NOAA Atlas NESDIS 46

WORLD OCEAN DATABASE 2001
Volume 5: Temporal Distribution of Nutrient Profiles

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National Oceanographic Data Center
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Silver Spring, MD
March 2002

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This publication should be cited as:

M. E. Conkright, R. A. Locarnini, T. P. Boyer, J. I. Antonov, O. K. Baranova, H. E. Garcia, R. Gelfeld, D. Johnson, P. P. Murphy, T. D. O'Brien, I. Smolyar, C. Stephens, 2002: *World Ocean Database 2001, Volume 5: Temporal Distribution of Nutrient Profiles.* S. Levitus, Ed., NOAA Atlas NESDIS 46, U.S. Government Printing Office, Wash., D.C., 286 pp., CD-ROMs.

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Fig. D28 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for 1996.

PREFACE

The oceanographic databases described by this atlas series greatly expands on the *World Ocean Database 1998* (WOD98) product. We have expanded these earlier databases to include data from new instrument types such as profiling floats and new variables such as pCO_2 and TCO_2. Previous oceanographic databases including the NODC/WDC profile archives, and products derived from these databases, have proven to be of great utility to the international oceanographic, climate research, and operational environmental forecasting communities. In particular, the objectively analyzed fields of temperature and salinity derived from these databases have been used in a variety of ways. These include use as boundary and/or initial conditions in numerical ocean circulation models, for verification of numerical simulations of the ocean, as a form of "sea truth" for satellite measurements such as altimetric observations of sea surface height, and for planning oceanographic expeditions. Increasingly nutrient fields are being used to initialize and/or verify biogeochemical models of the world ocean. The databases, and products based on these databases, are critical for support of international assessment programs such as the Intergovernmental Program on Climate Change (IPCC) of the United Nations.

It is well known that the amount of carbon dioxide in the earth's atmosphere will most likely double during the next century compared to CO_2 levels that occurred at the beginning of the Industrial Revolution. Regardless of one's scientific and/or political view of a possible "enhanced greenhouse warming" due to the increase of carbon dioxide, it is necessary that the international scientific community have access to the most complete historical oceanographic databases possible in order to study this problem, as well as other scientific and environmental problems.

The production of oceanographic databases is a major undertaking. Such work benefits from the input of many individuals and organizations. We have tried to structure the data sets in such a way as to encourage feedback from experts around the world who have knowledge that can improve the data and metadata contents of the database. It is only with such feedback that high quality global ocean databases can be prepared. Just as with scientific theories and numerical models of the ocean and atmosphere, the development of global ocean databases is not carried out in one giant step, but proceeds in an incremental fashion.

In the acknowledgment section of this publication we have expressed our view that creation of global ocean databases is only possible through the cooperation of scientists, data managers, and scientific administrators throughout the international community. I thank my colleagues at the Ocean Climate Laboratory of NODC for their dedication to the project leading to publication of this atlas series. Their commitment has made this database possible. It is my belief that the development and management of national and international oceanographic data archives is best performed by scientists who are actively working with the data.

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March 2002

Acknowledgments

This work was made possible by a grant from the NOAA Climate and Global Change Program which enabled the establishment of a research group, the Ocean Climate Laboratory (OCL), at the National Oceanographic Data Center. The purpose of the OCL is to prepare research quality oceanographic databases, as well as to compute objective analyses of, and diagnostic studies based on, these databases.

The data made available as part of this atlas include a part of the oceanographic data archives maintained by NODC/WDC as well as data acquired as a result of the IODE/IOC "Global Oceanographic Data Archaeology and Rescue" (GODAR) project. At NODC/WDC, "data archaeology and rescue" projects are supported with funding from the NOAA Environmental Science Data and Information Management (ESDIM) Program and NOAA Climate and Global Change Program. The majority of funding for these efforts is now provided by the ESDIM program. Support for this work from joint NASA/NOAA and DOE/NOAA Global Change data management programs is appreciated. Support for some of the regional IOC/GODAR meetings was provided by the MAST program of the European Union.

We acknowledge the scientists, technicians, and programmers who have submitted data to national and regional data centers as well as the managers and staff at the various data centers. Our database allows for the storage of metadata including information about Principal Investigators to recognize their efforts.

The OCL expresses thanks to those who provided comments and helped develop an improved *World Ocean Database 2001* (WOD01) product. In particular, Dr. Steve Worley of NCAR, and Steve Hankin of PMEL for testing the CD-ROMs prior to distribution. Roy Lowry (BODC) and Tom Whitworth (TAMU) for suggestions. Any errors in WOD01 are the responsibility of the Ocean Climate Laboratory.

