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



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## 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<sub>2</sub> and TCO<sub>2</sub>. 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<sub>2</sub> 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.

Sydney Levitus  
National Oceanographic Data Center/World Data Center for Oceanography- Silver Spring  
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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.

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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 Niskin 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       |      |         |

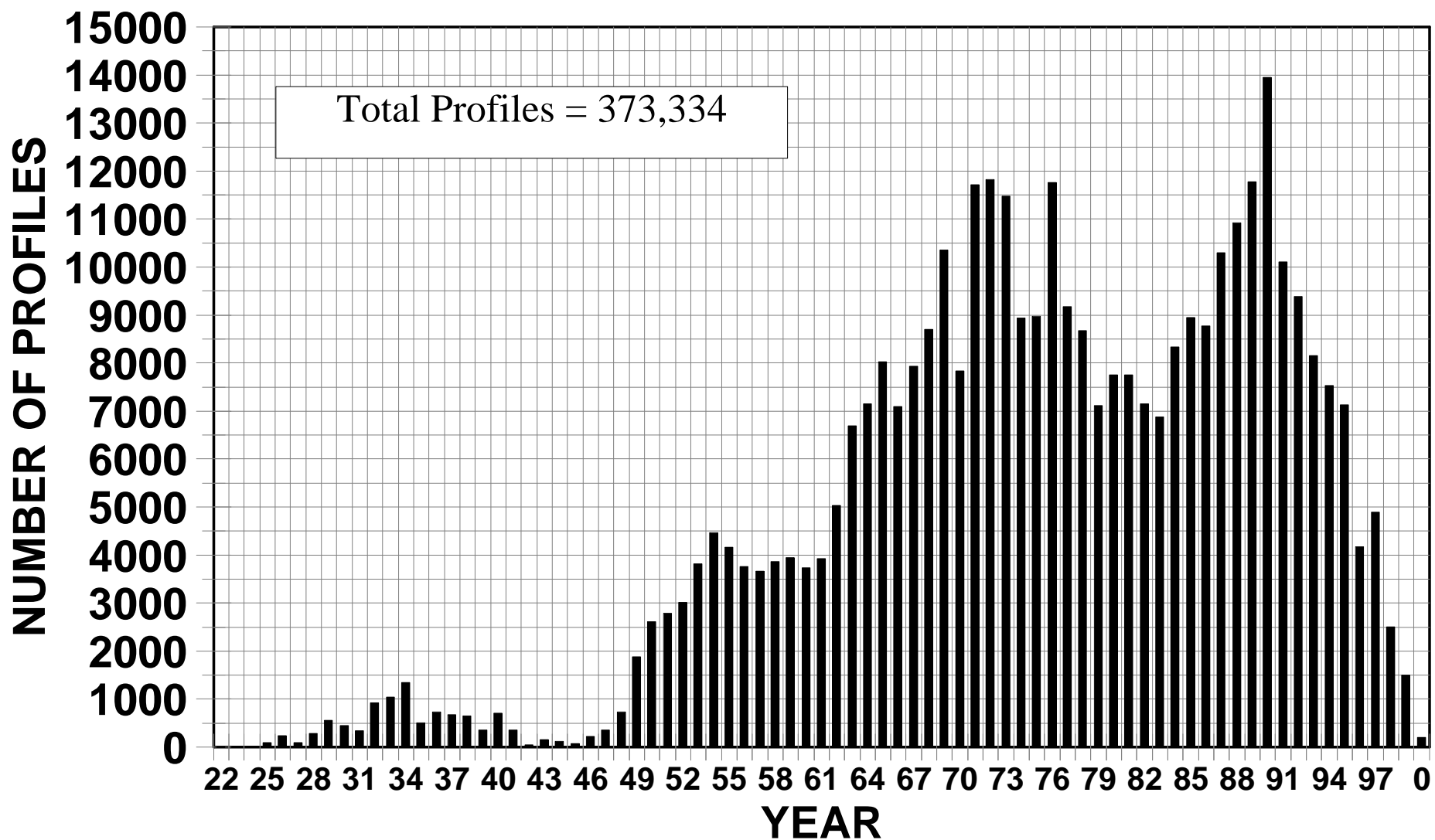


Table 11 The number of OSD nitrate+nitrite profiles in WOD01 as a function of year for the southern hemisphere. The total number of profiles = 5,687

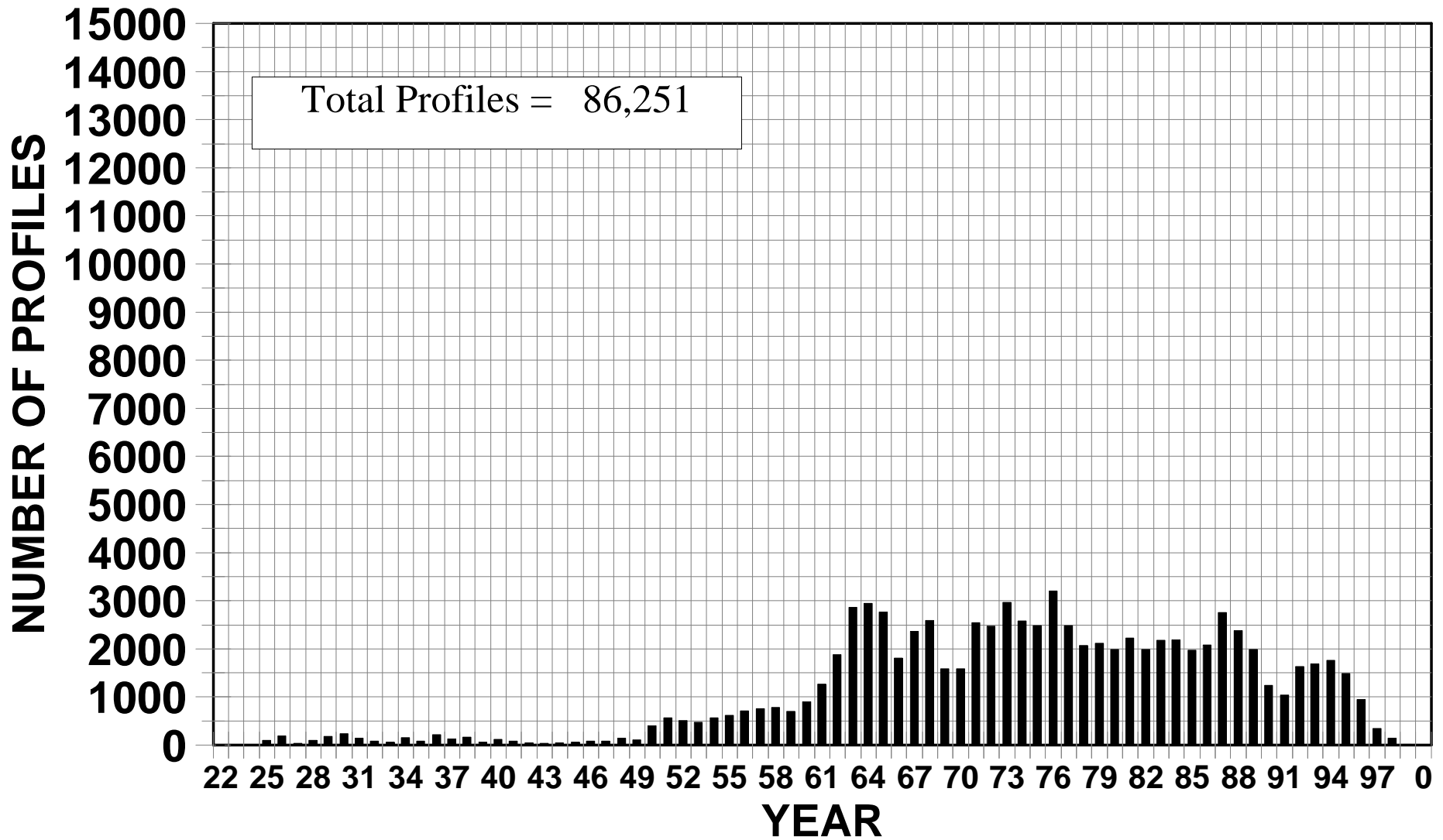
| YEAR | PROFILE | YEAR | PROFILE | YEAR | PROFILE |
|------|---------|------|---------|------|---------|
| 1953 | 30      | 1968 | 0       | 1983 | 0       |
| 1954 | 73      | 1969 | 0       | 1984 | 96      |
| 1955 | 0       | 1970 | 0       | 1985 | 386     |
| 1956 | 0       | 1971 | 8       | 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

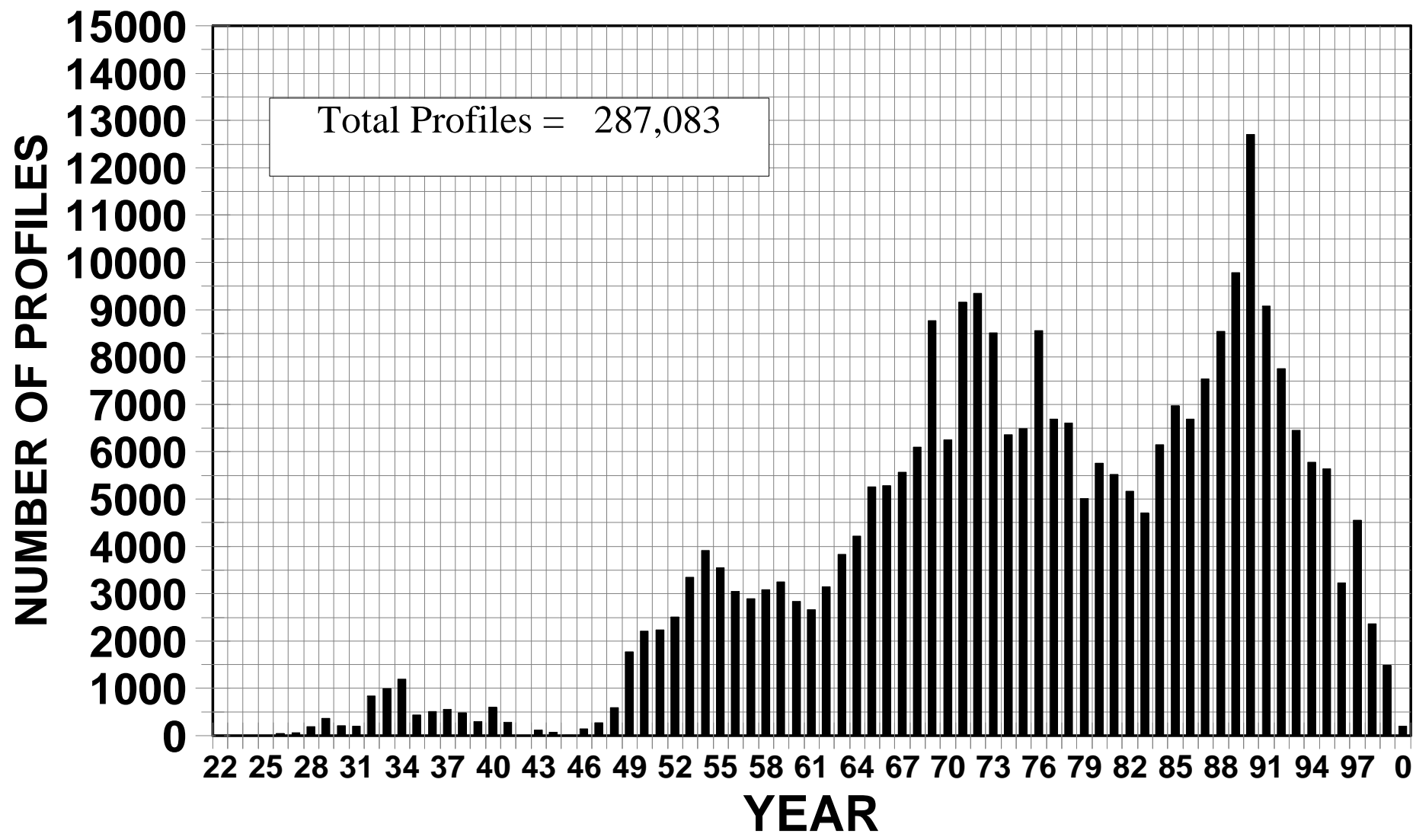
| YEAR | PROFILE | YEAR | PROFILE | YEAR | PROFILE |
|------|---------|------|---------|------|---------|
| 1967 | 12      | 1977 | 0       | 1987 | 27      |
| 1968 | 0       | 1978 | 0       | 1988 | 0       |
| 1969 | 0       | 1979 | 0       | 1989 | 202     |
| 1970 | 0       | 1980 | 0       | 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**

