WDC-A Activities

Robert Gelfeld Charlotte Sazama Godfrey Trammell

U.S. NODC/WDC for Oceanography, Silver Spring Sydney Levitus, Director

February 6, 2008

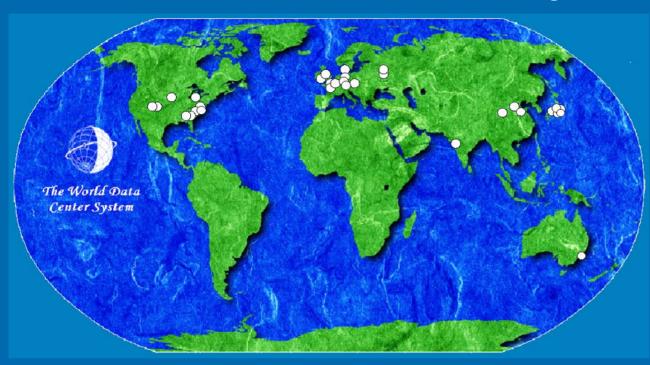




World Data Centers

The first large-scale international scientific enterprises were the
International Polar Years of 1882-1883 and 1932-1933,
which eventually led to the
International Geophysical Year of 1957-1958 (IGY).
The International Council of Scientific Unions (now International Council for Science)
established the World Data Center system to serve the IGY, and developed data
management plans for each IGY scientific discipline.

World Data Centers throughout the World



USA

Atmospheric Trace Gases, Oak Ridge
Biodiversity and Ecology, Denver
Glaciology, Boulder
Human Interactions in the Environment, Palisades
Land Cover Data, Sioux Falls
Marine Geology and Geophysics, Boulder
Meteorology, Asheville
Oceanography, Silver Spring
Paleoclimatology, Boulder
Remotely Sensed Land Data, Sioux Falls
Rotation of the Earth, Washington
Satellite Information, Greenbelt
Seismology, Denver
Solar-Terrestrial Physics, Boulder

Solid Earth Geophysics, Boulder

Europe

Climate, Hamburg
Earth Tides, Brussels
Geomagnetism, Copenhagen
Geomagnetism, Edinburgh
Glaciology, Cambridge
Marine Environmental Sciences, Bremen
Remote Sensing of the Atmosphere, Oberpfaffenhofen
Soils, Wageningen
Solar Activity, Meudon
Solar-Terrestrial Physics, Didcot
Sunspot Index, Brussels

52 WDCs covering32 disciplines operating in12 countries

Asia-Pacific

Airglow, Tokyo
Aurora, Tokyo
Cosmic Rays, Mito
Geomagnetism, Kyoto
Geomagnetism, Mumbai
Ionosphere, Tokyo
Nuclear Radiation, Tokyo
Solar Radio Emissions, Nagano
Solar-Terrestrial Science, Sydney
Space Science Satellites, Sagamihara

Russia

Marine Geology and Geophysics, Moscow Meteorology, Obninsk Oceanography, Obninsk Rockets and Satellites, Obninsk Rotation of the Earth, Obninsk Solar-Terrestrial Physics, Moscow Solid Earth Physics, Moscow

China

Astronomy, Beijing
Geology, Beijing
Geophysics, Beijing
Glaciology and Geocryology, Lanzhou
Meteorology, Beijing
Oceanography, Tianjin
Renewable Resources and Environment, Beijing
Seismology, Beijing
Space Sciences, Beijing

Principles and Responsibilities of ICSU World Data Centers

The basic principles and responsibilities of the international exchange of data through the World Data Centers have carried forward under ICSU rules, essentially unchanged since the establishment of the WDC system for the International Geophysical Year, 1957-1958.

- 1. Operate for the benefit of the international scientific community.
- 2. Are maintained by host country or institution.
- 3. Accept and store data safely and in good condition.
- 4. Make freely available information on data holdings.
- 5. Exchange data among themselves and facilitate data availability.
- 6. Hold no confidential or security-classified data.
- 7. Honor proprietary use of data by their originators (not to exceed two years).
- 8. Provide data to scientists in any country free of charge, on an exchange basis or at a cost not to exceed the cost of copying and sending the requested data.
- 9. Accept any scientist as a visitor to work on site with data holdings held by WDC.
- 10. Report to the ICSU Panel as requested.



Countries with whom WDC for Oceanography, Silver Spring has exchanged data, information or publications