Ervin Godfrey Trammell and Charlotte Sazama of the NODC International Data Exchange Team helped locate data in the WDC archives for digitization. We thank Mike Chepurin, Igor Minin, Dan Smolyar, Alexandra Grodsky, and Carla Forgy of the OCL for their work in data digitization and their assistance in quality control of the data and metadata in WOD01. Renee Tatusko identified many missing metadata. The OCL acknowledges the help received over the last several years from colleagues in other NODC divisions. Francis Mitchell helped with all the code lists and accessions, Melanie Hamilton supplied GTSPP data.

Declassification of naval oceanographic data by various navies is acknowledged. The Intergovernmental Oceanographic Commission has requested such declassification efforts in recent years.

World Ocean Database 2001, Volume 5: Temporal Distribution of Ocean Station Data (OSD)Nutrient Profiles

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ABSTRACT

This atlas describes a collection of scientifically quality controlled Ocean Station Data (OSD) nutrient profiles. Yearly distributions for individual years of all OSD nutrient profiles in the database are presented to provide information on the state of ocean OSD profile observations.

1. INTRODUCTION

Ocean Station Data (OSD) has historically referred to measurements made from a stationary research ship using reversing thermometers to measure temperature and making measurements of other variables such as salinity, oxygen, nutrients, chlorophyll, *etc*. on seawater samples gathered using special bottles. The two most commonly used bottles are the Nansen and Nisken bottles. Data that are in the OSD files are frequently referred to as "bottle data" and the entire collection of data from these file may be alternatively referred to as the "Bottle Data File". WOD01 includes measurements of temperature, salinity, oxygen, nitrate, phosphate, silicate, pH, alkalinity, chlorophyll and plankton.

2. OCEAN STATION DATA (OSD) NUTRIENT PROFILE DISTRIBUTIONS

Figure 1 shows the number of OSD phosphate profiles contained in WOD01 for the world ocean as a function of year. Figures 2 and 3 show the time series of OSD phosphate profiles for the southern and northern hemispheres respectively. Figure 4 shows the distribution of OSD phosphate profiles contained in WOD01 for the world ocean. There are a total of 373,334 OSD phosphate profiles for the entire world ocean with 86,251 profiles (23.0%) measured in the southern hemisphere and 287,083 profiles (77.0%) measured in the northern hemisphere. Table 1 provides the number of OSD phosphate profiles included in WOD01 for the world ocean as a function of year. Table 2 and 3 show the number of OSD phosphate profiles for the southern and northern hemispheres respectively. The geographic distribution of OSD phosphate profiles for individual years for 1922-2000 are shown in Appendix A, Figures A1-A79.

Figure 5 shows the number of OSD silicate profiles contained in WOD01 for the world ocean as a function of year. Figures 6 and 7 show the time series of OSD silicate profiles for the southern and northern hemispheres respectively. Figure 8 shows the distribution of OSD silicate profiles contained in WOD01 for

the world ocean. There are a total of 261,963 OSD silicate profiles for the entire world ocean with 67,682 profiles (25.8%) measured in the southern hemisphere and 194,281 profiles (74.2%) measured in the northern hemisphere. Table 4 provides the number of OSD silicate profiles included in WOD01 for the world ocean as a function of year. Table 5 and 6 show the number of OSD silicate profiles for the southern and northern hemispheres respectively. The geographic distribution of OSD silicate profiles for individual years for 1921-2000 are shown in Appendix B, Figures B1-B73.

Figure 9 shows the number of OSD nitrate profiles contained in WOD01 for the world ocean as a function of year. Figures 10 and 11 show the time series of OSD nitrate profiles for the southern and northern hemispheres respectively. Figure 12 shows the distribution of OSD nitrate profiles contained in WOD01 for the world ocean. There are a total of 208,799 OSD nitrate profiles for the entire world ocean with 39,558 profiles (18.9%) measured in the southern hemisphere and 169,241 profiles (82.1%) measured in the northern hemisphere. Table 7 provides the number of OSD nitrate profiles included in WOD01 for the world ocean as a function of year. Table 8 and 9 show the number of OSD nitrate profiles for the southern and northern hemispheres respectively. The geographic distribution of OSD nitrate profiles for individual years for 1925-2000 are shown in Appendix C, Figures C1-C72.