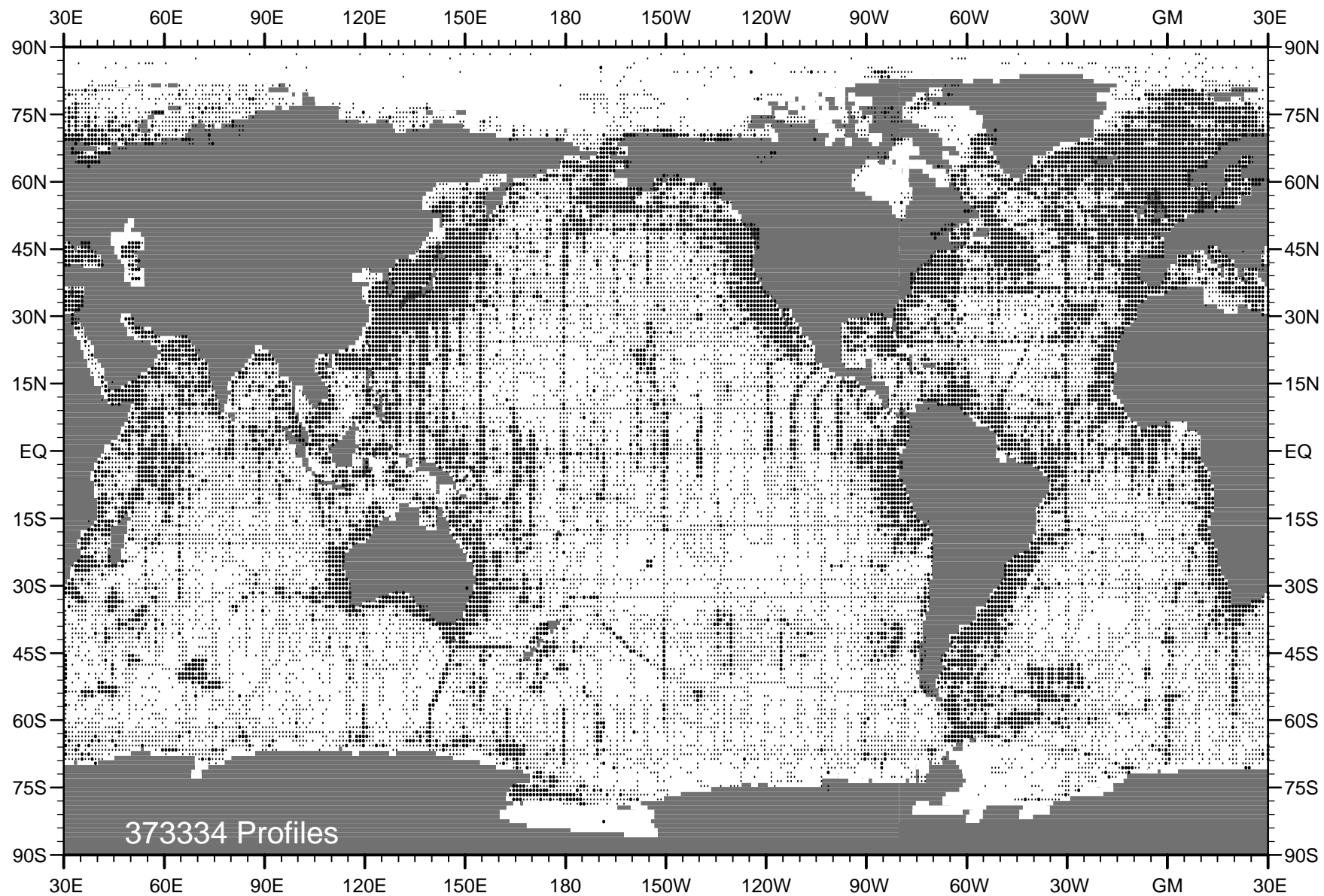
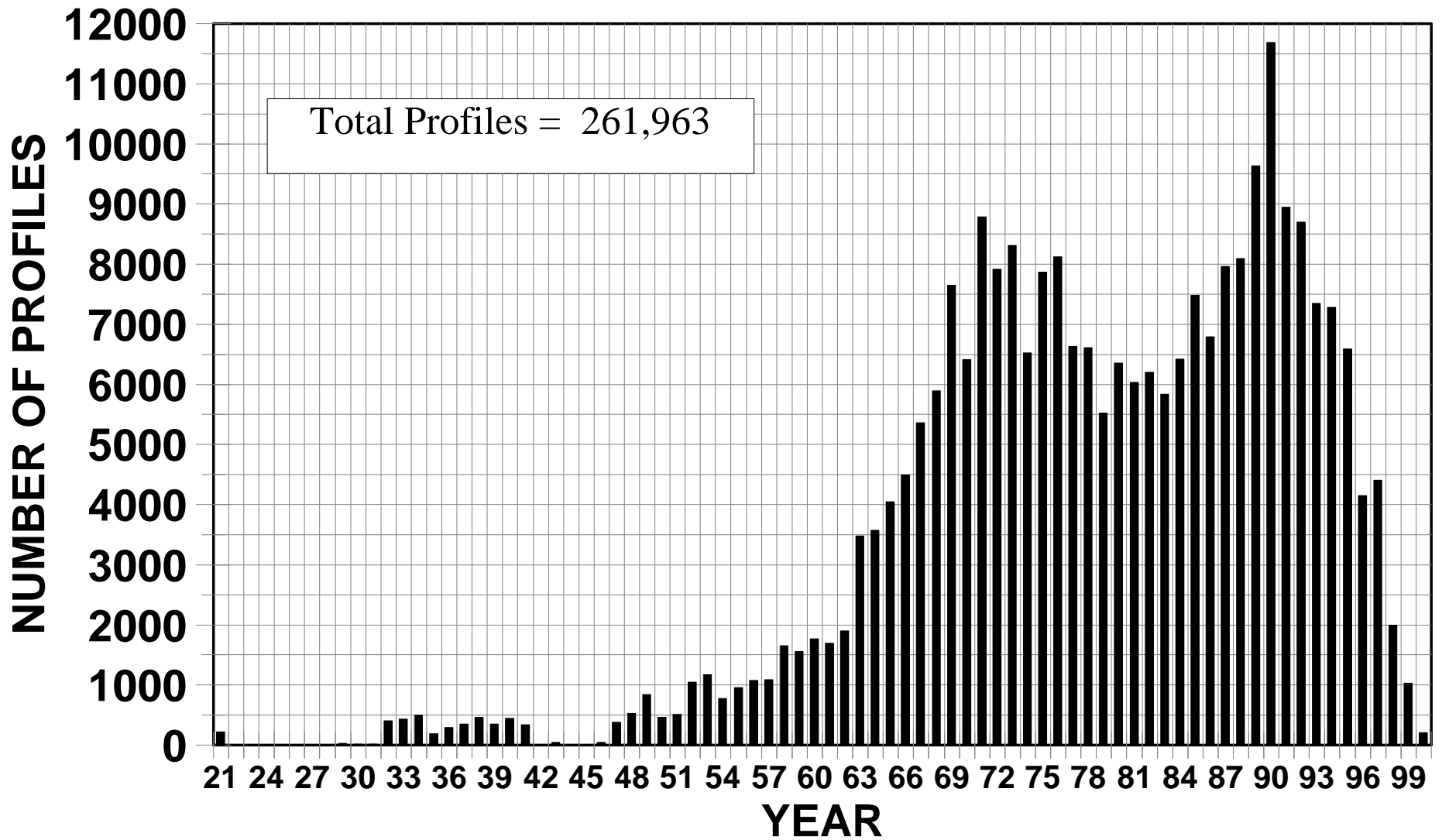
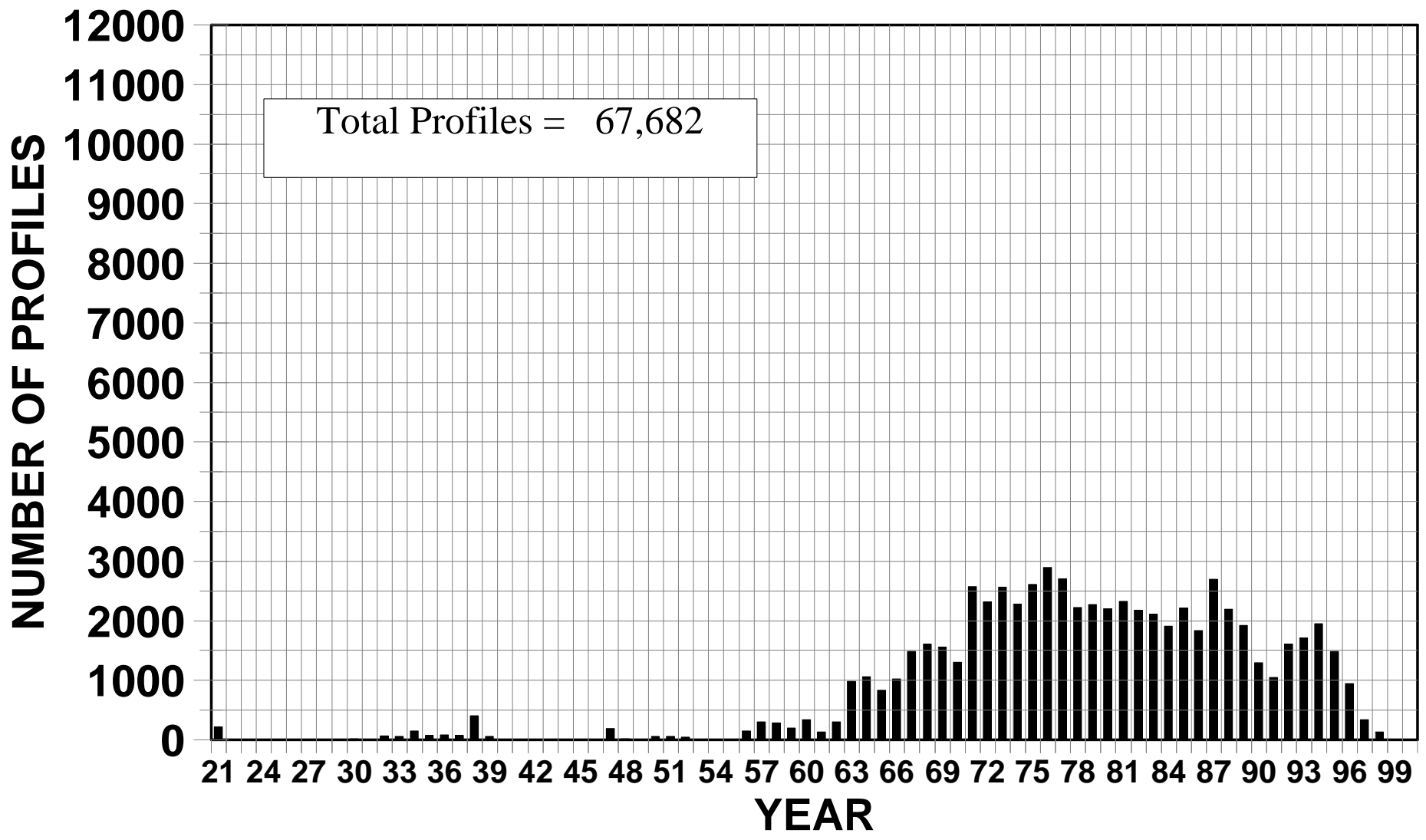


Fig. 4 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01.

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

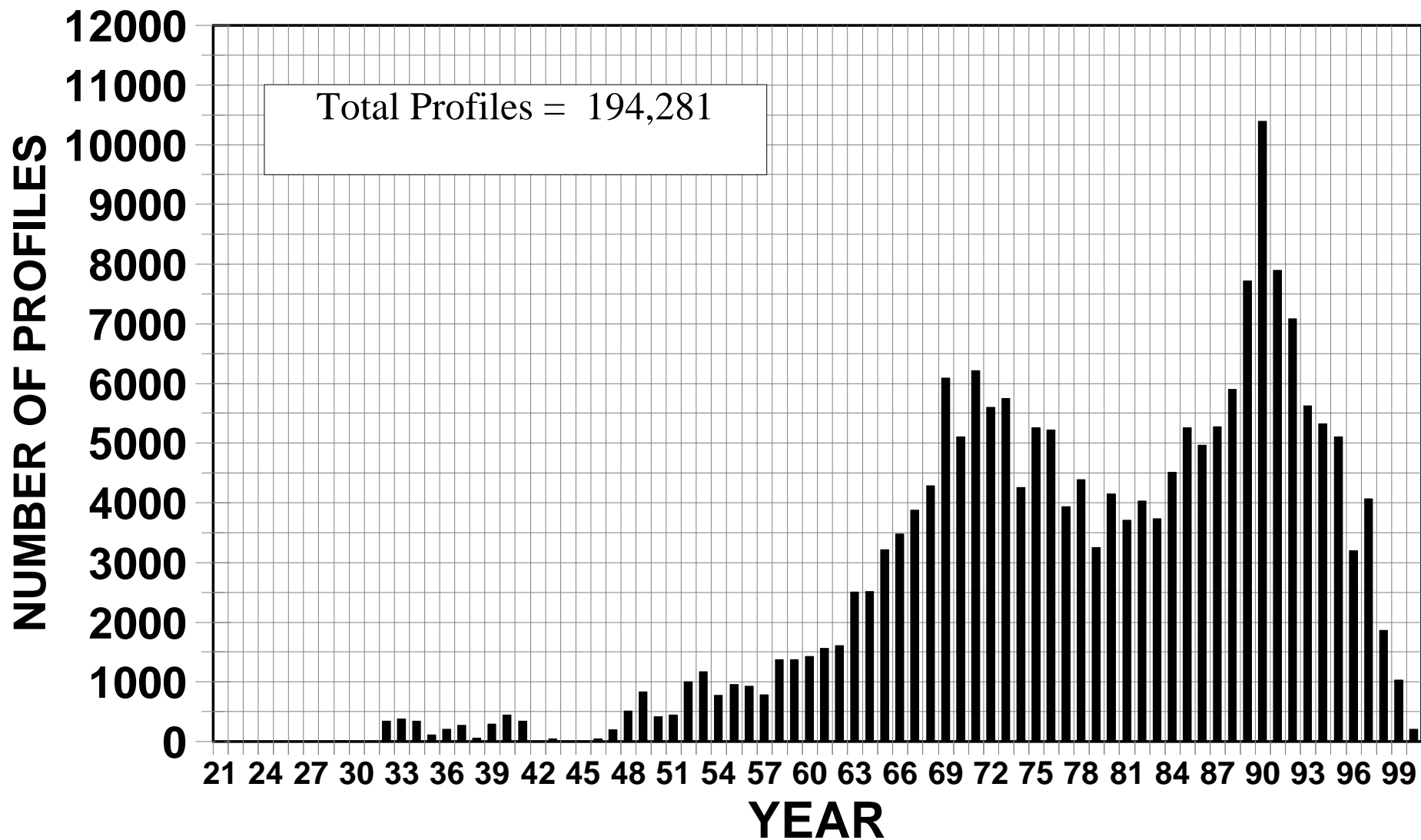


**Fig. 5 Time series of Ocean Station Data (OSD) silicate profiles in WOD01 as a function of year for the world ocean.**



**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.**

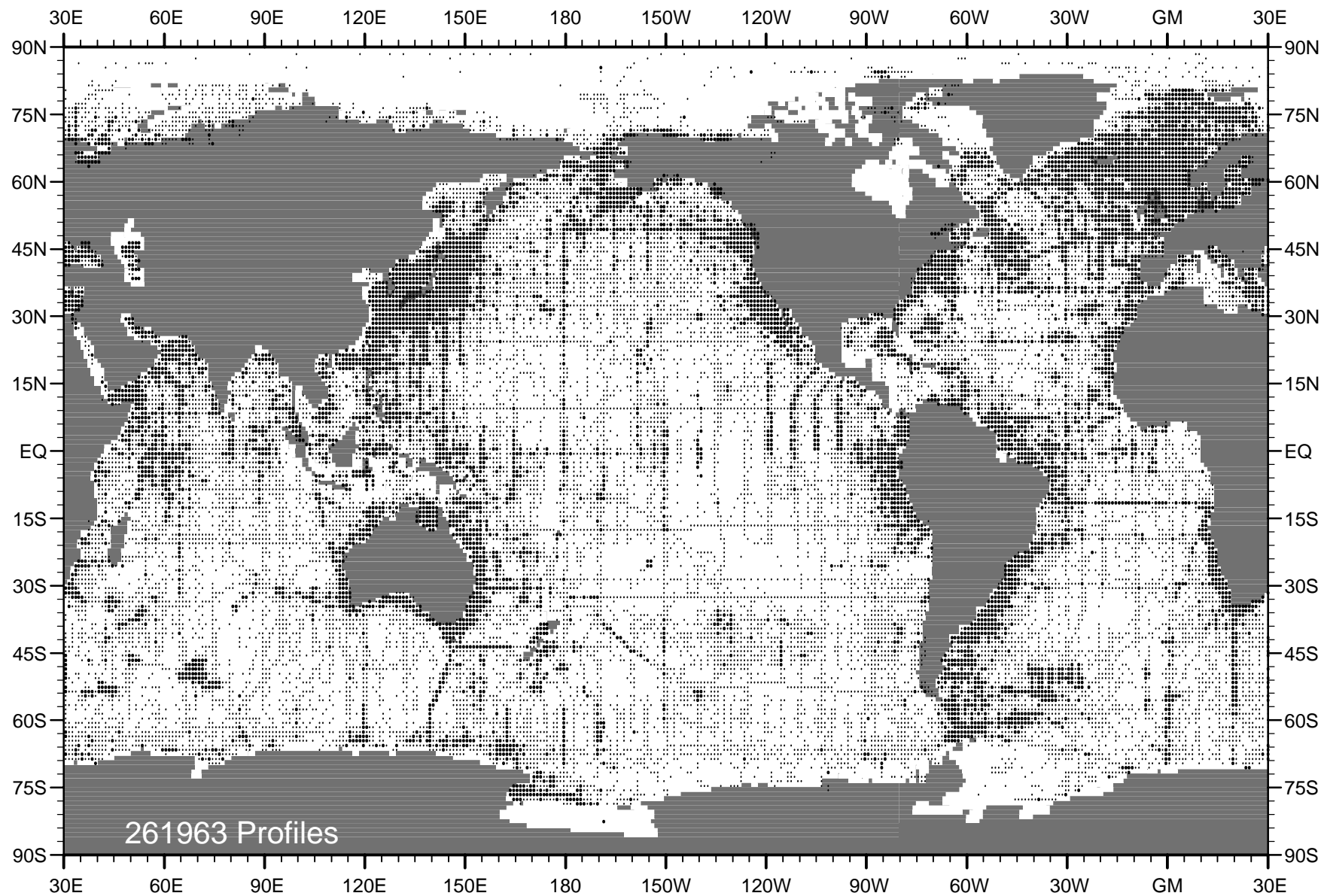
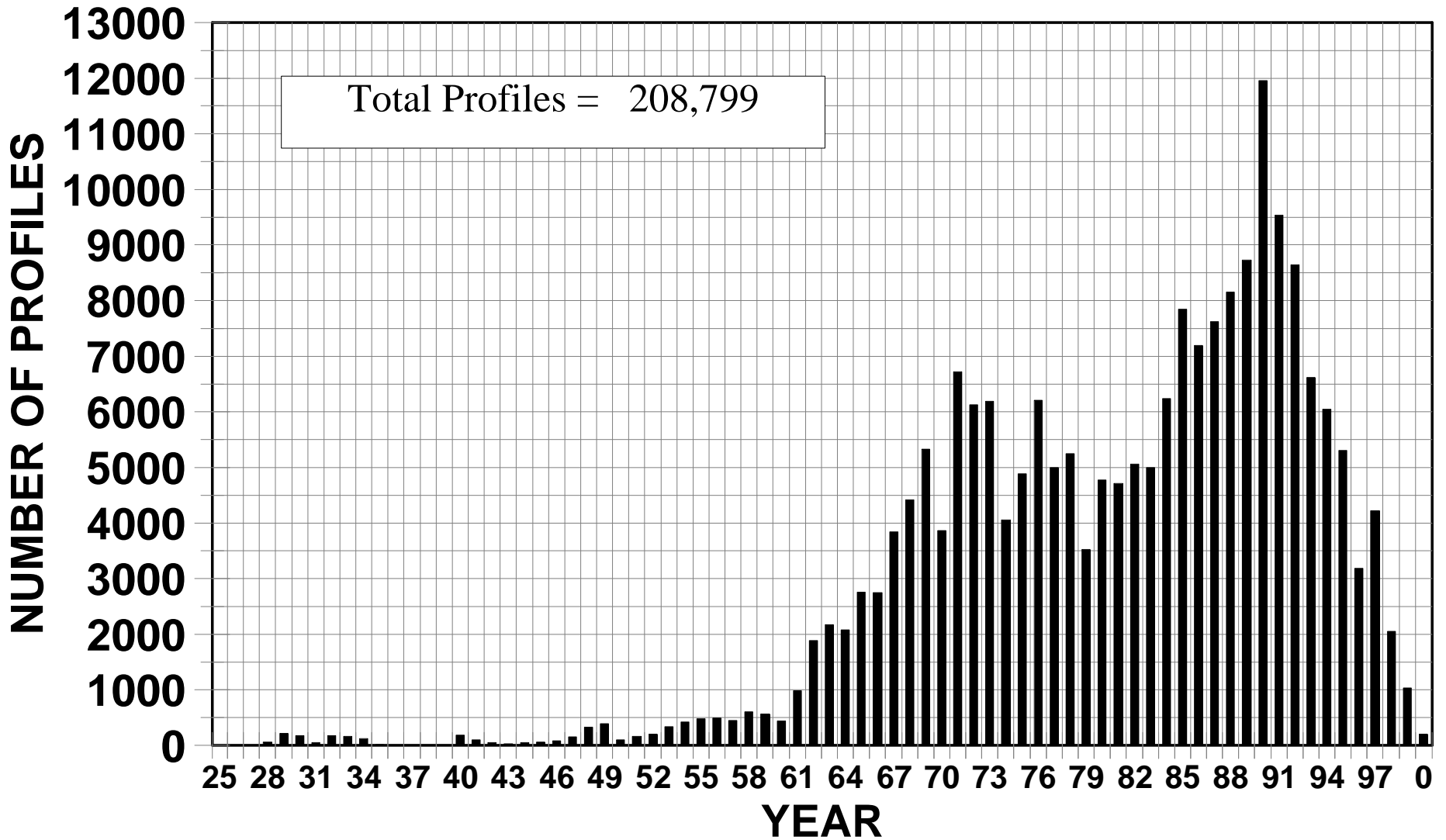
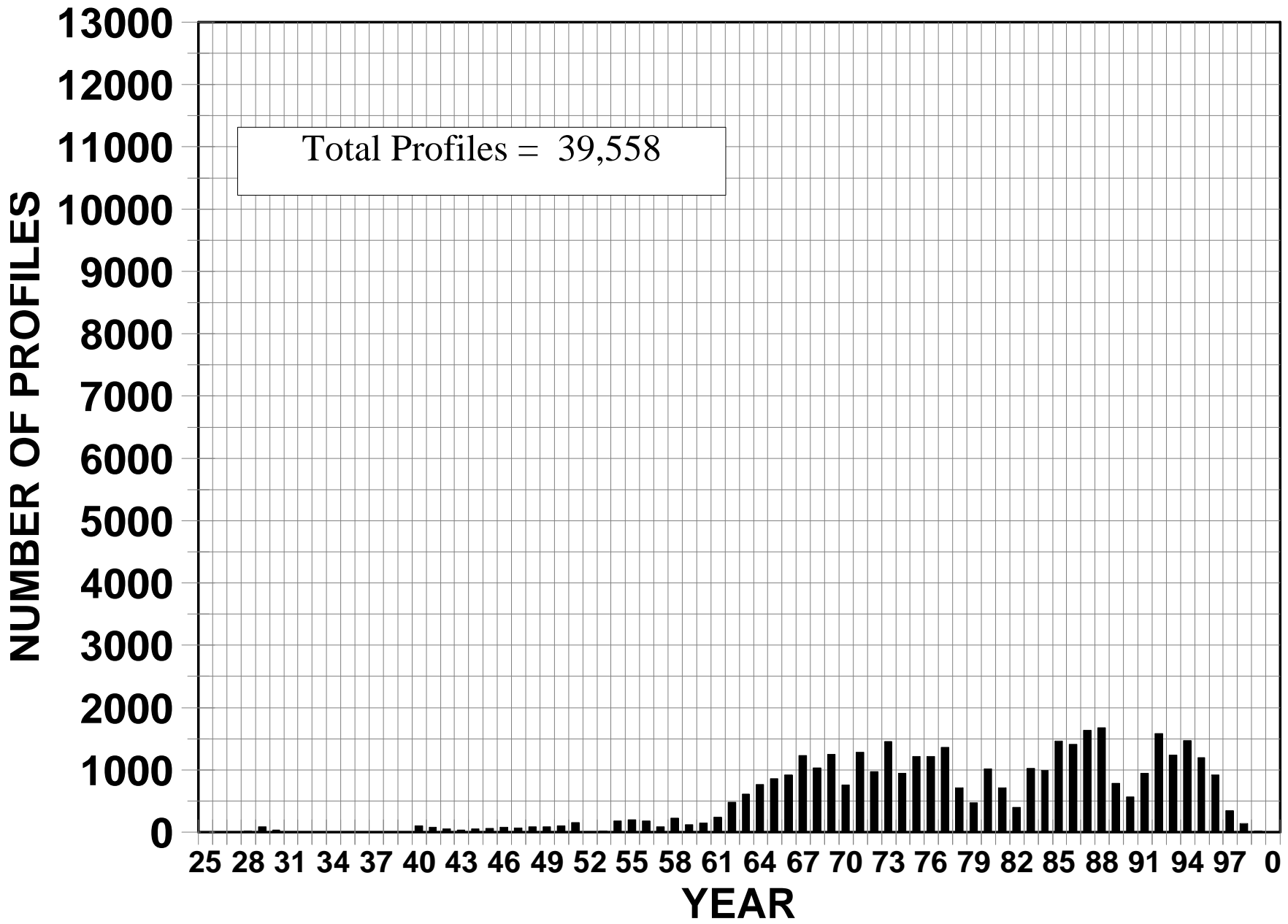