Algeria
Angola
Argentina
Australia
Austria
Bangladesh
Belgium
Belize

Benin Bermuda Brazil

Bulgaria, People's Rep. of

Burma Canada

Canary Islands

Chile

China, People's Rep. of

Colombia

Congo, People's Rep. of

Costa Rica Croatia Cuba Cyprus

Czechoslovakia

Denmark

Dominican Republic

Ecuador Egypt El Salvador Estonia

Ethiopia Fiji

Finland France

Germany Ghana

Greece Guatemala

Guinea Guyana Haiti

Honduras Hong Kong

Hungary Iceland India Indonesia

Iran
Iraq
Ireland
Israel
Italy

Ivory Coast Jamaica

Japan Kenya Korea, Republic of

Lebanon Liberia Liberia

Malagasy Republic

Malaysia Malta Mauritania Mexico

Mozambique Mozaco

Morocco Namibia Netherlands

New Caledonia New Guinea

New Zealand Nigeria Norway Oman Pakistan Panama

Peru Philippines Poland

Portugal Qatar Romania Russia

Saudi Arabia

Senegal
Seychelles
Sierra Leone
Singapore
South Africa

Spain Sri Lanka Sweden Switzerland Taiwan Tanzania

Trinidad and Tobago

Tunisia Turkey Uganda Ukraine

Thailand

United Arab Emirates

United Kingdom

Uruguay
United States
Venezuela

Vietnam, Republic of

Yemen Yugoslavia

WORLD DATA CENTER FOR OCEANOGRAPHY



SILVER SPRING



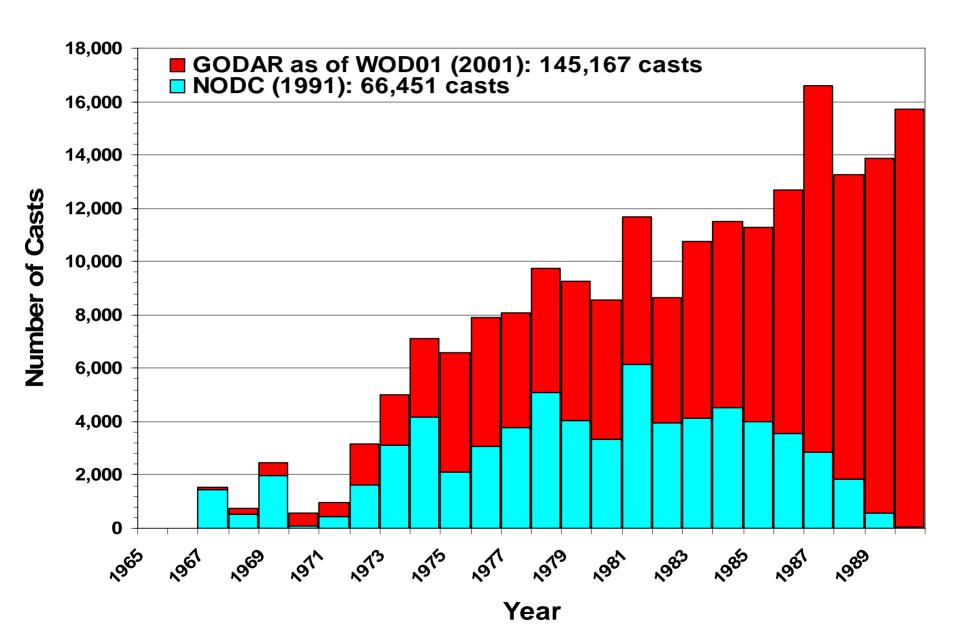
Collocated with the National Oceanographic Data Center

Exchange of Data and Publications with Scientists in 112 Countries throughout the World

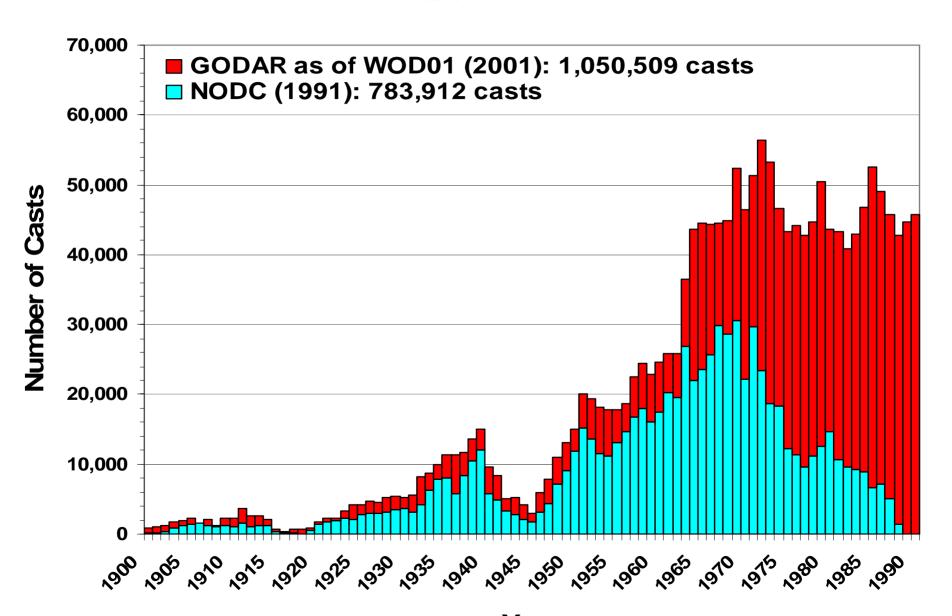
In the past 5 Years
Responded to over 350 Requests for
Data, Publications and Information
from Scientists in 24 Countries

Digitization of Data
Received in Manuscript Form
through Participation in
GODAR Project