Figure 13 shows the number of OSD nitrate+nitrite profiles contained in WOD01 for the world ocean as a function of year. Figures 14 and 15 show the time series of OSD nitrate+nitrite profiles for the southern and northern hemispheres respectively. Figure 16 shows the distribution of OSD nitrate+nitrite profiles contained in WOD01 for the world ocean. There are a total of 7,704 OSD nitrate+nitrite profiles for the entire world Ocean with 5,687 profiles (73.8%) measured in the southern hemisphere and 2,017 profiles (26.2%) measured in the northern hemisphere. Table 10 provides the number of OSD nitrate+nitrite profiles included in WOD01 for the world ocean as a function of year. Table 11 and 12 show the number of OSD nitrate+nitrite profiles for the southern and northern hemispheres respectively. The geographic distribution of OSD nitrate+nitrite profiles for individual years for 1953-1996 are shown in Appendix D, Figures D1-D28.

Most profiles have been made in the northern hemisphere, but the southern hemisphere coverage has been increased due to international data archaeology and rescue efforts and the World Ocean Database project (Levitus *et al.* 1994, 2002).

Table 1 The number of OSD phosphate profiles in WOD01 as a function of year for the World Ocean. The total number of profiles = 373,334

YEAR	PROFILE	YEAR	PROFILE	YEAR	PROFILE	YEAR	PROFILE
1922	1	1942	49	1962	5030	1982	7156
1923	2	1943	153	1963	6691	1983	6881
1924	1	1944	123	1964	7157	1984	8330
1925	90	1945	76	1965	8025	1985	8943
1926	240	1946	229	1966	7091	1986	8774
1927	99	1947	357	1967	7928	1987	10299
1928	281	1948	734	1968	8694	1988	10920
1929	550	1949	1881	1969	10356	1989	11778
1930	455	1950	2612	1970	7840	1990	13951
1931	343	1951	2795	1971	11711	1991	10112
1932	921	1952	3020	1972	11822	1992	9384
1933	1045	1953	3819	1973	11481	1993	8154
1934	1353	1954	4472	1974	8931	1994	7535
1935	514	1955	4158	1975	8970	1995	7124
1936	732	1956	3754	1976	11763	1996	4171
1937	678	1957	3663	1977	9178	1997	4893
1938	646	1958	3870	1978	8673	1998	2506
1939	355	1959	3949	1979	7121	1999	1507
1940	715	1960	3731	1980	7750	2000	204
1941	360	1961	3923	1981	7751		

Table 2 The number of OSD phosphate profiles in WOD01 as a function of year for the southern hemisphere. The total number of profiles = 86,251

YEAR	PROFILE	YEAR	PROFILE	YEAR	PROFILE	YEAR	PROFILE
1924	1	1943	34	1962	1880	1981	2226
1925	89	1944	51	1963	2860	1982	1985
1926	189	1945	59	1964	2943	1983	2172
1927	41	1946	84	1965	2761	1984	2182
1928	97	1947	82	1966	1811	1985	1973
1929	178	1948	143	1967	2361	1986	2082
1930	239	1949	108	1968	2593	1987	2756
1931	145	1950	397	1969	1580	1988	2371
1932	77	1951	562	1970	1588	1989	1988
1933	56	1952	512	1971	2547	1990	1243
1934	154	1953	472	1972	2475	1991	1035
1935	81	1954	565	1973	2965	1992	1635
1936	218	1955	609	1974	2576	1993	1695
1937	126	1956	706	1975	2479	1994	1757
1938	167	1957	762	1976	3203	1995	1485
1939	57	1958	783	1977	2483	1996	946
1940	115	1959	696	1978	2066	1997	348
1941	80	1960	894	1979	2114	1998	138
1942	49	1961	1267	1980	1990	1999	14

Table 3 The number of OSD phosphate profiles in WOD01 as a function of year for the northern hemisphere. The total number of profiles = 287,083

YEAR	PROFILE	YEAR	PROFILE	YEAR	PROFILE	YEAR	PROFILE
1922	1	1942	0	1962	3150	1982	5171
1923	2	1943	119	1963	3831	1983	4709
1924	0	1944	72	1964	4214	1984	6148
1925	1	1945	17	1965	5264	1985	6970
1926	51	1946	145	1966	5280	1986	6692
1927	58	1947	275	1967	5567	1987	7543
1928	184	1948	591	1968	6101	1988	8549
1929	372	1949	1773	1969	8776	1989	9790
1930	216	1950	2215	1970	6252	1990	12708
1931	198	1951	2233	1971	9164	1991	9077
1932	844	1952	2508	1972	9347	1992	7749
1933	989	1953	3347	1973	8516	1993	6459
1934	1199	1954	3907	1974	6355	1994	5778
1935	433	1955	3549	1975	6491	1995	5639
1936	514	1956	3048	1976	8560	1996	3225
1937	552	1957	2901	1977	6695	1997	4545
1938	479	1958	3087	1978	6607	1998	2368
1939	298	1959	3253	1979	5007	1999	1493
1940	600	1960	2837	1980	5760	2000	204
1941	280	1961	2656	1981	5525		