Fig. 8 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01.

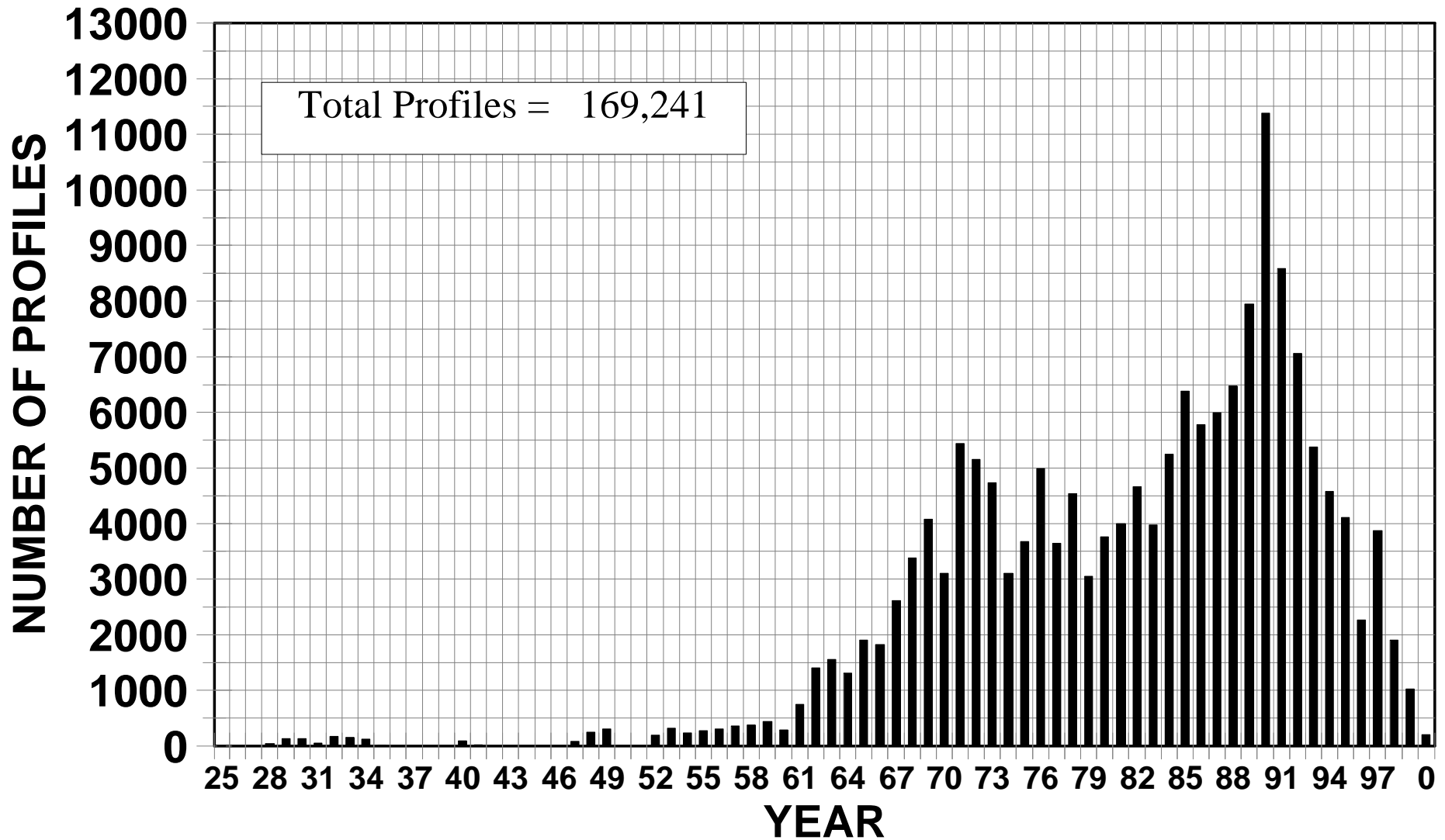
Dots show location of 1-degree squares containing any data.



**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.

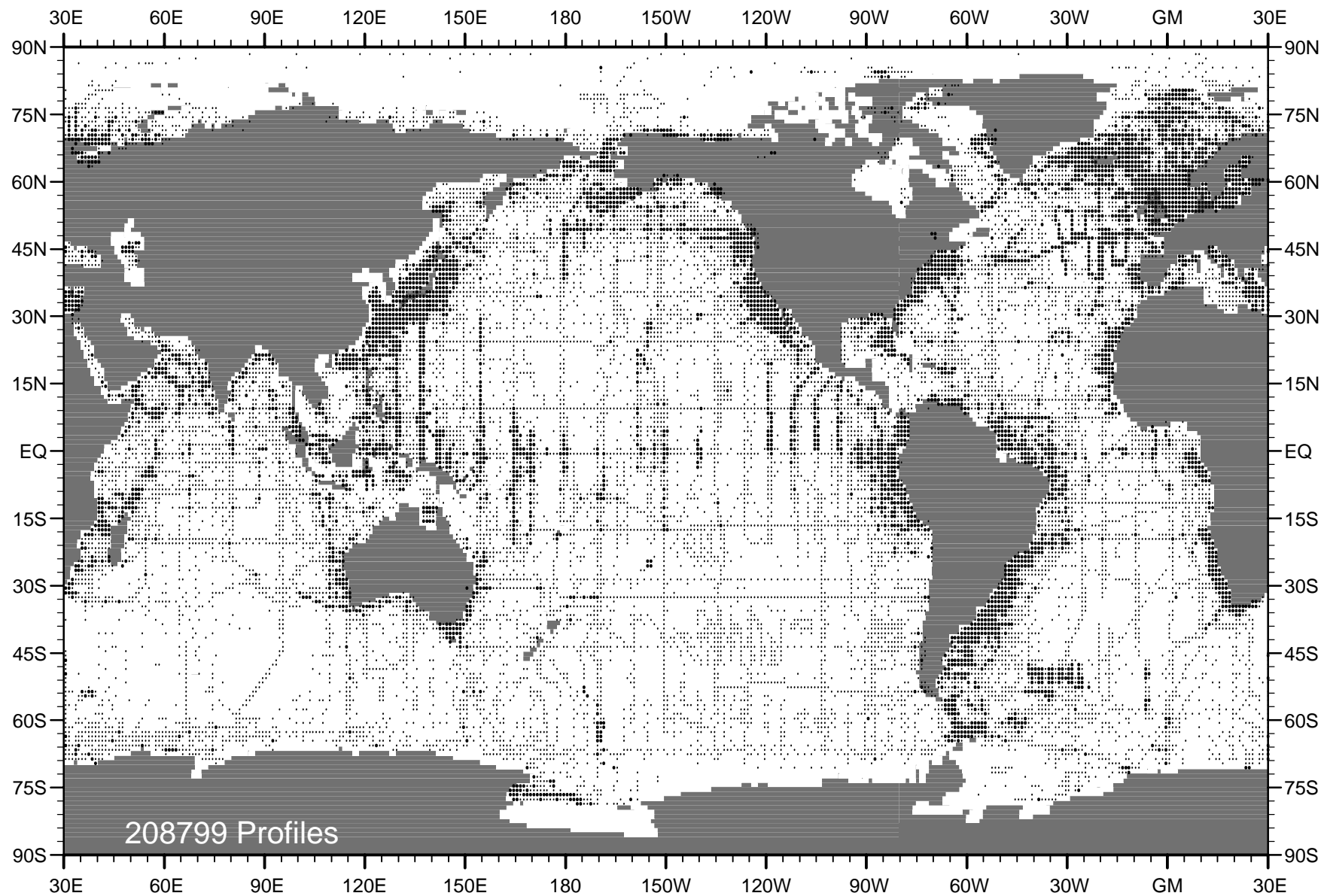
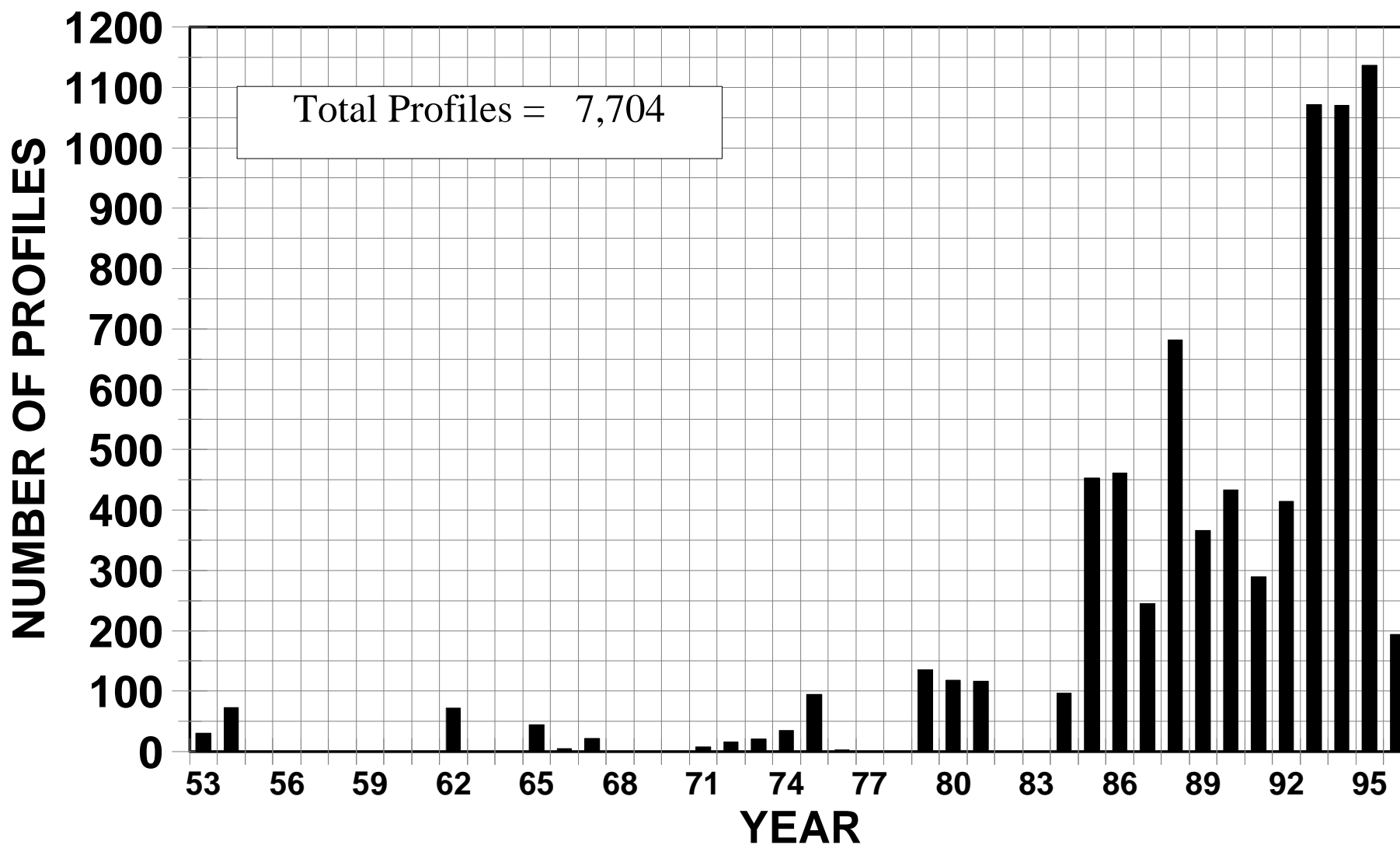
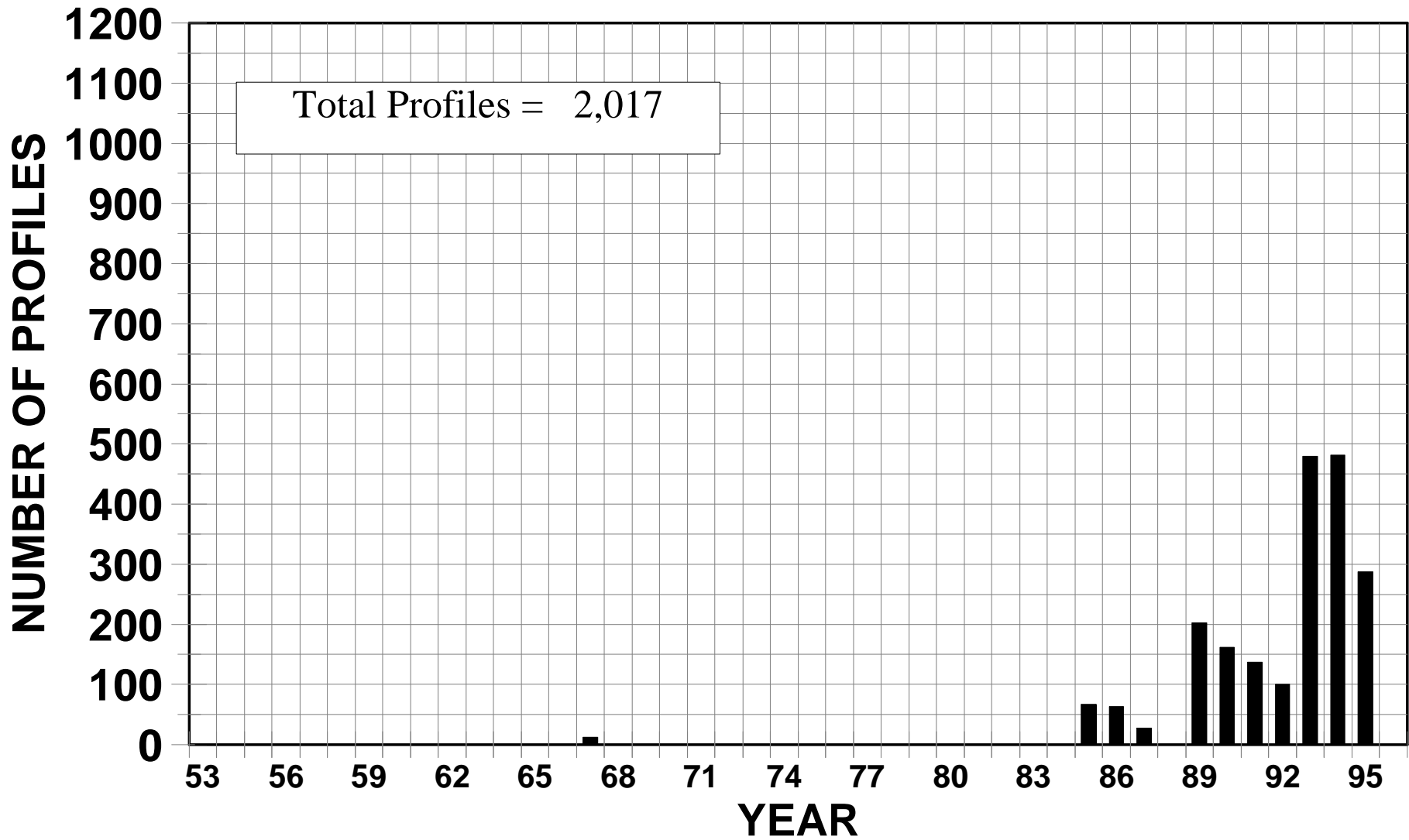


Fig. 12 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01.