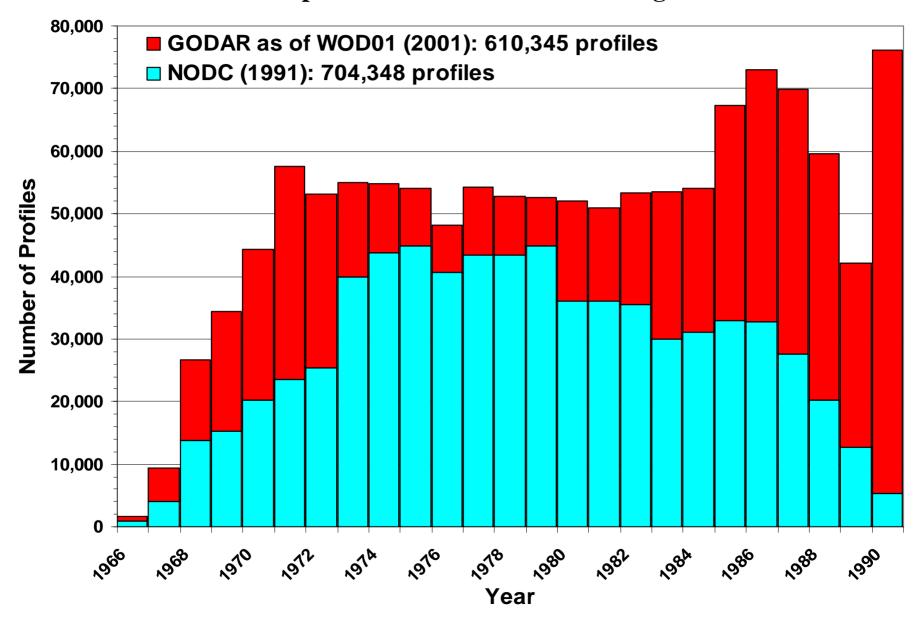
CTD/STD casts data acquired through the GODAR Project for 1965-1991 compared to NODC archive holding as of 1991



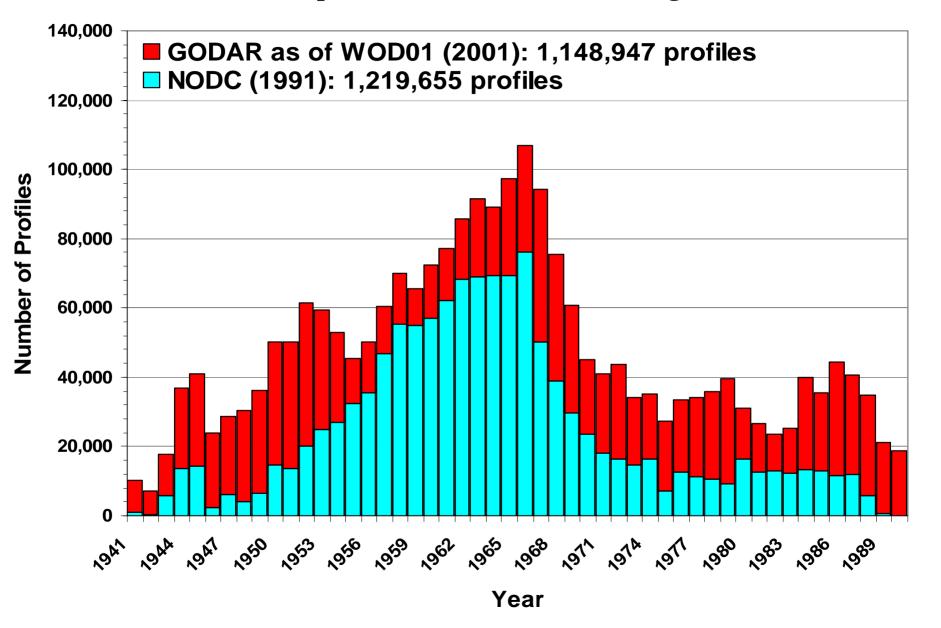
OSD cast data acquired through the GODAR Project for 1900-1991 compared to NODC archive holdings as of 1991



XBT temperature profiles acquired through the GODAR Project for 1966-1991 compared to NODC archive holdings as of 1991



MBT temperature profiles acquired through the GODAR Project for 1941-1991 compared to NODC archive holdings as of 1991



International Ocean Atlas Series

PUBLISHED

- Volume 1. Climatic Atlas of the Barents Sea 1998: Temperature, Salinity, Oxygen With Murmansk Marine Biological Institute (Russia)
- Volume 2. Biological Atlas of the Arctic Seas 2000: Plankton of the Barents and Kara Seas With Murmansk Marine Biological Institute (Russia)
- Volume 3. Hydrochemical Atlas of the Sea of Okhotsk 2001

 With All Russia Research Institute of Fisheries and Oceanography (Russia)