Table 4 The number of OSD silicate profiles in WOD01 as a function of year for the World Ocean. The total number of profiles = 261,963

YEAR	PROFILE	YEAR	PROFILE	YEAR	PROFILE	YEAR	PROFILE
1921	221	1941	344	1961	1696	1981	6029
1922	0	1942	0	1962	1905	1982	6205
1923	0	1943	44	1963	3484	1983	5836
1924	0	1944	0	1964	3574	1984	6421
1925	1	1945	6	1965	4050	1985	7476
1926	0	1946	52	1966	4494	1986	6792
1927	1	1947	382	1967	5366	1987	7966
1928	0	1948	530	1968	5891	1988	8096
1929	33	1949	846	1969	7652	1989	9639
1930	22	1950	468	1970	6412	1990	11686
1931	22	1951	508	1971	8784	1991	8950
1932	409	1952	1049	1972	7912	1992	8697
1933	434	1953	1169	1973	8309	1993	7343
1934	499	1954	772	1974	6529	1994	7277
1935	192	1955	959	1975	7867	1995	6593
1936	296	1956	1077	1976	8120	1996	4147
1937	347	1957	1087	1977	6630	1997	4408
1938	460	1958	1654	1978	6607	1998	1991
1939	352	1959	1564	1979	5523	1999	1033
1940	445	1960	1765	1980	6359	2000	204

Table 5 The number of OSD silicate profiles in WOD01 as a function of year for the southern hemisphere. The total number of profiles = 67,682

YEAR	PROFILE	YEAR	PROFILE	YEAR	PROFILE	YEAR	PROFILE
1921	221	1941	0	1961	133	1981	2323
1922	0	1942	0	1962	300	1982	2179
1923	0	1943	0	1963	982	1983	2105
1924	0	1944	0	1964	1058	1984	1912
1925	0	1945	0	1965	832	1985	2215
1926	0	1946	0	1966	1017	1986	1830
1927	1	1947	185	1967	1486	1987	2692
1928	0	1948	15	1968	1606	1988	2193
1929	11	1949	10	1969	1561	1989	1918
1930	20	1950	56	1970	1304	1990	1291
1931	14	1951	59	1971	2573	1991	1051
1932	64	1952	50	1972	2314	1992	1612
1933	59	1953	0	1973	2562	1993	1714
1934	155	1954	1	1974	2276	1994	1949
1935	78	1955	0	1975	2608	1995	1484
1936	89	1956	153	1976	2898	1996	947
1937	72	1957	299	1977	2700	1997	342
1938	403	1958	279	1978	2223	1998	131
1939	57	1959	196	1979	2266		
1940	0	1960	341	1980	2207		

Table 6 The number of OSD silicate profiles in WOD01 as a function of year for the northern hemisphere. The total number of profiles = 194,281

YEAR	PROFILE	YEAR	PROFILE	YEAR	PROFILE	YEAR	PROFILE
1925	1	1944	0	1963	2502	1982	4026
1926	0	1945	6	1964	2516	1983	3731
1927	0	1946	52	1965	3218	1984	4509
1928	0	1947	197	1966	3477	1985	5261
1929	22	1948	515	1967	3880	1986	4962
1930	2	1949	836	1968	4285	1987	5274
1931	8	1950	412	1969	6091	1988	5903
1932	345	1951	449	1970	5108	1989	7721
1933	375	1952	999	1971	6211	1990	10395
1934	344	1953	1169	1972	5598	1991	7899
1935	114	1954	771	1973	5747	1992	7085
1936	207	1955	959	1974	4253	1993	5629
1937	275	1956	924	1975	5259	1994	5328
1938	57	1957	788	1976	5222	1995	5109
1939	295	1958	1375	1977	3930	1996	3200
1940	445	1959	1368	1978	4384	1997	4066
1941	344	1960	1424	1979	3257	1998	1860
1942	0	1961	1563	1980	4152	1999	1033
1943	44	1962	1605	1981	3706	2000	204

Table 7 The number of OSD nitrate profiles in WOD01 as a function of year for the World Ocean. The total number of profiles = 208,799

YEAR	PROFILE	YEAR	PROFILE	YEAR	PROFILE	YEAR	PROFILE
1925	1	1944	50	1963	2168	1982	5059
1926	0	1945	57	1964	2075	1983	4999
1927	0	1946	78	1965	2759	1984	6236
1928	64	1947	152	1966	2750	1985	7843
1929	216	1948	326	1967	3838	1986	7195
1930	172	1949	391	1968	4418	1987	7621
1931	53	1950	106	1969	5331	1988	8150
1932	173	1951	159	1970	3866	1989	8731
1933	159	1952	206	1971	6725	1990	11956
1934	122	1953	336	1972	6128	1991	9535
1935	6	1954	415	1973	6187	1992	8649
1936	1	1955	478	1974	4057	1993	6617
1937	0	1956	489	1975	4890	1994	6049
1938	3	1957	451	1976	6209	1995	5306
1939	0	1958	600	1977	5003	1996	3185
1940	189	1959	559	1978	5246	1997	4217
1941	102	1960	439	1979	3519	1998	2047
1942	49	1961	982	1980	4771	1999	1037
1943	33	1962	1889	1981	4716	2000	205