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

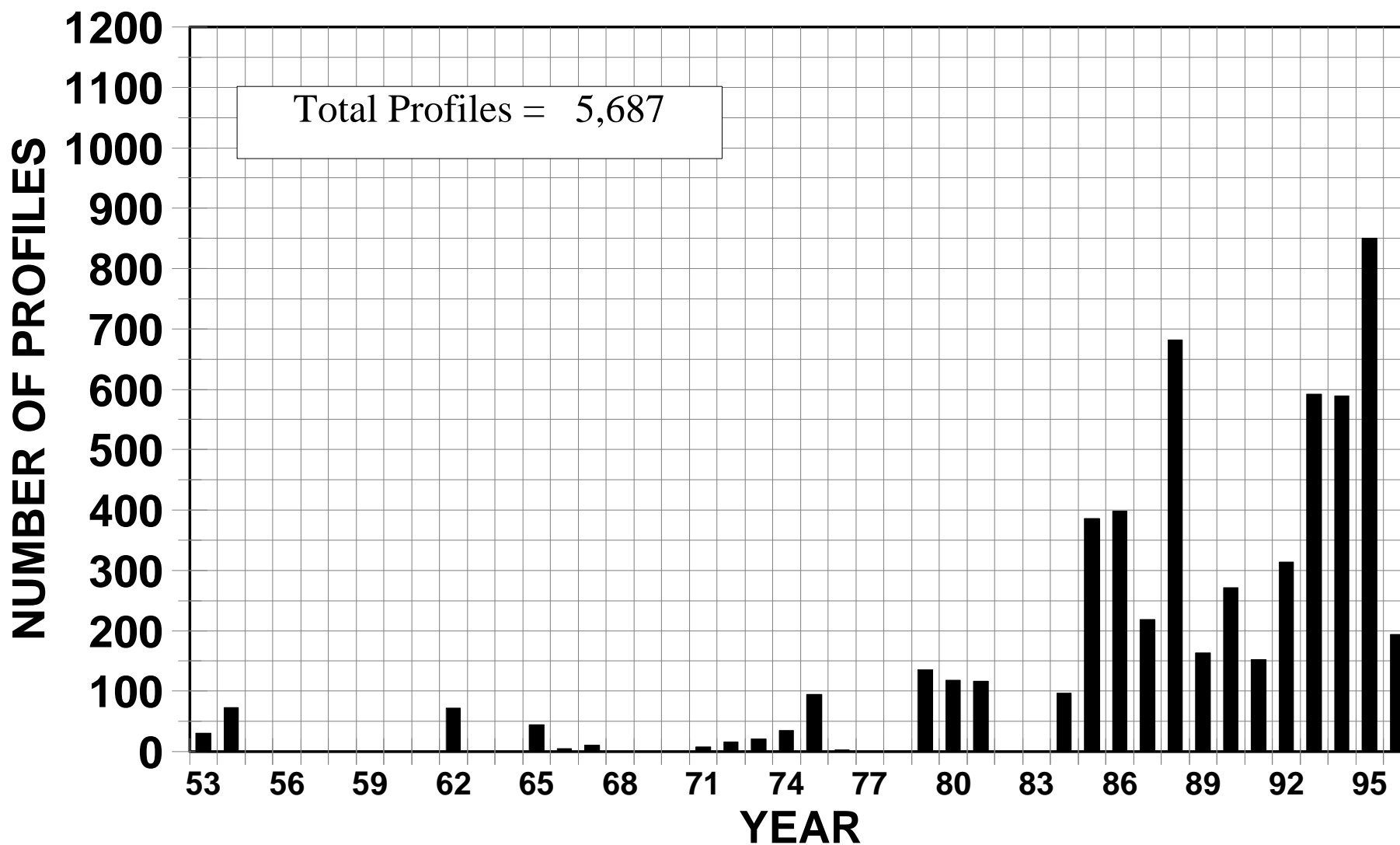


**Fig. 13** Time series of Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 as a function of year for the World Ocean.



**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.

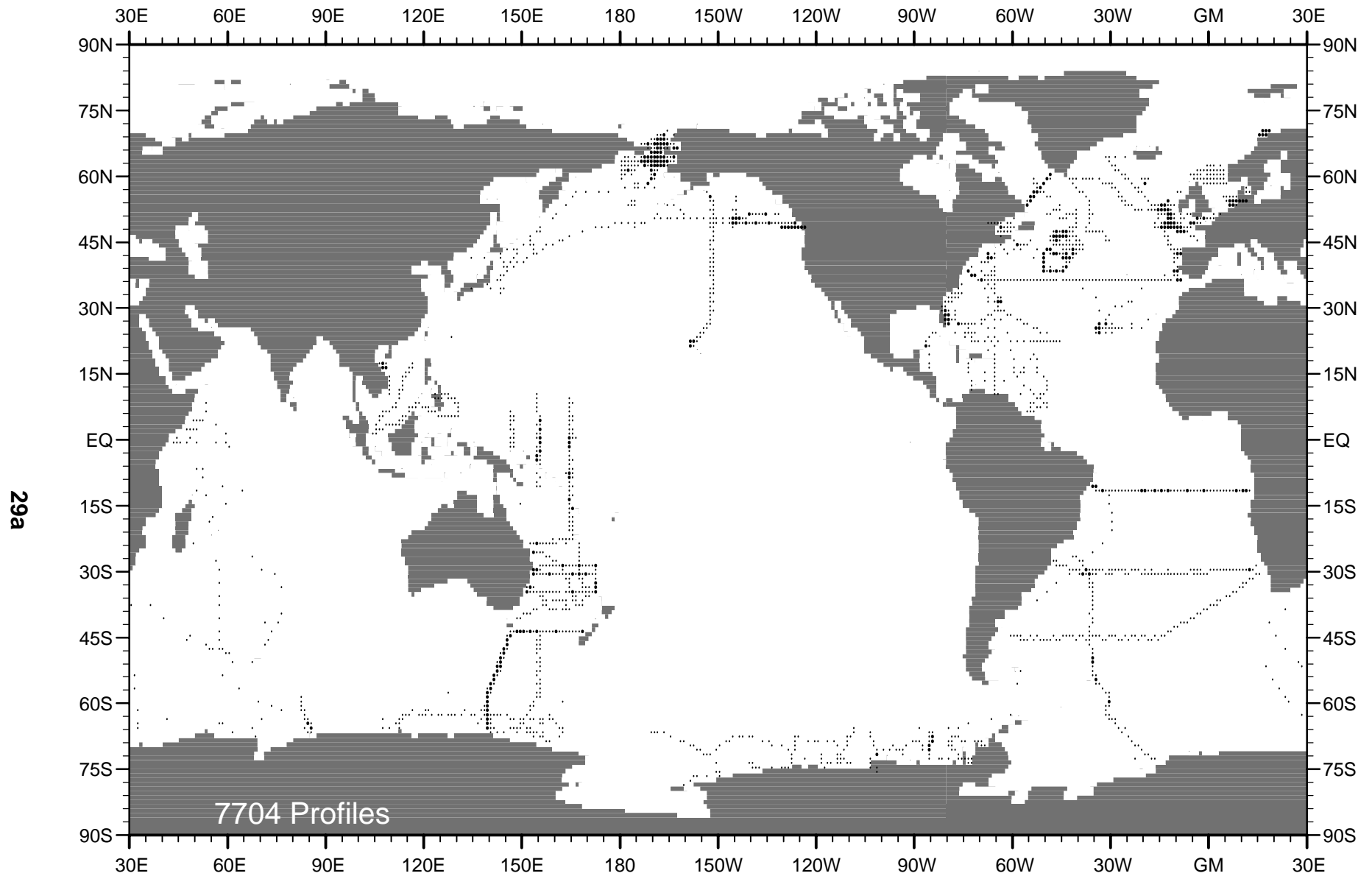


Fig. 16 Distribution of all Ocean Station Data (OSD) nitrate+nitrite in WOD01.  
 Dots show location of 1-degree squares containing any data.

### 3. BIBLIOGRAPHY

Levitus, S., R. Gelfeld, T. Boyer, and D. Johnson, 1994: *Results of the NODC and IOC Data Archaeology and Rescue projects. Key to Oceanographic Records Documentation No. 19*, National Oceanographic Data Center, Washington, D.C., 67 pp.

Levitus, S., R. Gelfeld, M. Conkright, T.P. Boyer, D. Johnson, I. Smolyar, C. Jones, G. Trammell, R. Moffatt, T. O'Brien, O. Baranova, C. Forgy, 2002: *Results of the NODC and IOC Oceanographic Data Archaeology and Rescue Projects*. In preparation.

**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.

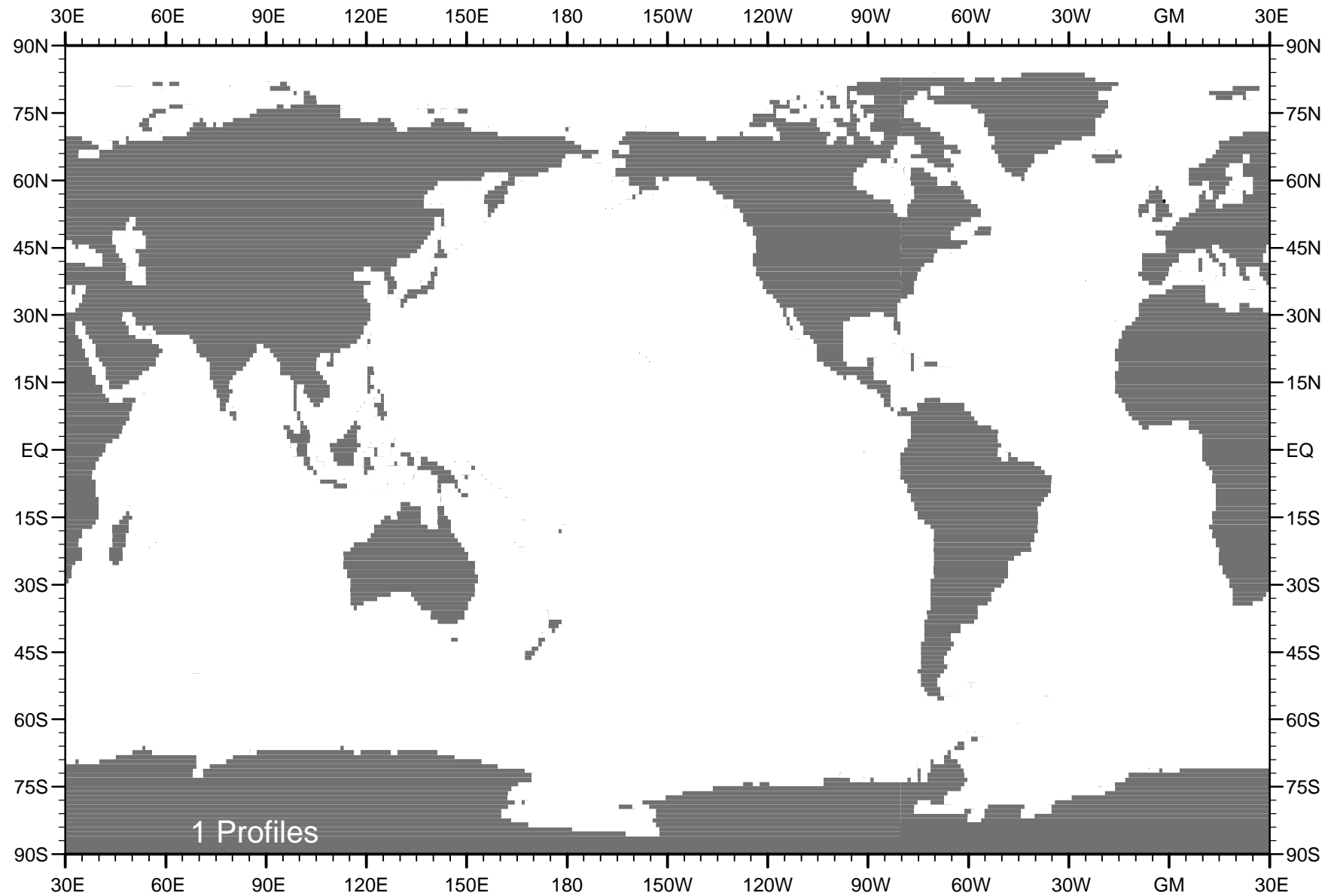


Fig. A1 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1922 .

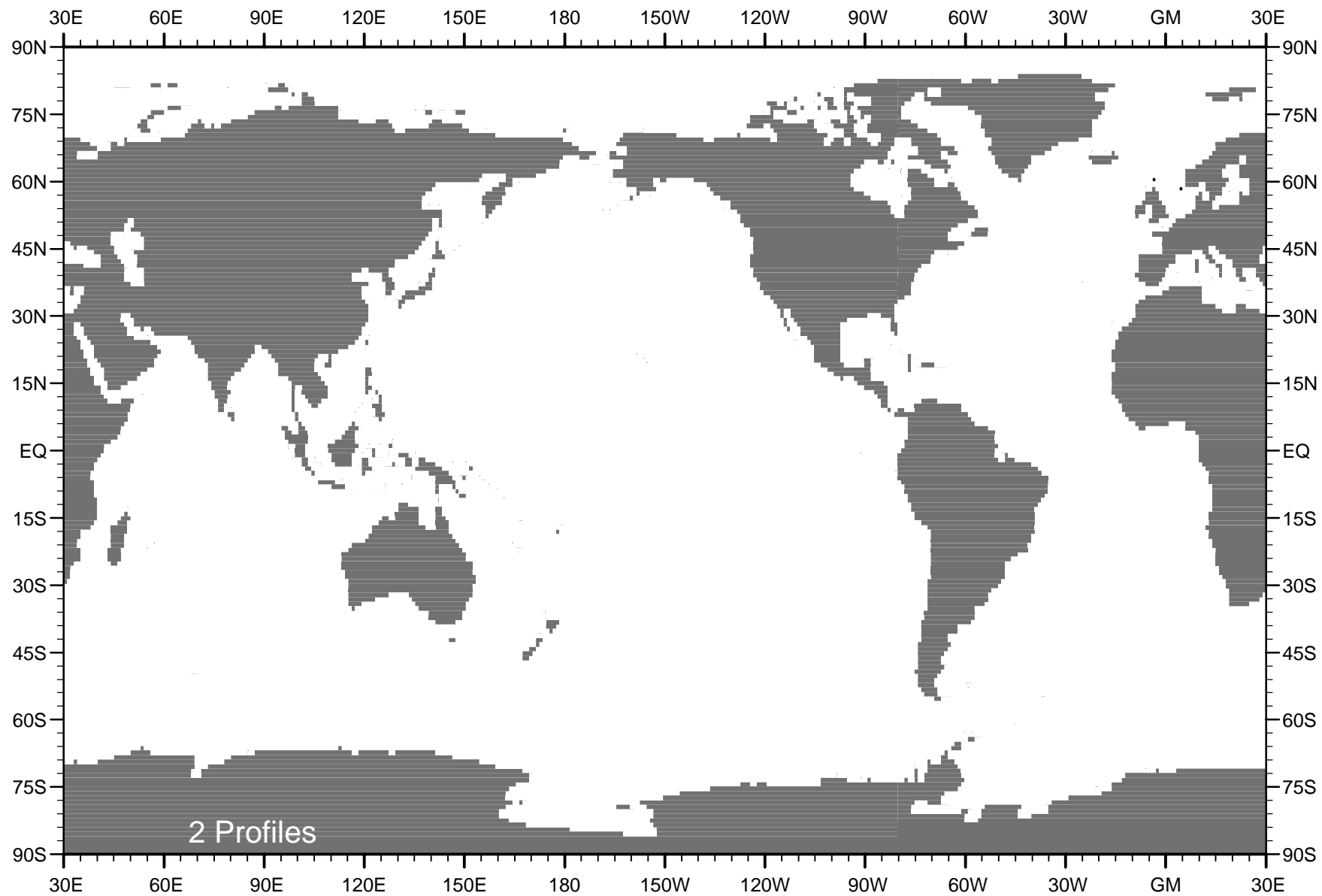


Fig. A2 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1923 .