IN PREPARATION

- Volume 4. Atlas of Temperature-Salinity Frequency Distributions: Atlantic Ocean With Polar Fund (Russia)
- Volume 5. Russian Marine Expeditionary Investigations of the World Ocean With World Data Center for Oceanography, Obninsk (Russia)
- Volume 6. Zooplankton of the Arctic Seas 2002
 With Zoological Institute (Russia)
- Volume 7. 36-Year Time Series of Temperature, Salinity, and Zooplankton at the fixing point in the White Seas 2002 With White Sea Biological Station (Russia)
- Volume 8. History of the Arctic Exploration 2003: Cruise reports, primary data With Shirshov Institute of Oceanography (Russia)
- Volume 9. Climatic Atlas of the Arctic Seas 2003. Database of Barents, Kara, Laptev, and White Seas
 With Murmansk Marine Biological Institute and Institute of Numerical Mathematics (Russia)



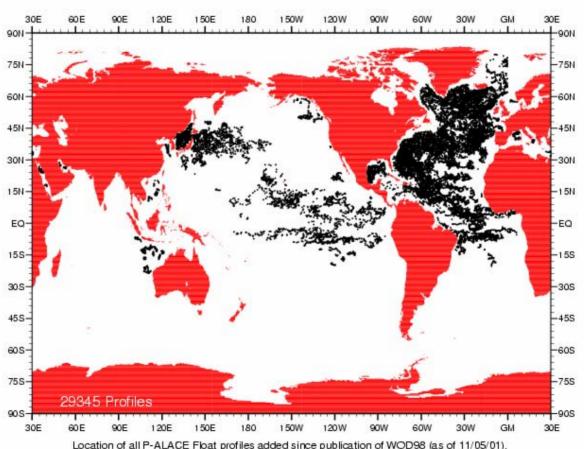


Examples of data acquired and processed by the Ocean Climate Lab during 2001

PROJECT/INSTITUTION	DATA TYPE	NUMBER OF PROFILES	TIME PERIOD
World Ocean Circulation Experiment (WOCE)	HCTD	17,234	1985-1999
Joint Global Ocean Flux Study (JGOFS)	Bottle	7,724	1975-1998
Global Ocean Ecosystem Dynamics (GLOBEC)	HCTD	4,866	1992-1999
Global Temperature Salinity Program Project	P-ALACE Float	25,522	1994-2001
Japan Marine Information Research Center (MIRC)	MBT	107,956	1965-1993
Japan Marine Information Research Center (MIRC)	Bottle	233,828	1919-1993



Argo P-ALACE FLOAT Profiles added to WOD98 from GTSPP



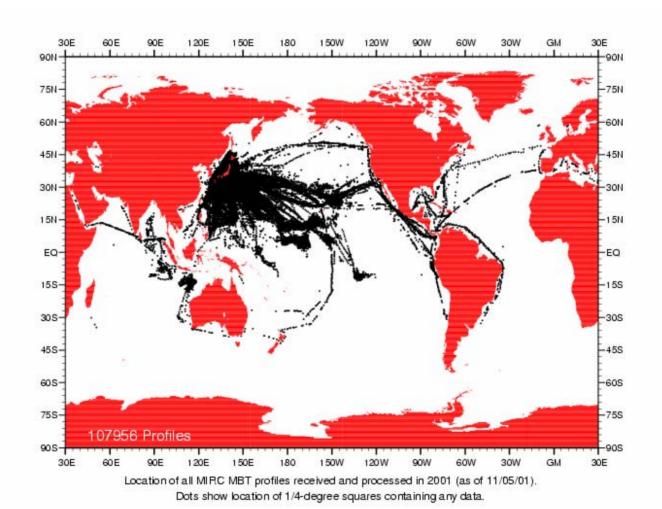
Location of all P-ALACE Float profiles added since publication of WOD98 (as of 11/05/01).

Dots show location of 1/4-degree squares containing any data.





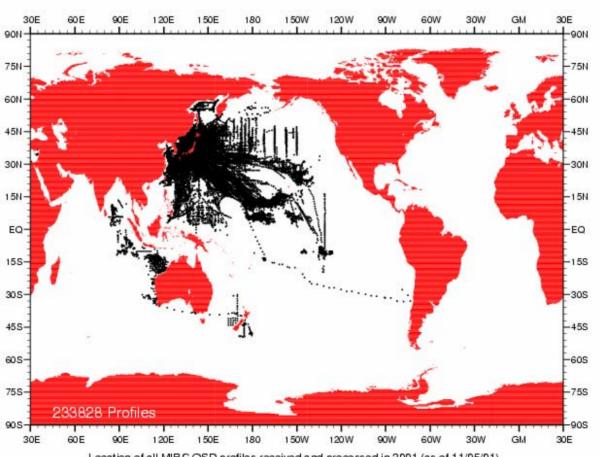
Mechanical Bathythermograph Profiles added to WOD98 from Japan's Marine information Research Center (MIRC)

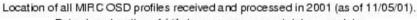






Ocean Station Profiles added to WOD98 from Japan's Marine information Research Center (MIRC)