Table 8 The number of OSD nitrate profiles in WOD01 as a function of year for the southern hemisphere. The total number of profiles = 39,558

YEAR	PROFILE	YEAR	PROFILE	YEAR	PROFILE	YEAR	PROFILE
1925	1	1944	50	1963	612	1982	396
1926	0	1945	57	1964	767	1983	1024
1927	0	1946	78	1965	857	1984	986
1928	20	1947	68	1966	924	1985	1464
1929	82	1948	85	1967	1227	1986	1413
1930	36	1949	83	1968	1034	1987	1633
1931	0	1950	104	1969	1249	1988	1677
1932	0	1951	157	1970	757	1989	779
1933	1	1952	8	1971	1281	1990	572
1934	0	1953	20	1972	973	1991	947
1935	0	1954	181	1973	1454	1992	1587
1936	0	1955	198	1974	950	1993	1236
1937	0	1956	179	1975	1213	1994	1468
1938	3	1957	90	1976	1215	1995	1196
1939	0	1958	225	1977	1357	1996	920
1940	100	1959	121	1978	711	1997	346
1941	80	1960	149	1979	470	1998	139
1942	49	1961	239	1980	1012	1999	14
1943	33	1962	484	1981	717		

Table 9 The number of OSD nitrate profiles in WOD01 as a function of year for the northern hemisphere. The total number of profiles = 169,241

YEAR	PROFILE	YEAR	PROFILE	YEAR	PROFILE	YEAR	PROFILE
1928	44	1947	84	1966	1826	1985	6379
1929	134	1948	241	1967	2611	1986	5782
1930	136	1949	308	1968	3384	1987	5988
1931	53	1950	2	1969	4082	1988	6473
1932	173	1951	2	1970	3109	1989	7952
1933	158	1952	198	1971	5444	1990	11384
1934	122	1953	316	1972	5155	1991	8588
1935	6	1954	234	1973	4733	1992	7062
1936	1	1955	280	1974	3107	1993	5381
1937	0	1956	310	1975	3677	1994	4581
1938	0	1957	361	1976	4994	1995	4110
1939	0	1958	375	1977	3646	1996	2265
1940	89	1959	438	1978	4535	1997	3871
1941	22	1960	290	1979	3049	1998	1908
1942	0	1961	743	1980	3759	1999	1023
1943	0	1962	1405	1981	3999	2000	205
1944	0	1963	1556	1982	4663		
1945	0	1964	1308	1983	3975		
1946	0	1965	1902	1984	5250		

Table 10 The number of OSD nitrate+nitrite profiles in WOD01 as a function of year for the World Ocean. The total number of profiles = 7,704

YEAR	PROFILE	YEAR	PROFILE	YEAR	PROFILE
1953	30	1968	0	1983	0
1954	73	1969	0	1984	96
1955	0	1970	0	1985	453
1956	0	1971	8	1986	461
1957	0	1972	16	1987	245
1958	0	1973	21	1988	682
1959	0	1974	35	1989	366
1960	0	1975	95	1990	433
1961	0	1976	3	1991	289
1962	72	1977	0	1992	414
1963	0	1978	0	1993	1071
1964	0	1979	135	1994	1070
1965	44	1980	118	1995	1137
1966	5	1981	116	1996	194
1967	22	1982	0		

Table 11 The number of OSD nitrate+nitrite profiles in WOD01 as a function of year for the southern hemisphere. The total number of profiles = 5,687

YEAR	PROFILE	YEAR	PROFILE	YEAR	PROFILE
1953	30	1968	0	1983	0
1954	73	1969	0	1984	96
1955	0	1970	0	1985	386
1956	0	1971	8	1986	386
1957	0	1972	16	1987	218
1958	0	1973	21	1988	682
1959	0	1974	35	1989	164
1960	0	1975	95	1990	271
1961	0	1976	3	1991	152
1962	72	1977	0	1992	314
1963	0	1978	0	1993	592
1964	0	1979	135	1994	589
1965	44	1980	118	1995	850
1966	5	1981	116	1996	194
1967	10	1982	0		

Table 12 The number of OSD nitrate+nitrite profiles in WOD01 as a function of year for the northern hemisphere. The total number of profiles = 2,017

YEAR	PROFILE	YEAR	PROFILE	YEAR	PROFILE
1967	12	1977	0	1987	27
1968	0	1978	0	1988	0
1969	0	1979	0	1989	202
1970	0	1980	0	1990	162
1971	0	1981	0	1991	137
1972	0	1982	0	1992	100
1973	0	1983	0	1993	479
1974	0	1984	0	1994	481
1975	0	1985	67	1995	287
1976	0	1986	63		

Fig. 1 Time series of Ocean Station Data (OSD) phosphate profiles in WOD01 as a function of year for the world ocean.