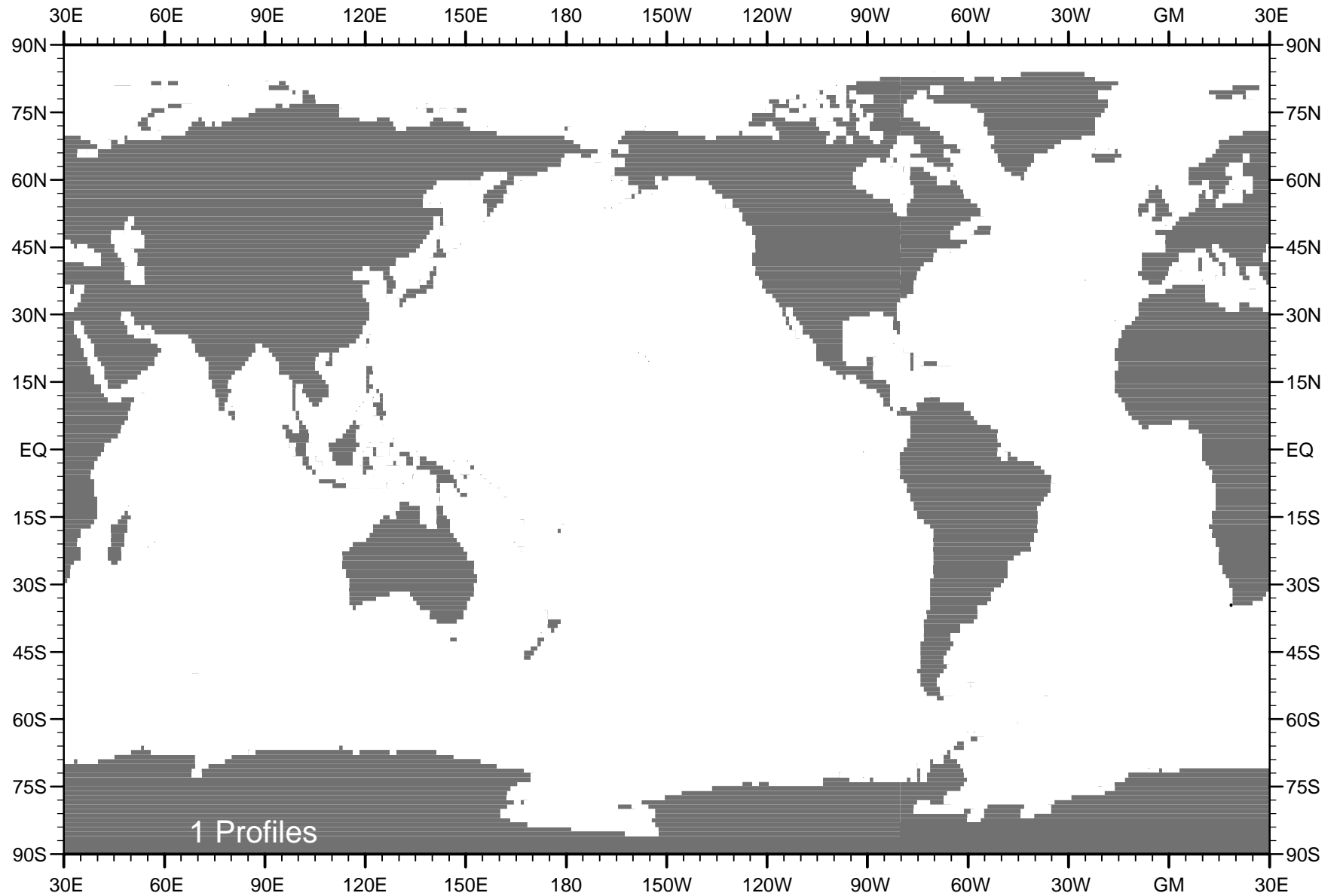


Fig. A3 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1924 .

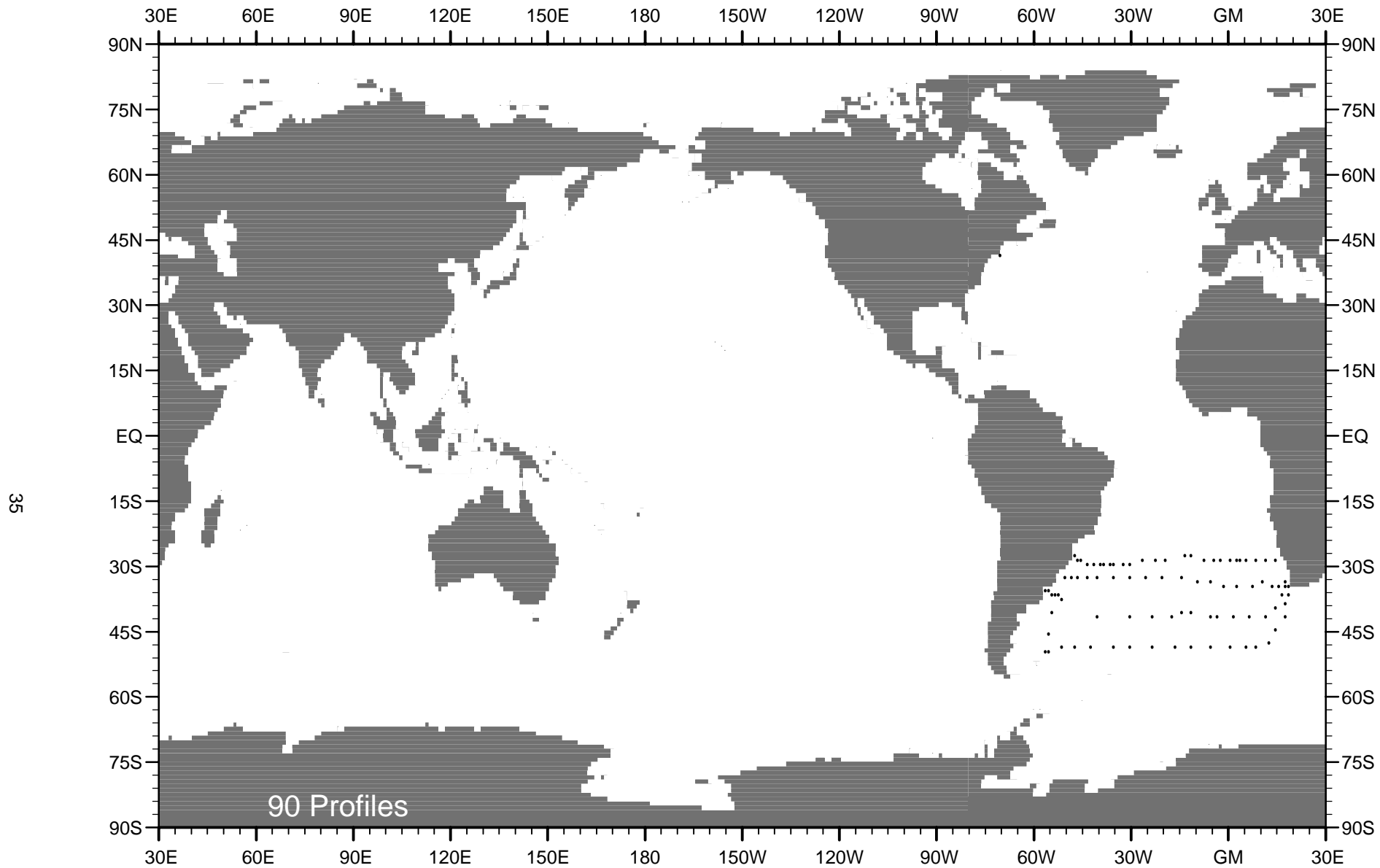


Fig. A4 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1925 .



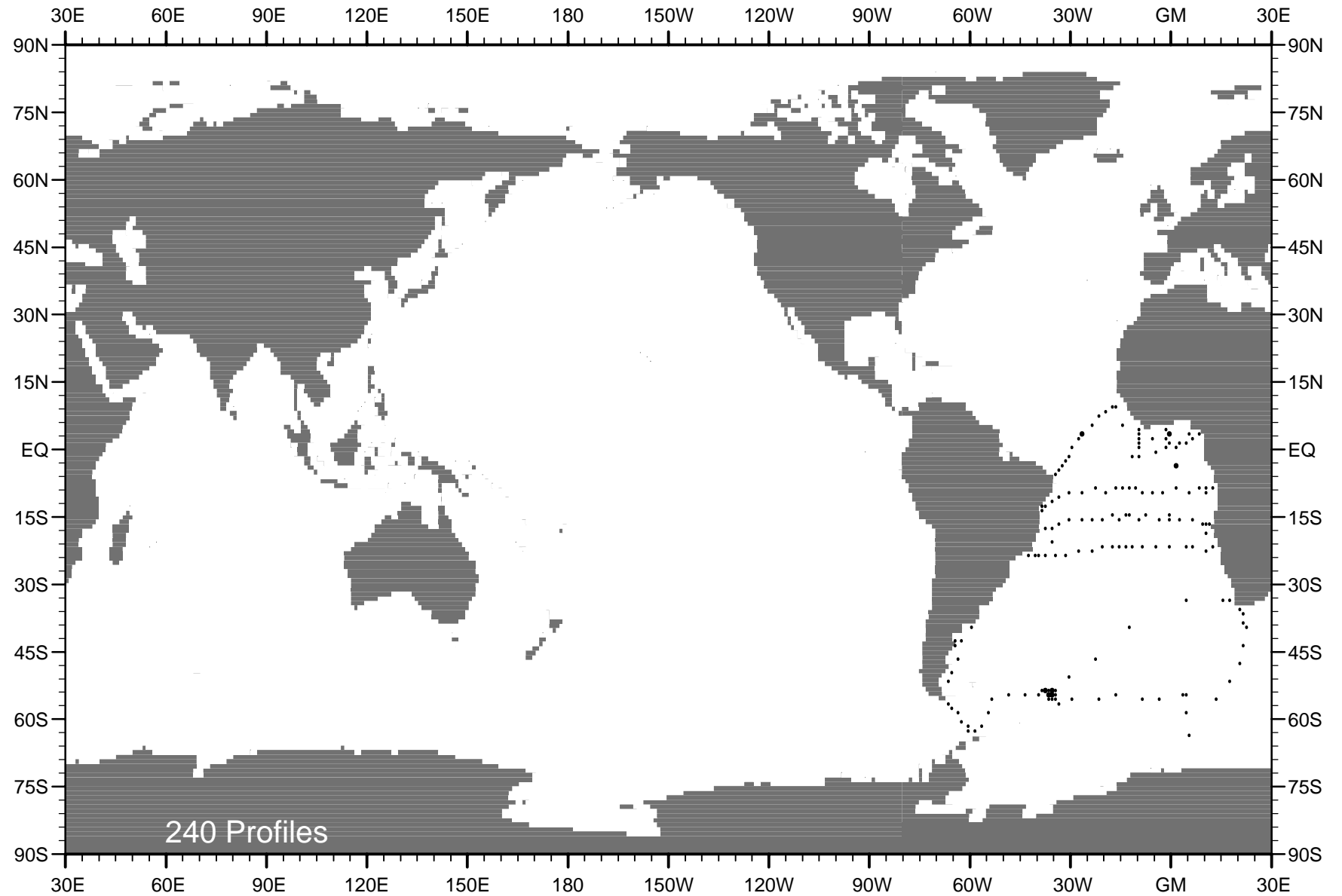


Fig. A5 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1926 .

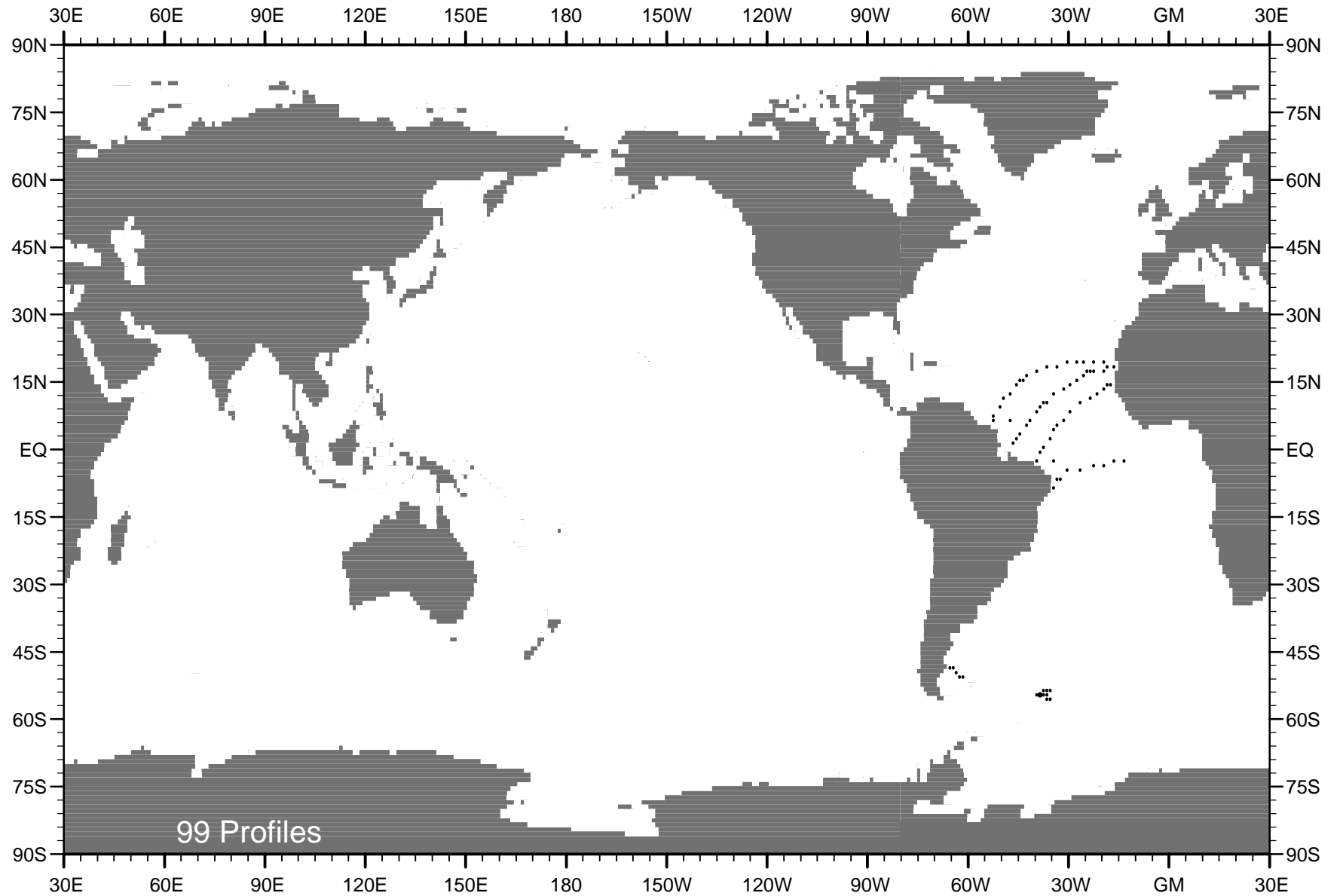


Fig. A6 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1927 .

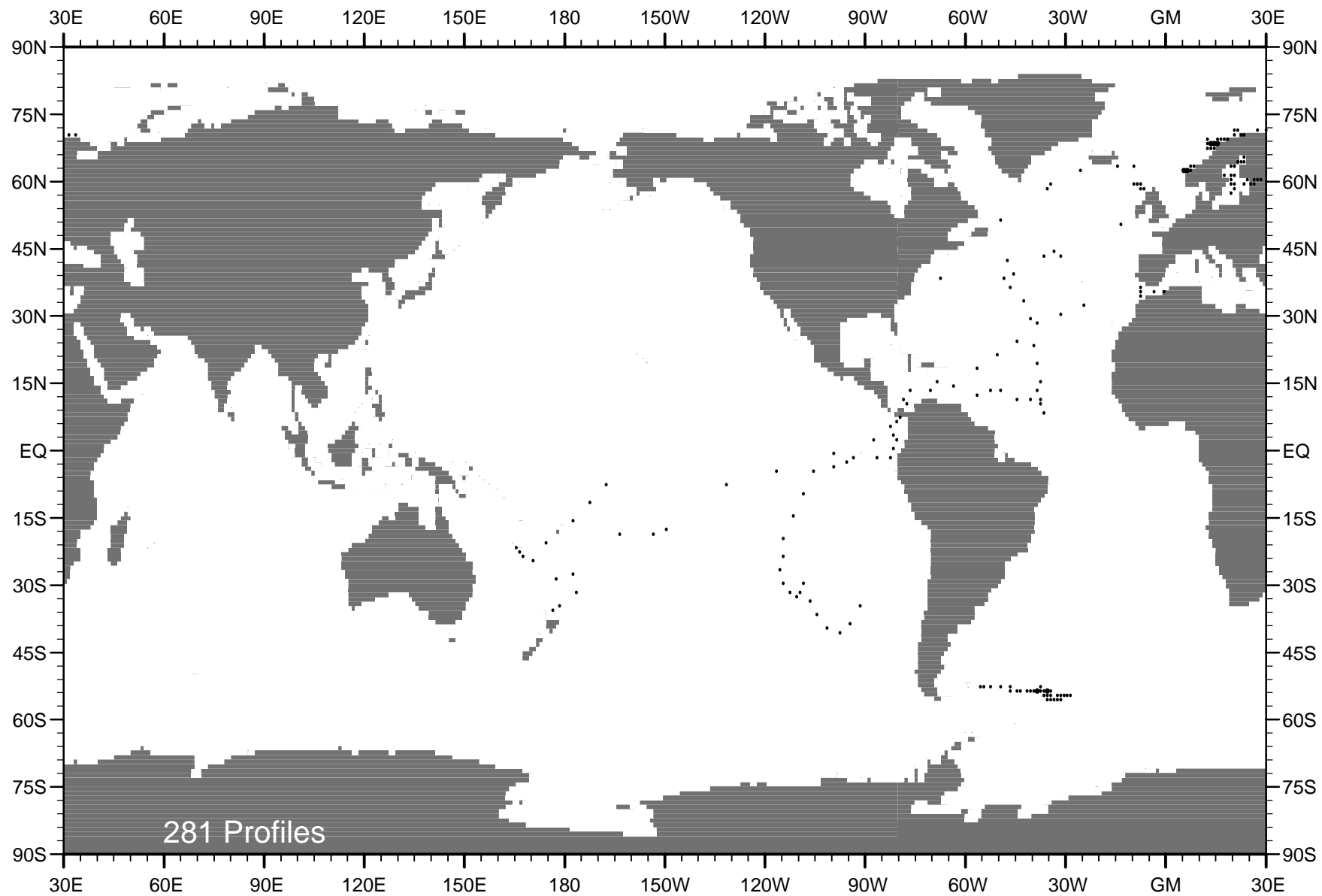


Fig. A7 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1928 .