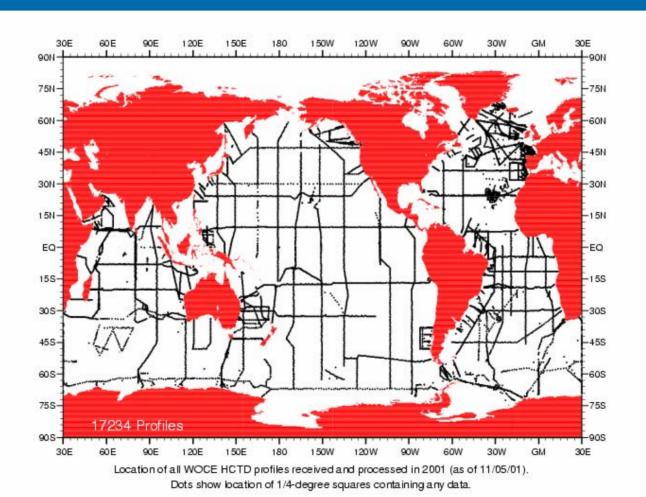


Dots show location of 1/4-degree squares containing any data.





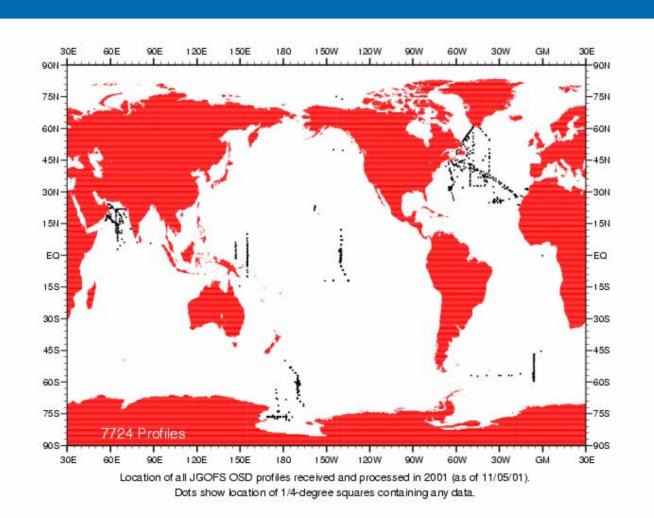
HCTD Profiles added to WOD98 from WOCE







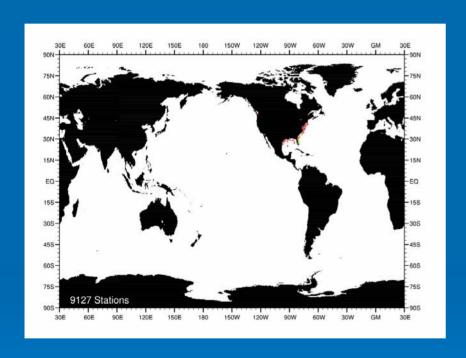
Ocean Station Profiles added to WOD98 from JGOFS

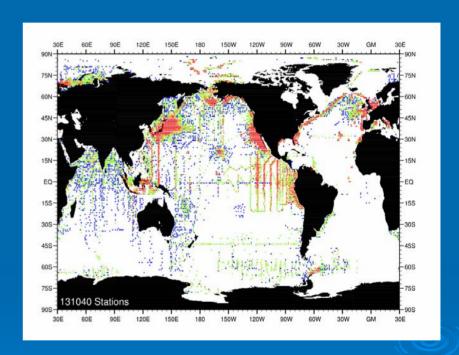






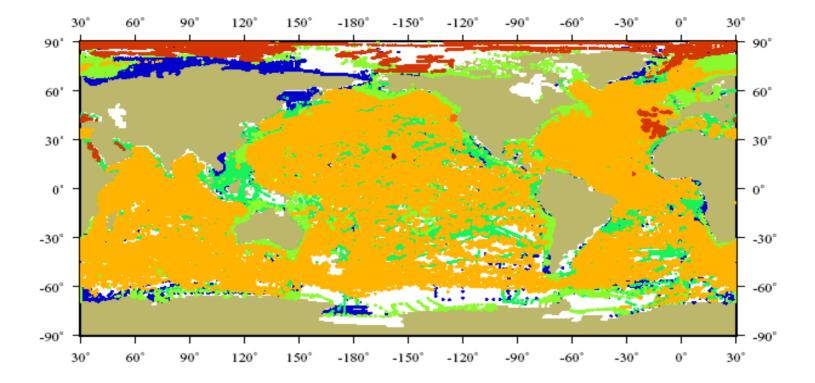
Plankton Data in World Ocean Database





Pre-CGC pilot project 1994

After CGC 1994 and ESDIM 1995, 1999-2000



New data added in WOD05

Number of profiles = 943572

Number of probes = 10 probes

gelfeld / 14 Mar 2006

Data Stewardship Considerations

Requirements

- Provide content expertise in many different areas (physical, chemical, biological, ecological, satellite...)
- Take the long-term view
- Understand the data management 'big picture'
- Attend to details

Concerns

- Time consuming
- Labor intensive
- Lack of resources
- Long-term viability of digital files
- Metadata
 management is not for
 everyone...