Fig. 2 Time series of Ocean Station Data (OSD) phosphate profiles in WOD01 as a function of year for the southern hemisphere.

Fig. 3 Time series of Ocean Station Data (OSD) phosphate profiles in WOD98 as a function of year for the northern hemisphere

Fig. 4 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01.
Dots show location of 1-degree squares containing any data.

Fig. 5 Time series of Ocean Station Data (OSD) silicate profiles in WOD01 as a function of year for the world ocean.

Fig. 6 Time series of Ocean Station Data (OSD) silicate profiles in WOD01 as a function of year for the southern hemisphere.

Fig. 7 Time series of Ocean Station Data (OSD) silicate profiles in WOD01 as a function of year for the northern hemisphere.

Fig. 8 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01.
Dots show location of 1-degree squares containing any data.

Fig. 9 Time series of Ocean Station Data (OSD) nitrate profiles in WOD01 as a function of year for the world ocean.

Fig. 10 Time series of Ocean Station Data (OSD) nitrate profiles in WOD01 as a function of year for the southern hemisphere.

Fig. 11 Time series of Ocean Station Data (OSD) nitrate profiles in WOD01 as a function of year for the northern hemisphere.

Fig. 12 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01.
Dots show location of 1-degree squares containing any data.

Fig. 13 Time series of Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 as a function of year for the World Ocean.

Fig. 14 Time series of Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 as a function of year for the southern hemisphere.

Fig. 15 Time series of Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 as a function of year for the northern hemisphere.

Fig. 16 Distribution of all Ocean Station Data (OSD) nitrate+nitrite in WOD01.
Dots show location of 1-degree squares containing any data.

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4. APPENDIX A: DISTRIBUTIONS FOR INDIVIDUAL YEARS OF ALL OCEAN STATION DATA (OSD) PHOSPHATE PROFILES IN WOD01

This appendix contains yearly distributions of all OSD phosphate profiles contained in WOD01. These maps provide some history of the observational progress of the field of oceanography. They also serve as indicators of whether or not a particular data set from a scientist or institution is part of the NODC/WDC-A archive. The exchange of information provided by the publication of such maps has provided us with valuable information about deficiencies in the database. The locations of all WOD01 OSD phosphate profiles are plotted including stations that may be erroneously located over land. However, WOD01 contains some stations from various lakes so care should be exercised in the use of these stations and the determination as to whether they represent errors in locations.

For all figures in Appendix A, a small dot indicates a one-degree square containing from one to four stations and a large dot indicates five or more stations.

Fig. A1 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1922 .

Fig. A2 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1923 .

Fig. A3 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1924 .

Fig. A4 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1925 .

Fig. A5 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1926 .

Fig. A6 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1927 .

Fig. A7 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1928 .

Fig. A8 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1929 .

Fig. A9 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1930 .

Fig. A10 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1931 .

Fig. A11 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1932 .

Fig. A12 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1933 .

Fig. A13 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1934 .

Fig. A14 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1935 .

Fig. A15 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1936 .

Fig. A16 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1937 .

Fig. A17 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1938 .

Fig. A18 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1939 .

Fig. A19 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1940 .

Fig. A20 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1941 .

Fig. A21 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1942 .

Fig. A22 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1943 .

Fig. A23 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1944 .

Fig. A24 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1945 .

Fig. A25 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1946 .

Fig. A26 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1947 .

Fig. A27 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1948 .

Fig. A28 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1949 .

Fig. A29 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1950 .

Fig. A30 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1951 .

Fig. A31 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1952 .

Fig. A32 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1953 .

Fig. A33 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1954 .

Fig. A34 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1955 .

Fig. A35 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1956 .

Fig. A36 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1957 .

Fig. A37 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1958 .

Fig. A38 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1959 .

Fig. A39 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1960 .

Fig. A40 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1961 .

Fig. A41 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1962 .

Fig. A42 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1963 .

Fig. A43 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1964 .

Fig. A44 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1965 .

Fig. A45 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1966 .

Fig. A46 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1967 .