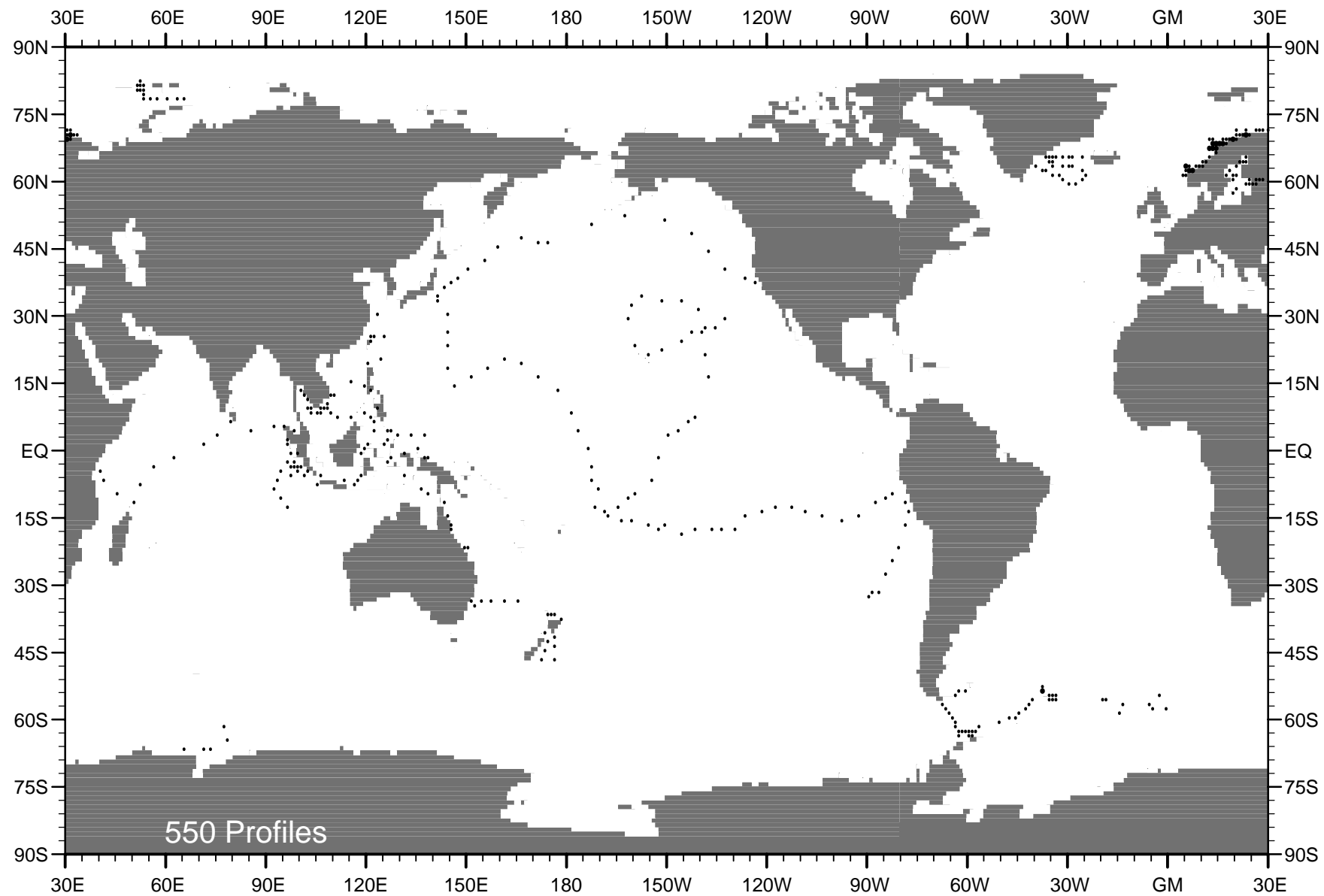


Fig. A8 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1929 .

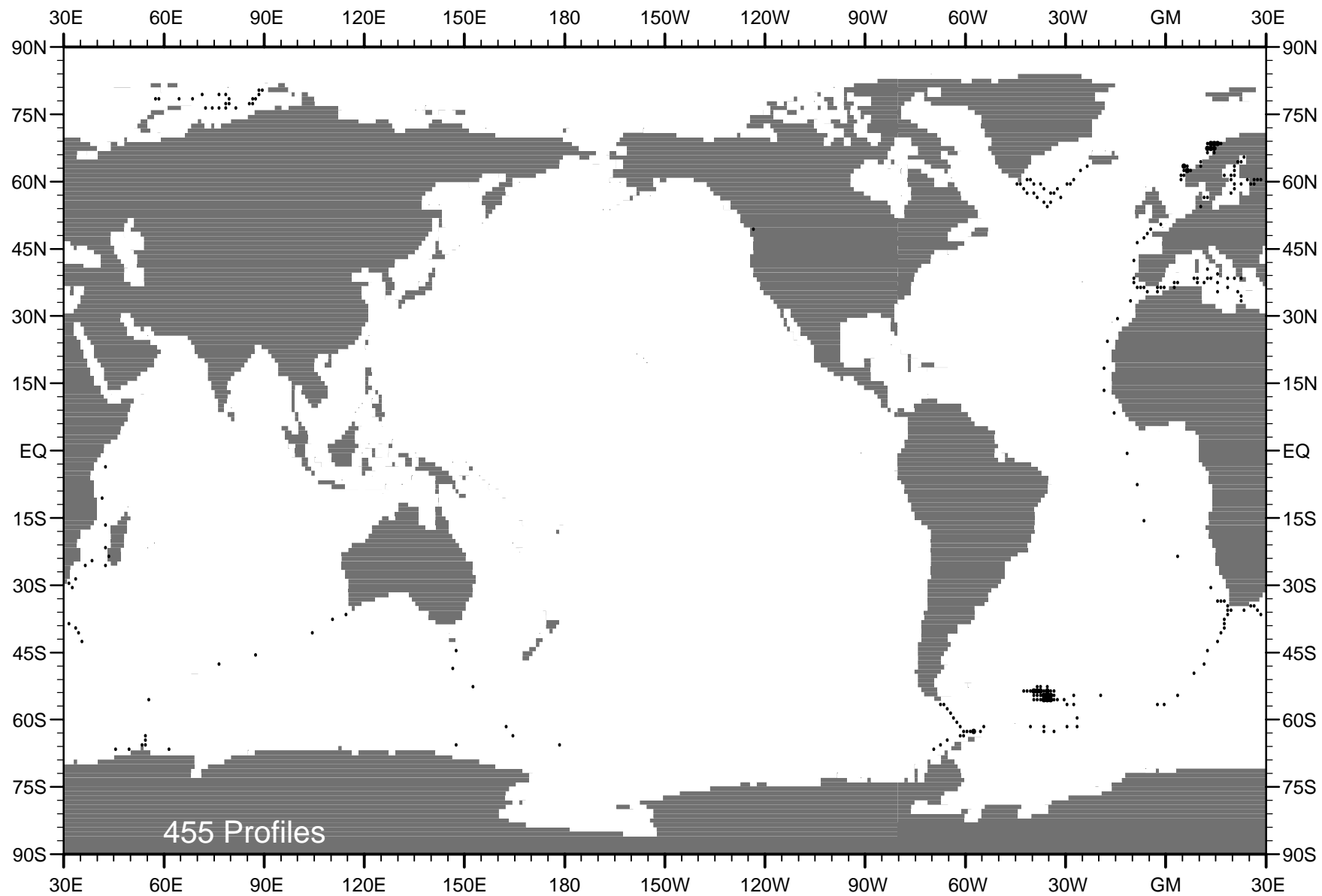


Fig. A9 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1930 .

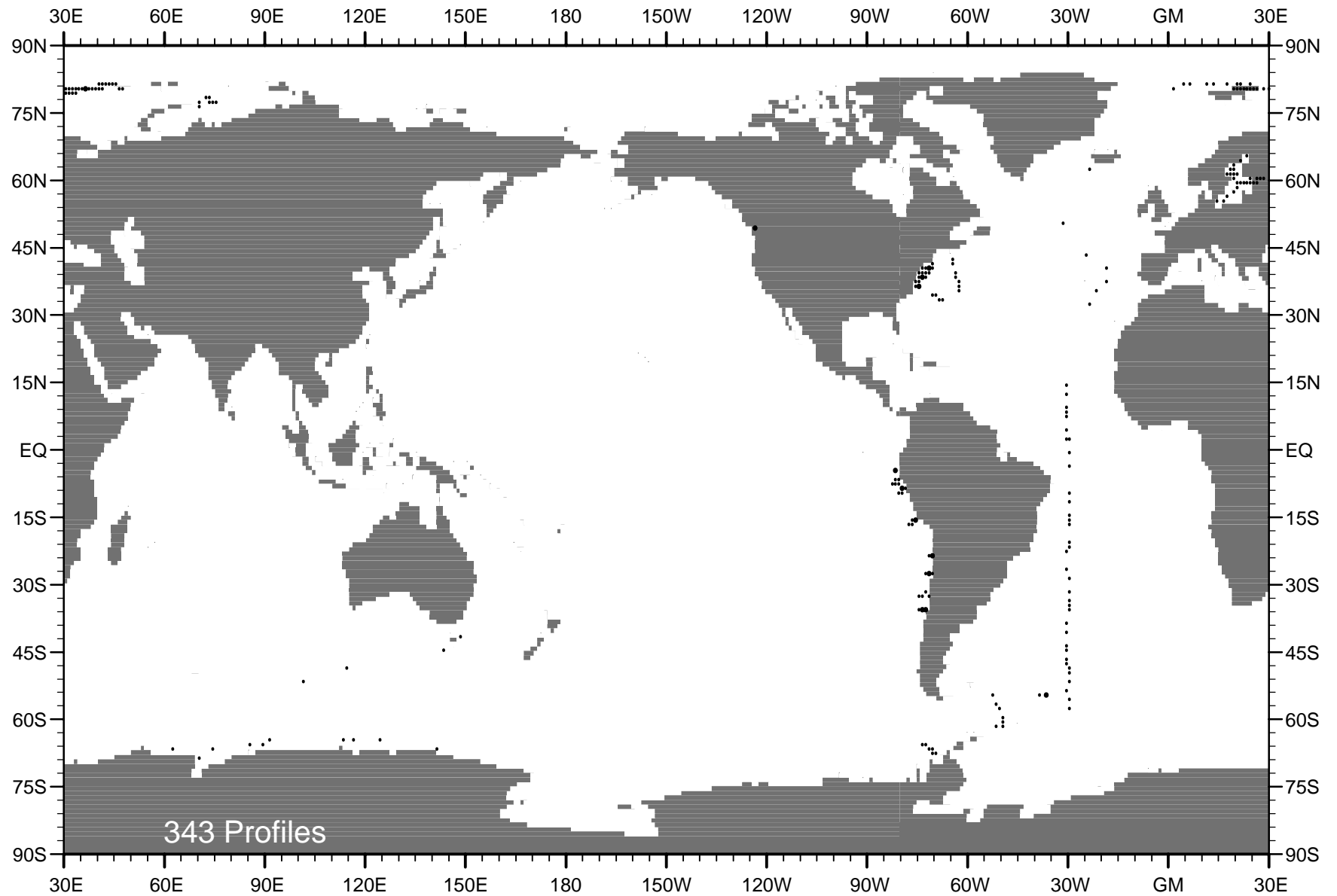


Fig. A10 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1931 .

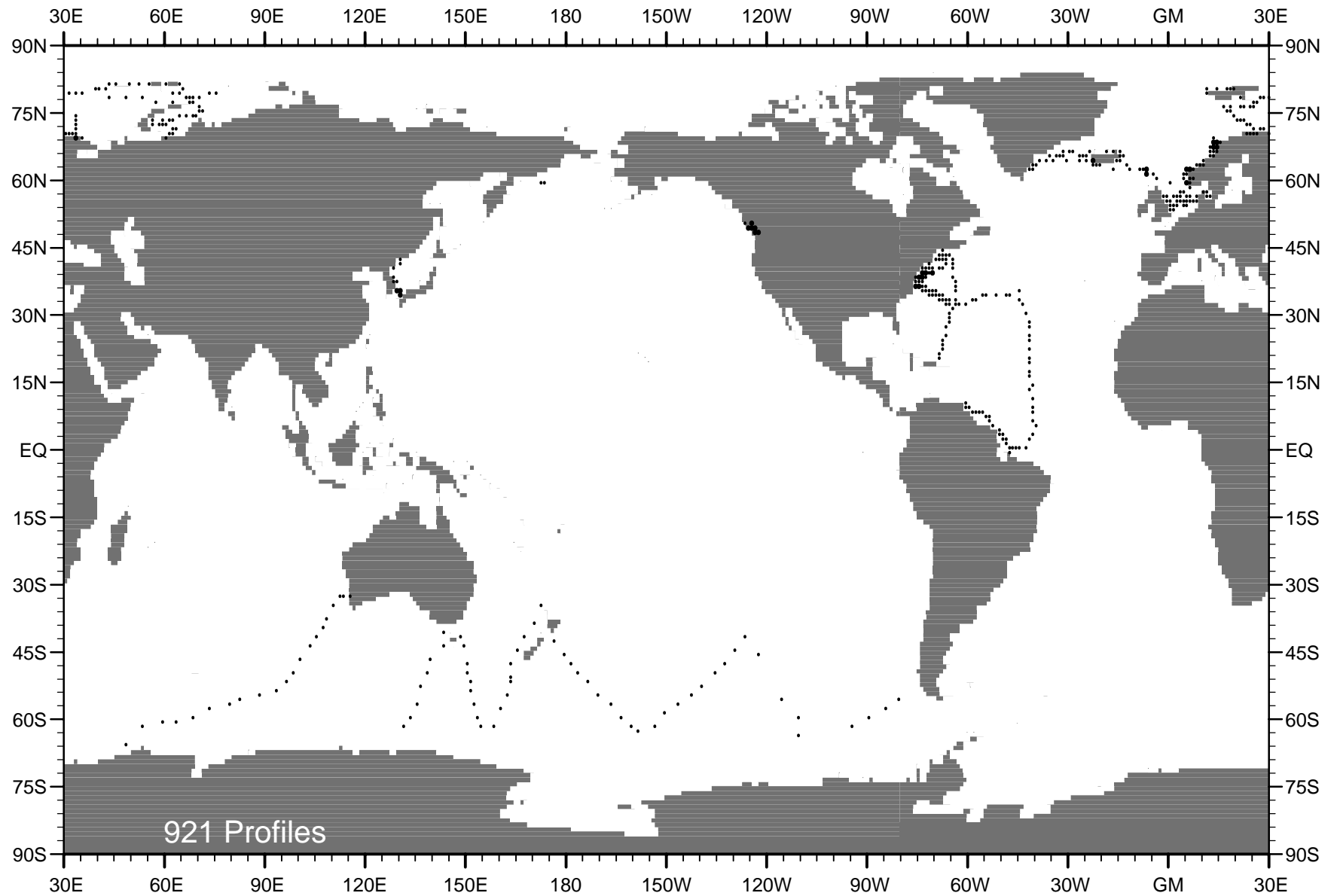


Fig. A11 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1932 .

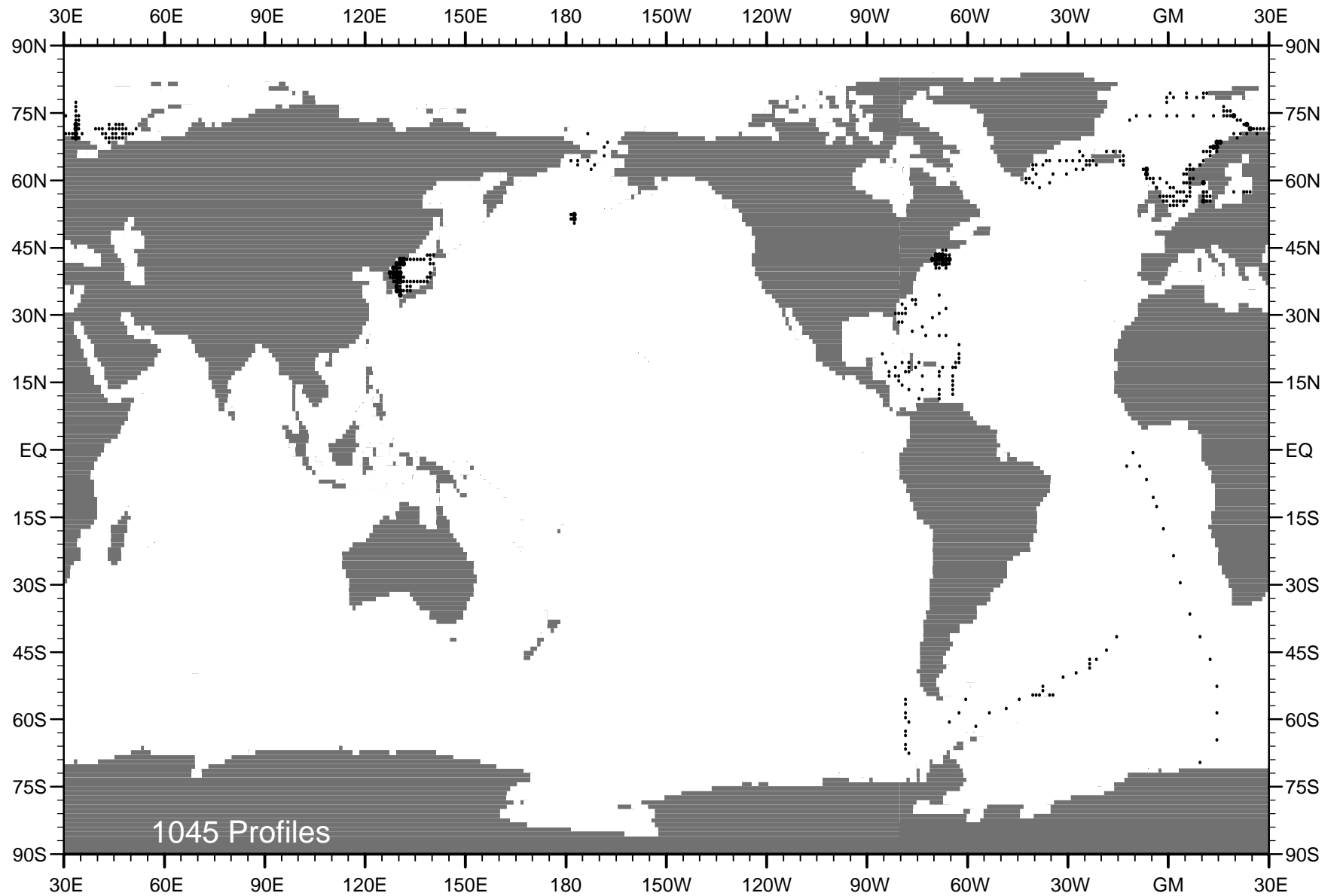


Fig. A12 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1933 .



