2_TEQ
EQ_PBARO
SHIPBARO
Output
On-screen table
Download file CSV TSV NetCDF
On-screen plot
Run query
Reset
Metadata
Ship/Experiment: R/V Meteor; Leg: 5
Cruise name: Cruise 11/5 WOCE Line A21/A12
Observer: Taro Takahashi
Departure port: Ushuaia Argentina; Departure date: 23-Jan-90
Arrive port: Ushuaia Argentina; Arrive date: 8-Mar-90
Comments: Extracted from HYDR File
Done


X : 0.5 to 58881.5
DATA SET: plot-April-11-07-03-49-40-AM.csv
LATITUDE
LONGITUDE
60.
40.
20.
0.
-20.
-40.
-60.
440
420
400
380
360
340
320
300
280
260
240
220
Sea Surface pCO2_SST


W.A.V.E.S
Web-Accessible Visualization and Extraction System
Underway
Atlantic/Indian
Query parameters
Ship/Experiment
All Ships/Experiments
Longitude (+/- E/W)
Latitude (+/- N/S)
Month
January
December
Year
1968
2006
VCO2_SW
Temp_pCO2
Temperature
Salinity
pCO2_SST
pCO2_TEQ
EQ_PBARO
SHIPBARO
Output
On-screen table
Download file
CSV
TSV
NetCDF
On-screen plot
Run query
Reset
Metadata


W.A.V.E.S
Web-Accessible Visualization and Extraction System
Underway
Pacific/Indian
Query parameters
Ship/Experiment
All Ships/Experiments
Longitude (+/- E/W)
-89.3288
29.77627
Latitude (+/- N/S)
-77.4900
61.70505
Month
January
December
Year
1968
2006
VCO2_SW
Temp_pCO2
Temperature
Salinity
pCO2_SST
pCO2_TEQ
EQ_PBARO
SHIPBARO
Output
On-screen table
Download file
CSV
TSV
NetCDF
On-screen plot
Run query
Reset
Metadata


W.A.V.E.S
Web-Accessible Visualization and Extraction System
Underway
Query parameters
Ship/Experiment
All Ships/Experiments
Longitude (+/- E/W)
From: 179.8676 To: 179.4289
Latitude (+/- N/S)
From: -79.2838 To: 31.9287
Month
From: January To: December
Year
From: 1968 To: 2006
VCO2_SW
Temp_pCO2
Temperature
Salinity
pCO2_SST
pCO2_TEQ
EQ_PBARO
SHIPBARO
Output
On-screen table
Download file
CSV
TSV
NetCDF
On-screen plot
Run query
Reset
Metadata
Ship/Experiment: R/V N.B. Palmer
Cruise name: 0008 Antarctic Peninsula
Observer: Suzanne O'Hara
Departure port: Hobart AUS; Departure date: 20-Dec-00
Arrive port: Hobart AUS; Arrive date: 25-Jan-01
Comments: Air from S.Pole Extrapolation


http://alabama.ornl.gov/waves/underway/u_table.php?page=0
W.A.V.E.S
Web-Accessible Visualization and Extraction System
Underway measurments query results
Created on: 30th of March 2007 10:35:26 AM
The following parameters were used:
Total rows: 250847, not more than 5000 rows per page
<<FIRST <PREV Page 1 of 51 NEXT> LAST>>
Latitude
Longitude
Date
JDate
VCO2_SW
Temp_pCO2
Temperature
Salinity
pCO2_SST
pCO2_TEQ
EQ_PBARO
SHIPBARO


Thank you!