Fig. A47 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1968 .

Fig. A48 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1969 .

Fig. A49 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1970 .

Fig. A50 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1971 .

Fig. A51 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1972 .

Fig. A52 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1973 .

Fig. A53 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1974 .

Fig. A54 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1975 .

Fig. A55 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1976 .

Fig. A56 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1977 .

Fig. A57 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1978 .

Fig. A58 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1979 .

Fig. A59 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1980 .

Fig. A60 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1981 .

Fig. A61 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1982 .

Fig. A62 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1983 .

Fig. A63 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1984 .

Fig. A64 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1985 .

Fig. A65 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1986 .

Fig. A66 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1987 .

Fig. A67 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1988 .

Fig. A68 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1989 .

Fig. A69 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1990 .

Fig. A70 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1991 .

Fig. A71 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1992 .

Fig. A72 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1993 .

Fig. A73 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1994 .

Fig. A74 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1995 .

Fig. A75 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1996 .

Fig. A76 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1997 .

Fig. A77 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1998 .

Fig. A78 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1999 .

Fig. A79 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 2000 .

5. APPENDIX B: DISTRIBUTIONS FOR INDIVIDUAL YEARS OF ALL OCEAN STATION DATA (OSD) SILICATE PROFILES IN WOD01

This appendix contains yearly distributions of all OSD silicate profiles contained in WOD01. These maps provide some history of the observational progress of the field of oceanography. They also serve as indicators of whether or not a particular data set from a scientist or institution is part of the NODC/WDC-A archive. The exchange of information provided by the publication of such maps has provided us with valuable information about deficiencies in the database. The locations of all WOD01 OSD silicate profiles are plotted including stations that may be erroneously located over land. However, WOD01 contains some stations from various lakes so care should be exercised in the use of these stations and the determination as to whether they represent errors in locations.

For all figures in Appendix B, a small dot indicates a one-degree square containing from one to four stations and a large dot indicates five or more stations.

Fig. B1 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1921 .

Fig. B2 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1925 .

Fig. B3 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1927 .

Fig. B4 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1929 .

Fig. B5 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1930 .

Fig. B6 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1931 .

Fig. B7 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1932 .

Fig. B8 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1933 .

Fig. B9 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1934 .

Fig. B10 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1935 .

Fig. B11 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1936 .

Fig. B12 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1937 .

Fig. B13 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1938 .

Fig. B14 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1939 .

Fig. B15 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1940 .

Fig. B16 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1941 .

Fig. B17 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1943 .

Fig. B18 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1945 .

Fig. B19 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1946 .

Fig. B20 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1947 .

Fig. B21 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1948 .

Fig. B22 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1949 .

Fig. B23 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1950 .

Fig. B24 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1951 .

Fig. B25 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1952 .

Fig. B26 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1953 .

Fig. B27 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1954 .

Fig. B28 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1955 .

Fig. B29 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1956 .

Fig. B30 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1957 .

Fig. B31 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1958 .

Fig. B32 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1959 .

Fig. B33 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1960 .

Fig. B34 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1961 .

Fig. B35 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1962 .

Fig. B36 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1963 .

Fig. B37 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1964 .

Fig. B38 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1965 .

Fig. B39 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1966 .

Fig. B40 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1967 .

Fig. B41 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1968 .

Fig. B42 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1969 .

Fig. B43 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1970 .

Fig. B44 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1971 .

Fig. B45 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1972 .

Fig. B46 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1973 .

Fig. B47 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1974 .

Fig. B48 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1975 .

Fig. B49 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1976 .

Fig. B50 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1977 .

Fig. B51 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1978 .

Fig. B52 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1979 .

Fig. B53 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1980 .

Fig. B54 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1981 .

Fig. B55 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1982 .

Fig. B56 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1983 .

Fig. B57 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1984 .

Fig. B58 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1985 .

Fig. B59 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1986 .

Fig. B60 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1987 .

Fig. B61 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1988 .

Fig. B62 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1989 .

Fig. B63 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1990 .

Fig. B64 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1991 .

Fig. B65 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1992 .

Fig. B66 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1993 .

Fig. B67 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1994 .

Fig. B68 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1995 .

Fig. B69 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1996 .

Fig. B70 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1997 .

Fig. B71 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1998 .

Fig. B72 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1999 .

Fig. B73 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 2000 .