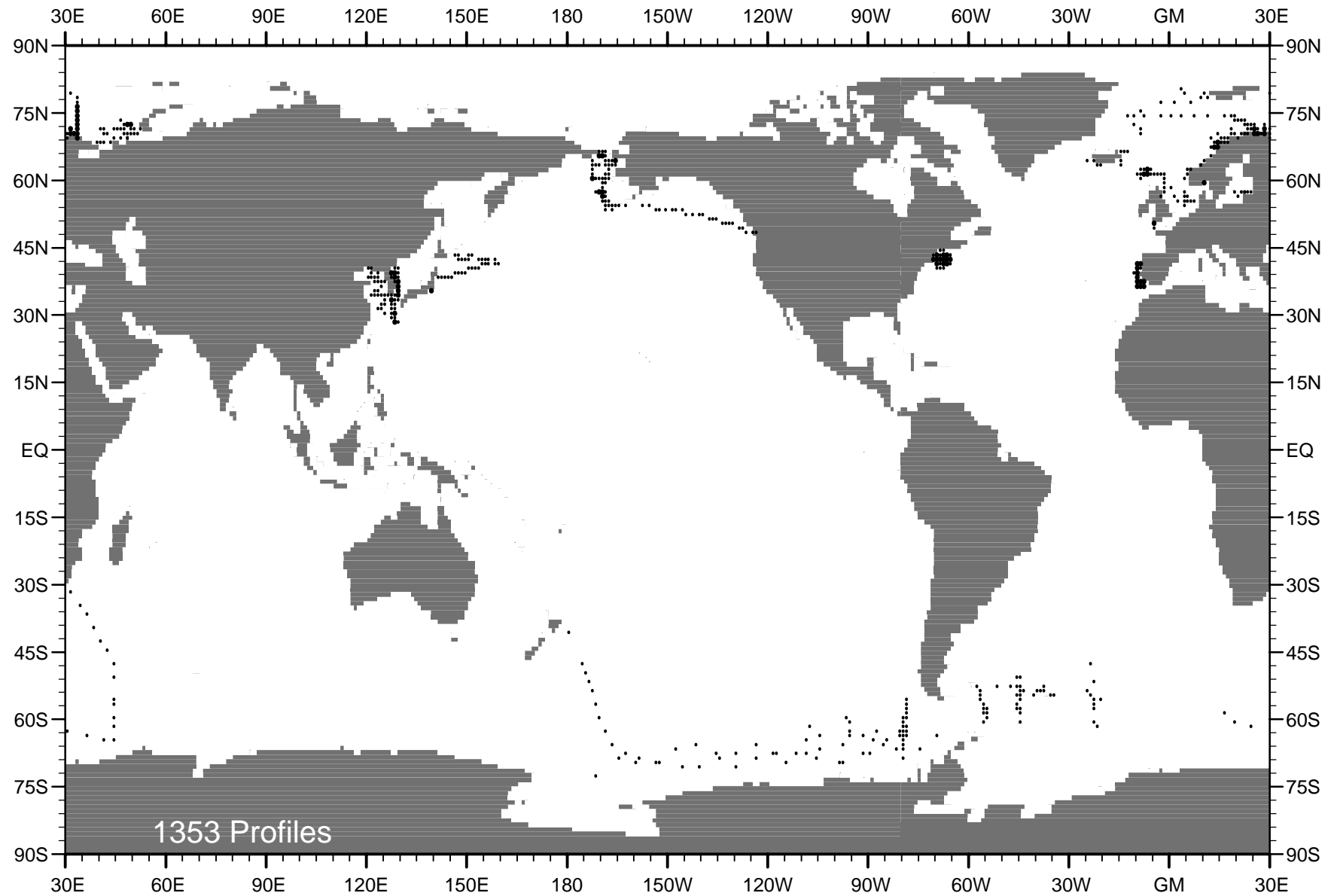


Fig. A13 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1934 .

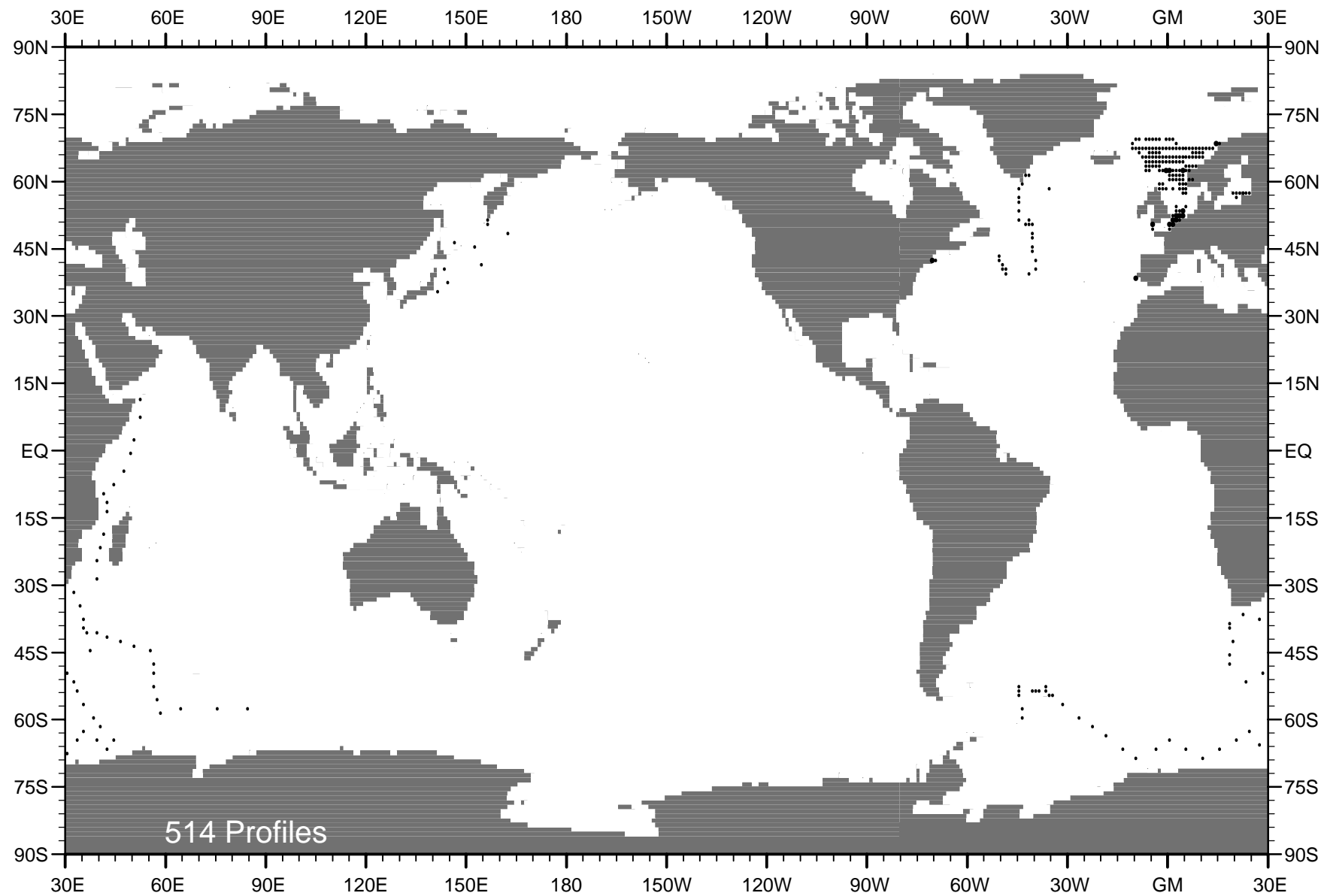


Fig. A14 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1935 .

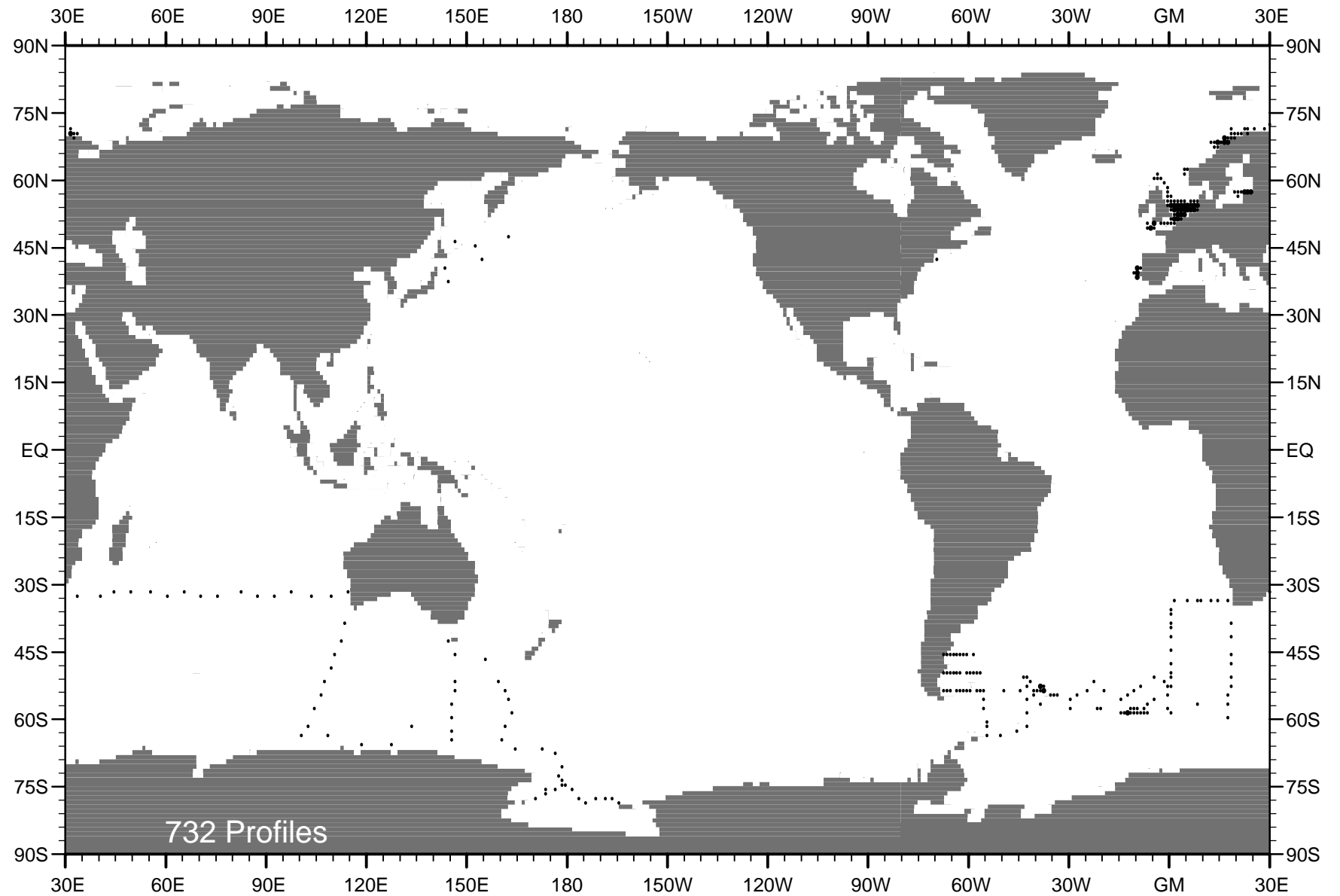


Fig. A15 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1936 .

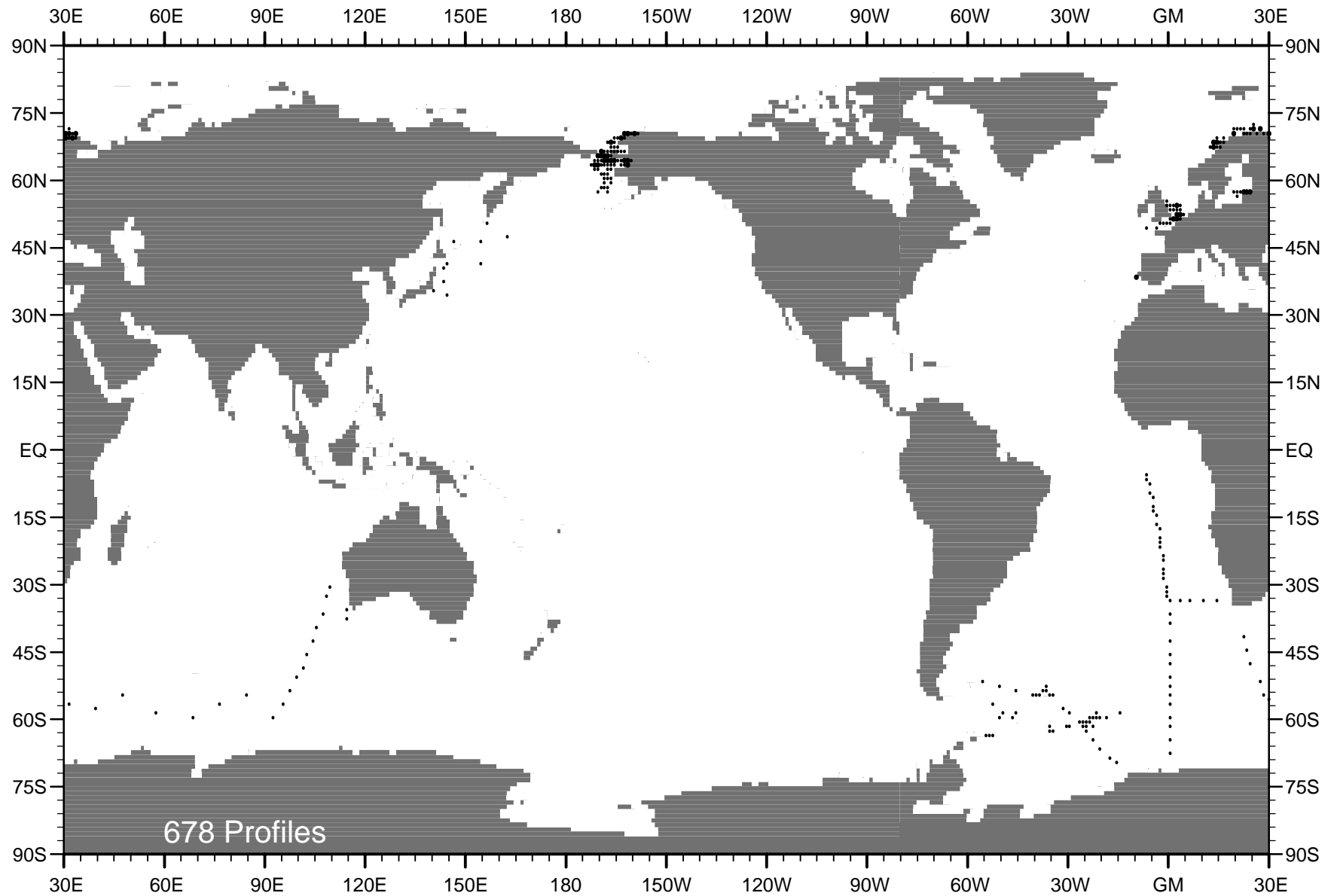


Fig. A16 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1937 .