WDC for Oceanography, Silver Spring

- Established in 1957 at Texas A & M as World Data Center A, Oceanography
- Funded by the National Science Foundation
- Joined NODC in 1962 at the Navy Yard
- > Transferred from NAVOCEANO to NOAA in 1970
- > Eliminated letter designation WDC-A in 1999

DATA & INFORMATION EXCHANGE & COOPERATION

WDC DATA AND INFORMATION SERVICES

DATA ARCHAEOLOGY AND RESCUE ACTIVITIES



Countries with whom WDC for Oceanography, Silver Spring has exchanged data, information or publications

Algeria
Angola
Argentina
Australia
Austria
Bangladesh
Belgium
Belize

Bermuda Brazil Bulgaria, People's Rep. of

Burma Canada

Benin

Canary Islands

Chile

China, People's Rep. of

Colombia

Congo, People's Rep. of

Costa Rica Croatia Cuba Cyprus

Czechoslovakia

Denmark

Dominican Republic

Ecuador Egypt El Salvador Estonia

Ethiopia Fiji

Finland France

Germany Ghana

Greece Guatemala

Guinea Guyana Haiti

Honduras Hong Kong

Hungary Iceland India Indonesia

Indonesia Iran Iraq Ireland Israel Italy

Ivory Coast Jamaica

Japan Kenya Korea, Republic of

Lebanon Liberia Liberia

Malagasy Republic

Malaysia Malta Mauritania Mexico

Mozambique Mozaco

Morocco Namibia Netherlands

New Caledonia New Guinea

New Zealand Nigeria Norway Oman Pakistan Panama

Peru Philippines

Poland
Portugal
Qatar
Romania

Russia

Saudi Arabia

Senegal Seychelles Sierra Leone Singapore South Africa

Spain Sri Lanka Sweden Switzerland Taiwan Tanzania

Trinidad and Tobago

Tunisia Turkey Uganda Ukraine

Thailand

United Arab Emirates

United Kingdom

Uruguay
United States
Venezuela

Vietnam, Republic of

Yemen Yugoslavia

Report of Observations/Samples collected by Oceanographic Programmes

ROSCOP was conceived by IOC in the late 1960s in order to provide a low level inventory for tracking oceanographic data collected on Research Vessels. Revised and re-named

CSR (Cruise Summary Report)

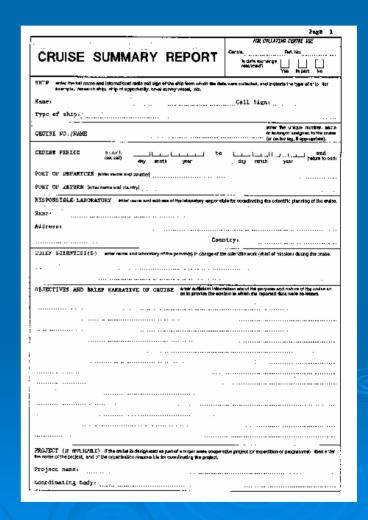
Online ROSCOP Database maintained by ICES

ROSCOP System Provides:

Cruise information prior to data submission

Referral service for non-typical data

Back-up Documentation for Data Centers



DATA & INFORMATION EXCHANGE & COOPERATION

WDC DATA AND INFORMATION SERVICES

DATA ARCHAEOLOGY AND RESCUE

ACTIVITIES

Original Catalogue of Data

Data Information Sheet

WDC Catalogue No. 101.1 A-1

Serial Stations

Number of Stations

Physical and Chemical Parameters

STD/CTD

Depth Range and Maximum

BTs

Currents

Bottom Topography

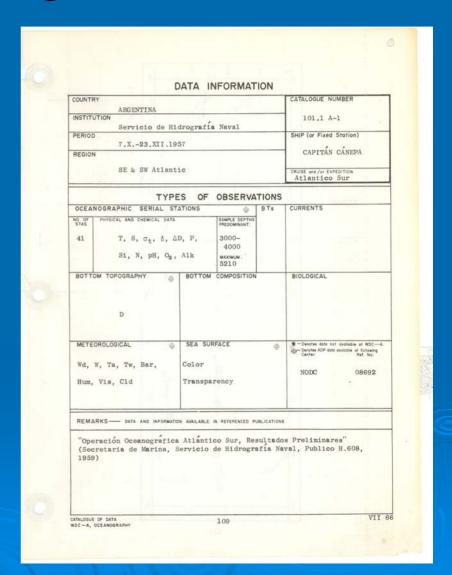
Bottom Composition

Biological Observations

Meteorological Observations

Sea Surface

Processing Information



Ship File

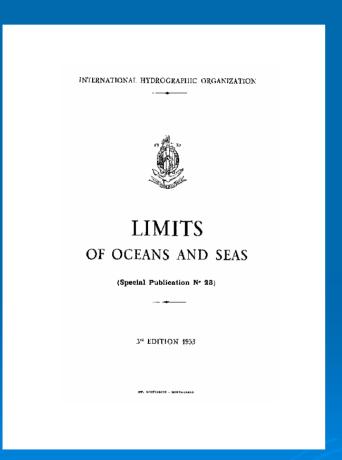
Geographic File

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U.S.S.R.
 AKADEMIK VERNADSKIT
 137.4 B-1, B-2, B-3, B-4, B-5, B-6, B-7, B-8, B-9, B-12, B-13, B-14, B-15, B-16, B-17, B-8, B-19, B-20
 137. 1 L-1
          Parygoningo
  AKADEMUK BERHADSKUN
 KAIYO MARU (different ship than KAIYO)
                                                            JAPAN
124.15 024 C2, C-3, C-4
124.21 077826 4
124.23 0255 627, 0-28
124.24 028, 5-2
124.27 A-3, A-4, A-5, A-6, A-7, A-8, A-9, A-10, A+1, A+2, (BTs only) A13, A+4,
124.27 C-1
124.5 E-1
```

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(15A.)
                             E-1 F-4 G-1 H-1
E-2 F-5 G-2 H-6
F-6 H-7
F7 H-8
   106.10 A-1
              B-2 C-1
               B-3 C-2
                     C-3
         A-4 B-5
          A-5 B-6
         A-10 B-7
137.6 C-1 E-5 G-1 H-1 I-9 M-1 (458)
               E-7
                     G-2 H-12
                                        M-13
                                        m-19
               E-8
                     G-11
G-12
        C-6
         C-6 E-10
C-7 E-15
         C-10
        C-19
         C-15
         C-16
```

WDC Geographical Index

The identification of cruise locations is based on the IHB Regions as defined in the International Hydrographic Organization's "Limits of Oceans and Seas"



1. Baltic Sea 1a. Gulf of Bothnia 1b. Gulf of Finland 1c. Gulf of Riga 2. Kattegat, Sound and Belts 3. Skagerrak 4. North Sea 5. Greenland Sea 6. Norwegian Sea 7. Barents Sea 8. White Sea 9. Kara Sea 10. Laptev Sea 11. East Siberia Sea 12. Chukchi Sea 13. Beaufort Sea 14. Northwestern Passages 14A. Baffin Bay 15. Davis Strait 15A. Labrador Sea 16. Hudson Bay 16A. Hudson Strait 17. Arctic Ocean 17A. Lincoln Sea 18. Inland Sea off West Coast of Scotland 19. Irish Sea and St. George's Channel 20. Bristol Channel 21. English Channel 22. Bay of Biscay 23. North Atlantic 23a. NE Atlantic Ocean 23b. NW Atlantic Ocean 24. Gulf of St Lawrence 25. Bay of Fundy 26. Gulf of Mexico 27. Caribbean Sea 28. Mediterranean Sea

28A, Med. Sea - Western Basin

28Aa Strait of Gibraltan 28Ab, Alboran Sea 28Ac. Belearic (Iberian) Sea 28Ad. Ligurian Sea 28Ae, Tyrrhenian Sea 28B. Med. Sea - Eastern Basin 28Bf. Ionian Sea 28Bq. Adriatic Sea 28Bh. Aegean Sea 29. Sea of Marmara 30. Black Sea 31. Sea of Azov 32. South Atlantic Ocean 32a, SE Atlantic 32b. SW Atlantic 33. Rio de la Plata 34. Gulf of Guinea 35. Gulf of Suez 36. Gulf of Agaba 37. Red Sea 38. Gulf of Aden 39. Arabian Sea 40. Gulf of Oman 41. Gulf of Iran (Persian Gulf) 42. Laccadive Sea 43. Bay of Bengal 44. Andaman or Burma Sea 45. Indian Ocean 45A. Mozambique Channel 45a. NW Indian Ocean 45b, NF Indian Ocean 45c, SW Indian Ocean 45d. SE Indian Ocean 46. Malacca & Singapore Straits 46a. Strait of Malacca 46b. Strait of Singapore

47. Gulf of Thailand (Siam)

48. East Indian Archipelago

48a. Sulu Sea

48b. Celebes Sea

48c. Malacca Sea 48d. Gulf of Tomini 48e. Halmahra Sea 48f. Ceram Sea 48g. Banda Sea 48h. Arafura Sea 48i. Timor Sea 48i. Flores Sea 48k. Gulf of Boni 48l. Bali Sea 48m. Macassar Sea 48n. Java Sea 480. Savu Sea 49. South China Sea 50. East China Sea 51. Yellow Sea 52. Sea of Japan 53. Inland Sea 54. Sea of Okhotsk 55. Bering Sea 56. Philippine Sea 57. North Pacific Ocean 57a, NW Pacific Ocean 57b. NE Pacific Ocean 58. Gulf of Alaska 59. Coastal Waters of SE Alaska and British Columbia 60. Gulf of California 61. South Pacific Ocean 61a. SW Pacific Ocean 61b. SE Pacific Ocean 62. Great Australian Bight 62A. Bass Strait

63. Tasman Sea

65. Solomon Sea

66. Bismark Sea

(South of 50°S)