6. APPENDIX C: DISTRIBUTIONS FOR INDIVIDUAL YEARS OF ALL OCEAN STATION DATA (OSD) NITRATE PROFILES IN WOD01

This appendix contains yearly distributions of all OSD nitrate profiles contained in WOD01. These maps provide some history of the observational progress of the field of oceanography. They also serve as indicators of whether or not a particular data set from a scientist or institution is part of the NODC/WDC-A archive. The exchange of information provided by the publication of such maps has provided us with valuable information about deficiencies in the database. The locations of all WOD01 OSD nitrate profiles are plotted including stations that may be erroneously located over land. However, WOD01 contains some stations from various lakes so care should be exercised in the use of these stations and the determination as to whether they represent errors in locations.

For all figures in Appendix C, a small dot indicates a one-degree square containing from one to four stations and a large dot indicates five or more stations.

Fig. C1 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1925 .

Fig. C2 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1928 .

Fig. C3 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1929 .

Fig. C4 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1930 .

Fig. C5 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1931 .

Fig. C6 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1932 .

Fig. C7 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1933 .

Fig. C8 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1934 .

Fig. C9 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1935 .

Fig. C10 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1936 .

Fig. C11 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1938 .

Fig. C12 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1940 .

Fig. C13 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1941 .

Fig. C14 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1942 .

Fig. C15 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1943 .

Fig. C16 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1944 .

Fig. C17 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1945 .

Fig. C18 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1946 .

Fig. C19 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1947 .

Fig. C20 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1948 .

Fig. C21 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1949 .

Fig. C22 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1950 .

Fig. C23 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1951 .

Fig. C24 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1952 .

Fig. C25 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1953 .

Fig. C26 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1954 .

Fig. C27 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1955 .

Fig. C28 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1956 .

Fig. C29 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1957 .

Fig. C30 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1958 .

Fig. C31 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1959 .

Fig. C32 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1960 .

Fig. C33 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1961 .

Fig. C34 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1962 .

Fig. C35 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1963 .

Fig. C36 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1964 .

Fig. C37 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1965 .

Fig. C38 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1966 .

Fig. C39 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1967 .

Fig. C40 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1968 .

Fig. C41 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1969 .

Fig. C42 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1970 .

Fig. C43 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1971 .

Fig. C44 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1972 .

Fig. C45 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1973 .

Fig. C46 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1974 .

Fig. C47 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1975 .

Fig. C48 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1976 .

Fig. C49 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1977 .

Fig. C50 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1978 .

Fig. C51 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1979 .

Fig. C52 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1980 .

Fig. C53 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1981 .

Fig. C54 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1982 .

Fig. C55 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1983 .

Fig. C56 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1984 .

Fig. C57 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1985 .

Fig. C58 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1986 .

Fig. C59 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1987 .

Fig. C60 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1988 .

Fig. C61 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1989 .

Fig. C62 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1990 .

Fig. C63 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1991 .

Fig. C64 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1992 .

Fig. C65 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1993 .

Fig. C66 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1994 .

Fig. C67 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1995 .

Fig. C68 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1996 .

Fig. C69 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1997 .

Fig. C70 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1998 .

Fig. C71 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1999 .

Fig. C72 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 2000 .

7. APPENDIX D: DISTRIBUTIONS FOR INDIVIDUAL YEARS OF ALL OCEAN STATION DATA (OSD) NITRATE+NITRITE PROFILES IN WOD01

This appendix contains yearly distributions of all OSD nitrate+nitrite profiles contained in WOD01. These maps provide some history of the observational progress of the field of oceanography. They also serve as indicators of whether or not a particular data set from a scientist or institution is part of the NODC/WDC-A archive. The exchange of information provided by the publication of such maps has provided us with valuable information about deficiencies in the database. The locations of all WOD01 OSD nitrate+nitrite profiles are plotted including stations that may be erroneously located over land. However, WOD01 contains some stations from various lakes so care should be exercised in the use of these stations and the determination as to whether they represent errors in locations.

For all figures in Appendix D, a small dot indicates a one-degree square containing from one to four stations and a large dot indicates five or more stations.

Fig. D2 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1954 .

Fig. D1 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1953 .

Fig. D3 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1962 .

Fig. D4 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1965 .

Fig. D5 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1966 .

Fig. D6 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1967 .

Fig. D7 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1971 .

Fig. D8 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1972 .

Fig. D9 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1973 .

Fig. D10 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1974 .

Fig. D11 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1975 .

Fig. D12 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1976 .

Fig. D13 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1979 .

Fig. D14 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1980 .

Fig. D15 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1981 .

Fig. D16 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1984 .

Fig. D17 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1985 .

Fig. D18 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1986 .

Fig. D19 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1987 .

Fig. D20 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1988 .

Fig. D21 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1989 .

Fig. D22 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1990 .

Fig. D23 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1991 .

Fig. D24 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1992 .

Fig. D25 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1993 .

Fig. D26 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1994 .

Fig. D27 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1995 .

Fig. D28 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1996 .