SO. Southern Ocean

64. Coral Sea

Catalogue of Data

WDC-A, OCEANOGRAPHY DATA INFORMATION

CATALOGUE NO.	SHIP/FIXED STATION	7.55	6000	TYPES OF OBSERVATIONS										
		START	END	REGION	NO. O			BTs	CURRENTS	BIOLOGY	MET.	SEA SURFACE	PUBLICATION NUMBER	REMARKS
01	ARGENTINA				8									3 . 1 .
01.03 A-03	OCA BALDA	12/03/1987	03/09/1991	32b	130	t			2.5				01.07-001	Cruises 02/87, 04/87, 06/87, 10/87, 04/88, 01/89, 05/89, 02/91, 04/91
24	JAPAN		100	2 2		12.3								
24.01 B-93	RYOFU MARU	17/01/1996	06/12/1996	56 57a 61a	238	† Oxy, Nu	r	XTb-88	Subs-343	Phyt-73 Zoo-60 Pigm-109	4	T, S	24.07-094	Cruises 9601, 9604, 9607, 9609, 9610
24.01 B-94	RYOFU MARU	21/01/1997	04/12/1997	50 56 57a	182	t Oxy, Nu	r	XTb-68	Subs-365	Phyt-29 Zoo-29 Pigm-69		T, S	24.07-095	Cruises 9701, 9704, 9705, 9709, 9711
24.01 F-35	KEIFU MARU	26/01/1996	18/11/1996	61a 50 56 57a	211	t Oxy, Nu	r	XTb-81	Subs-599			T, S	24.07-094	Cruises 9601, 9604, 9605, 9608, 9610
24.01 F-36	KEIFU MARU	22/01/1997	21/11/1997	57a 50 56 57a	181	† Oxy, Nu	r	ХТЪ-94	Subs-719			T, S	24.07-095	Cruises 9701, 9704, 9705, 9708, 9710
24.02 B-69	OSHORO MARU	02/11/1997	12/09/1998	55 56 57a	171	t		XTb-14		Zoo-5 FObs-51	x	T Col, Tra	24.04.055 24.04-056	Cruises 81, 82, 84, 85, 87, 88
24.02 C-22	HOKUSEI MARU	22/01/1998	05/10/1998	57b 52 54 57a	127	+		хть-в		Zoo-5 FObs-48	×	T Col, Tra	24.04.055 24.04-056	Cruises 77, 78, 79, 80
24.05 E-01	KAIYO MARU	13/05/1978	18/06/1979	57b 56 57a	61	Оху		XTb-24		33	х	Wa	24.06-070	3161
24.08 D-84	KOFU MARU	19/01/1996	17/12/1996	57a 52 57a	404	t Oxy, Nu	,	XTb-63	Subs-519	Phyt-34 Zoo-30 Pigm-130		T, S	24.07-094	Cruises 9601, 9604, 9606, 9607, 9610, 9611
24.08 D-85	KOFU MARU	27/01/1997	11/12/1997	52 57a	353	Oxy, Nut	r	XTb-62	Subs-462	Phyt-48 Zoo-48 Pigm-136		T, S	24.07-095	Cruises 9701, 9704, 9706, 9707, 9710, 9711

^{*} DATA FOR THIS CRUISE REPRESENT AN ADDITION TO DATA PREVIOUSLY RECEIVED BY WDC. OCEANOGRAPHY.

[†] DENOTES DATA OBTAINED BY ELECTRONIC, IN-SITU, CONDUCTIVITY/SALINITY/TEMPERATURE/DEPTH (CTD/STD) SENSORS.

^{††} ALL STATIONS AS A MINIMUM HAVE READINGS OF BOTH TEMPERATURE AND SALINITY, UNLESS OTHERWISE NOTED.

WORLD DATA CENTER A Oceanography



OCEANOGRAPHIC DATA EXCHANGE 1993

WDCA-OC-94-1

WORLD DATA CENTER A
Oceanography



CATALOGUE

OF

ACCESSIONED PUBLICATIONS

SUPPLEMENT NO. 21 1991-1992

WDCA-OC-93-1

WORLD DATA CENTER for Oceanography, Silver Spring



CATALOGUE OF DATA and REPORT OF DATA EXCHANGE 1999

WDC-OC-00-1

DATA & INFORMATION EXCHANGE & COOPERATION

WDC DATA AND INFORMATION SERVICES

DATA ARCHAEOLOGY AND RESCUE ACTIVITIES





World Data Center

50 Casasas Alva Prince Solar Radio Emissions, Nagano E

957 - 2007

Solar-Terrestrial Science, Sydney

The World Data Center system was created to archive and distribute data collected from the observational programs of the 1957-1958 International Geophysical Year. Originally established in the United States, Europe, Russia, and Japan, the WDC system has since expanded to include 52 Centers covering 32 scientific disciplines in 12 countries.

Mission Statement of the World Data Center System: Data constitute the raw material of scientific understanding. The World Data Center system works to guarantee access to solar, geophysical and related environmental data. It serves the whole scientific community by assembling, scrutinizing, organizing and disseminating data and information



Thank You!