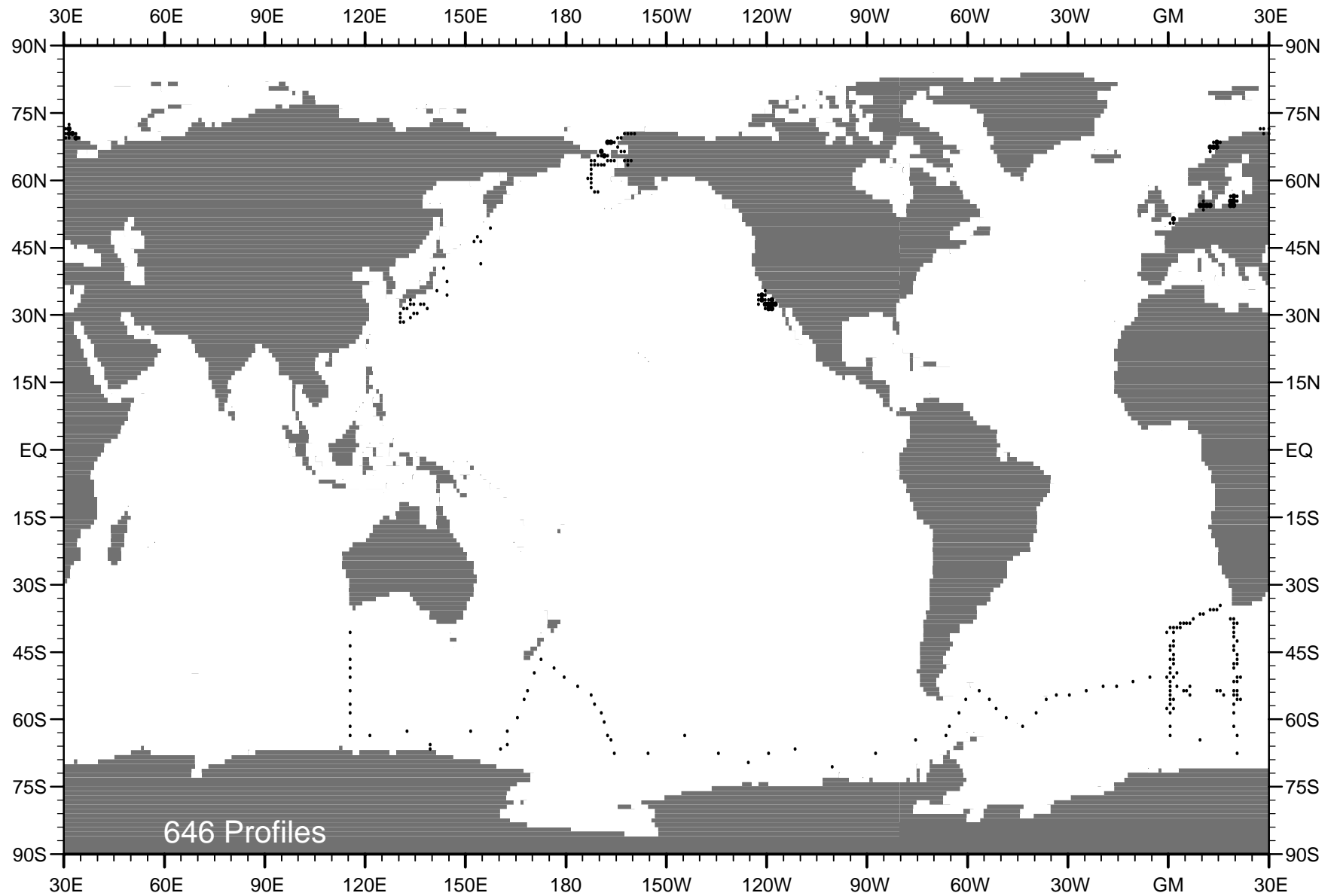


Fig. A17 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1938 .

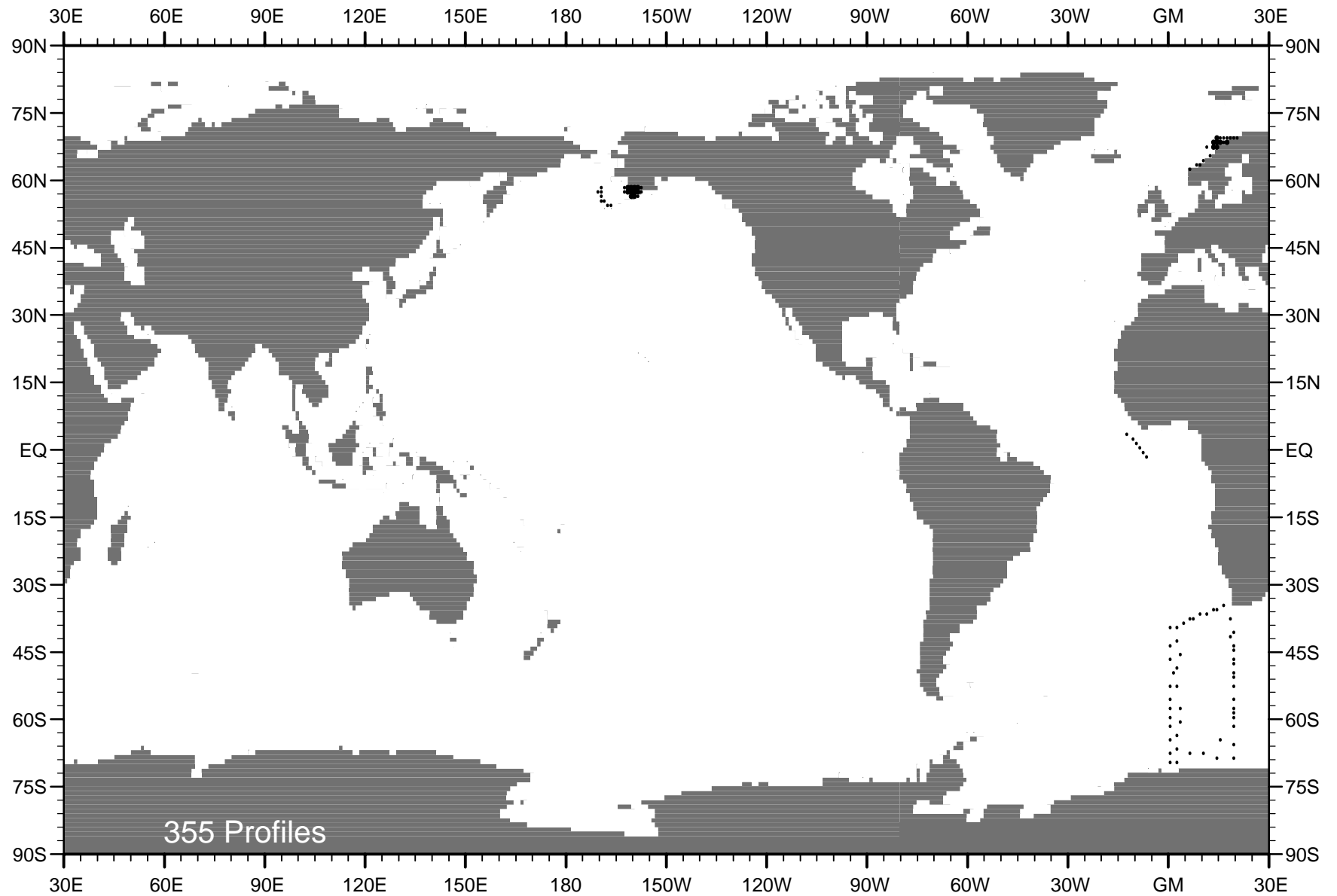


Fig. A18 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1939 .

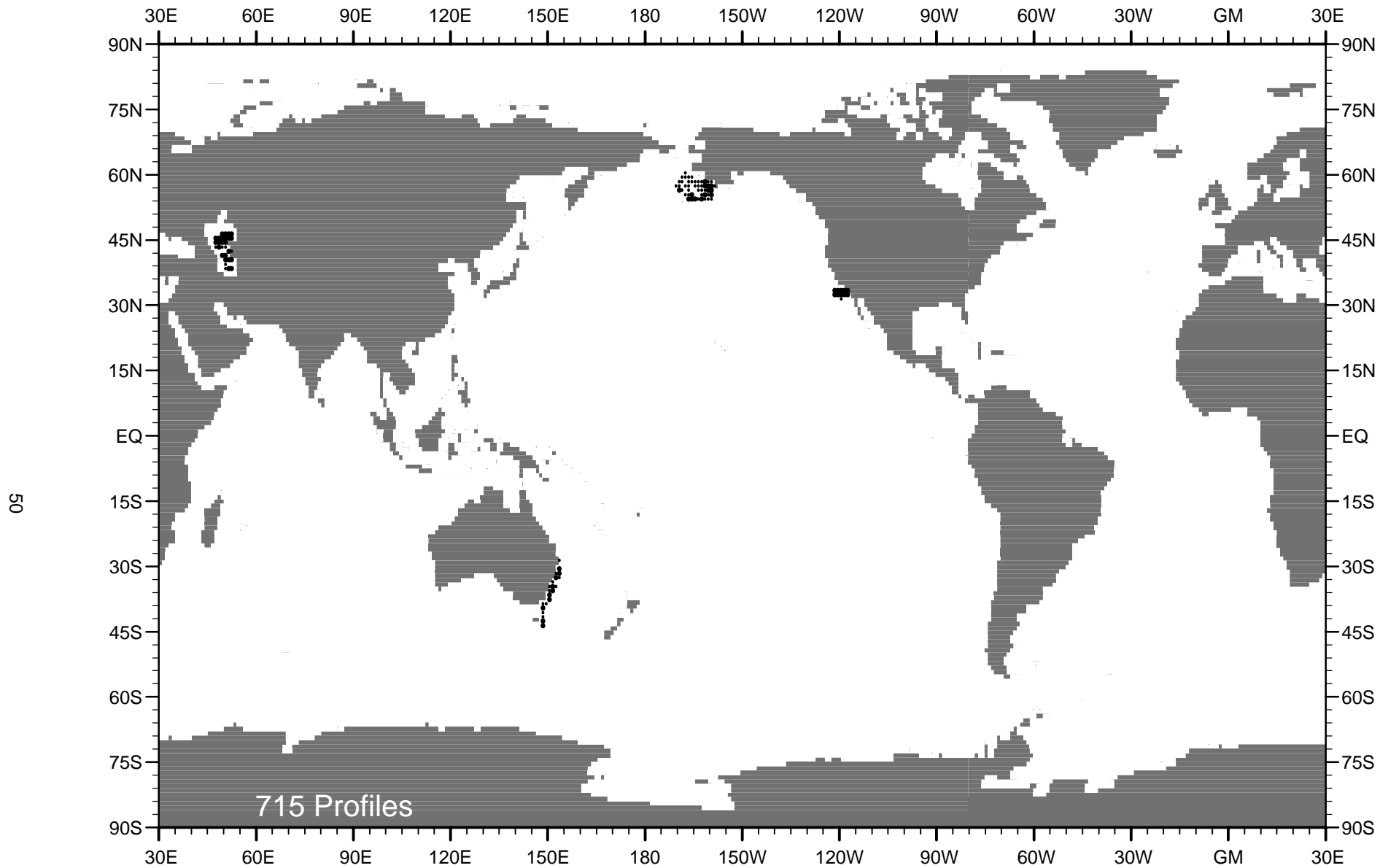


Fig. A19 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1940 .

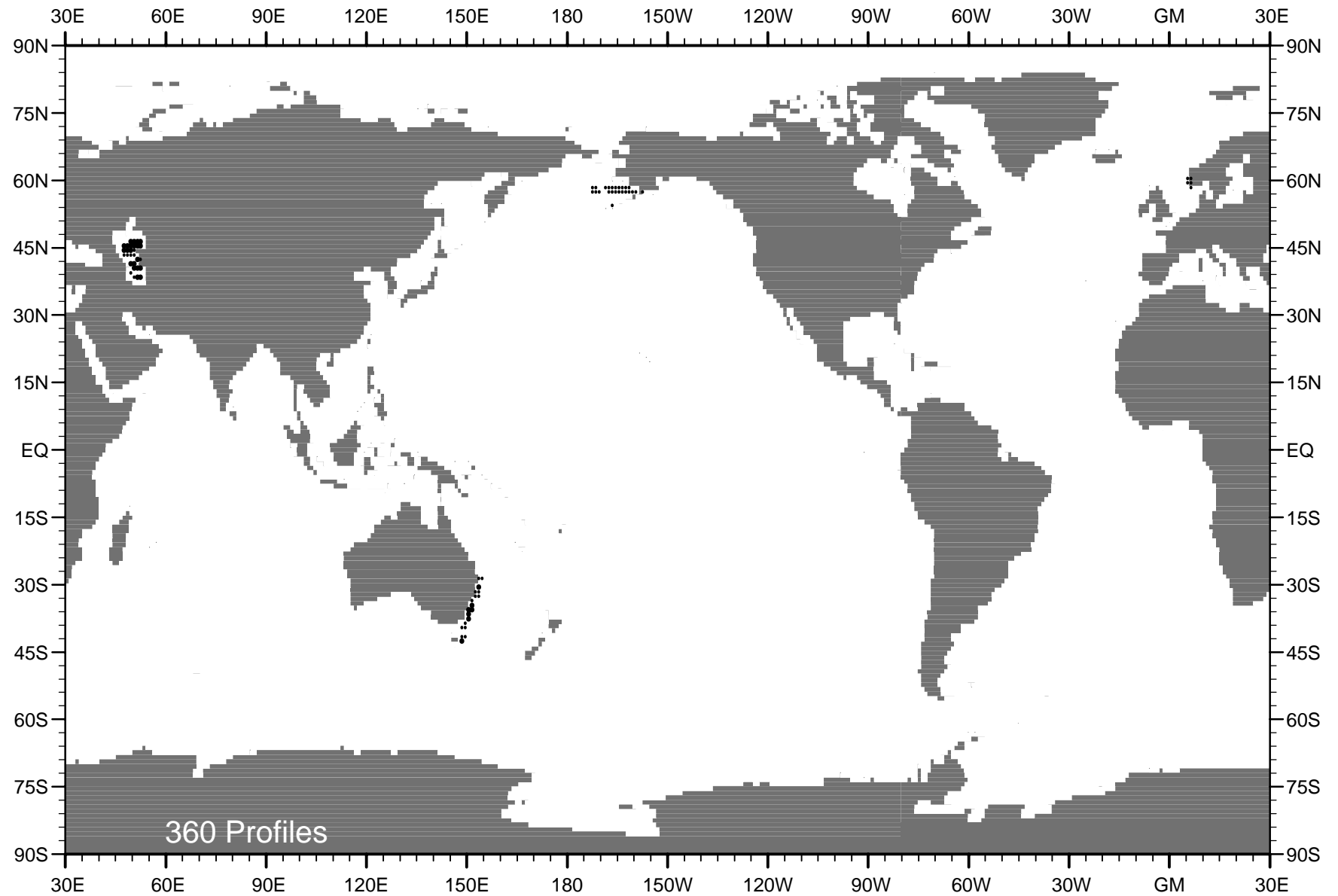


Fig. A20 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1941 .



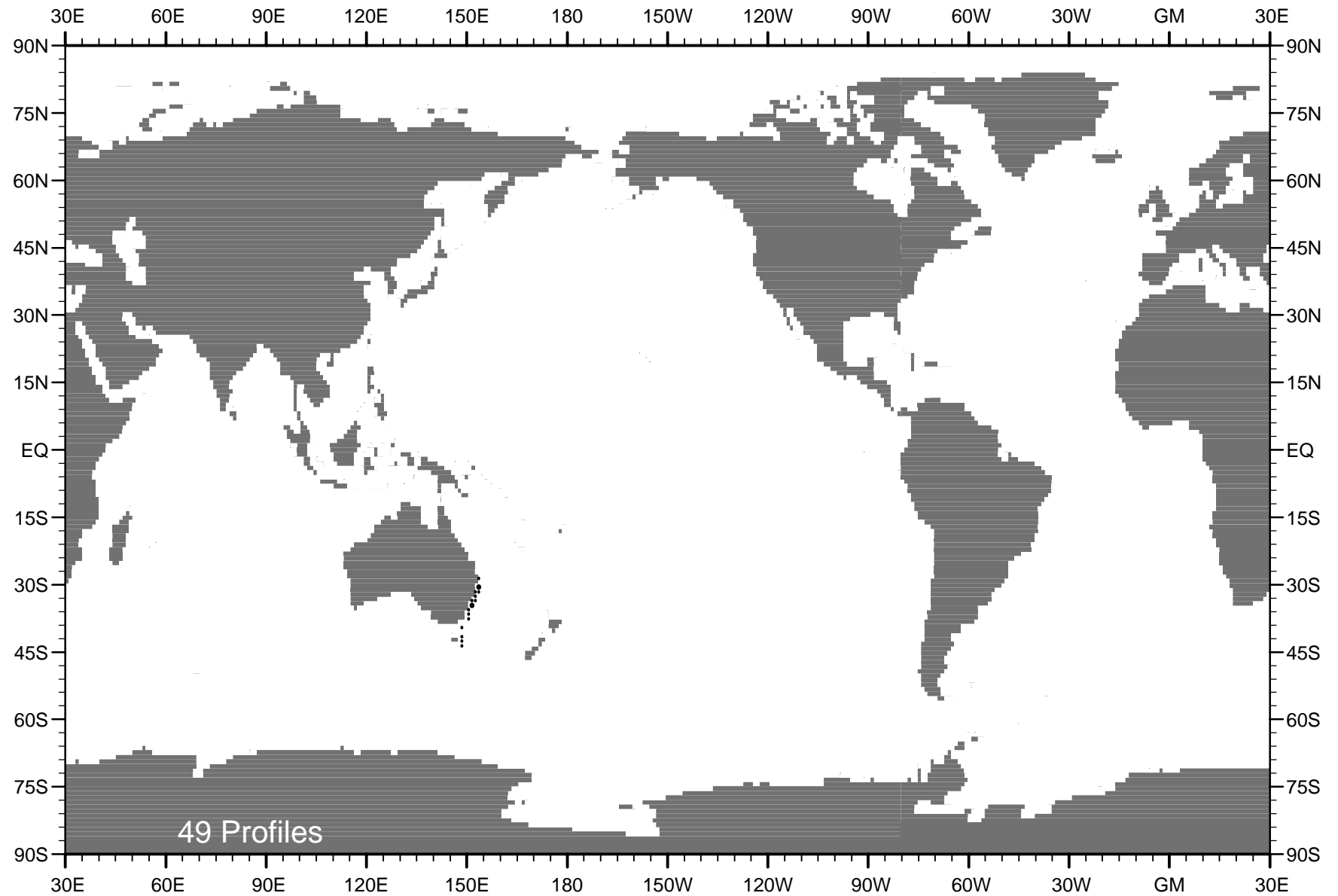


Fig. A21 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1942 .

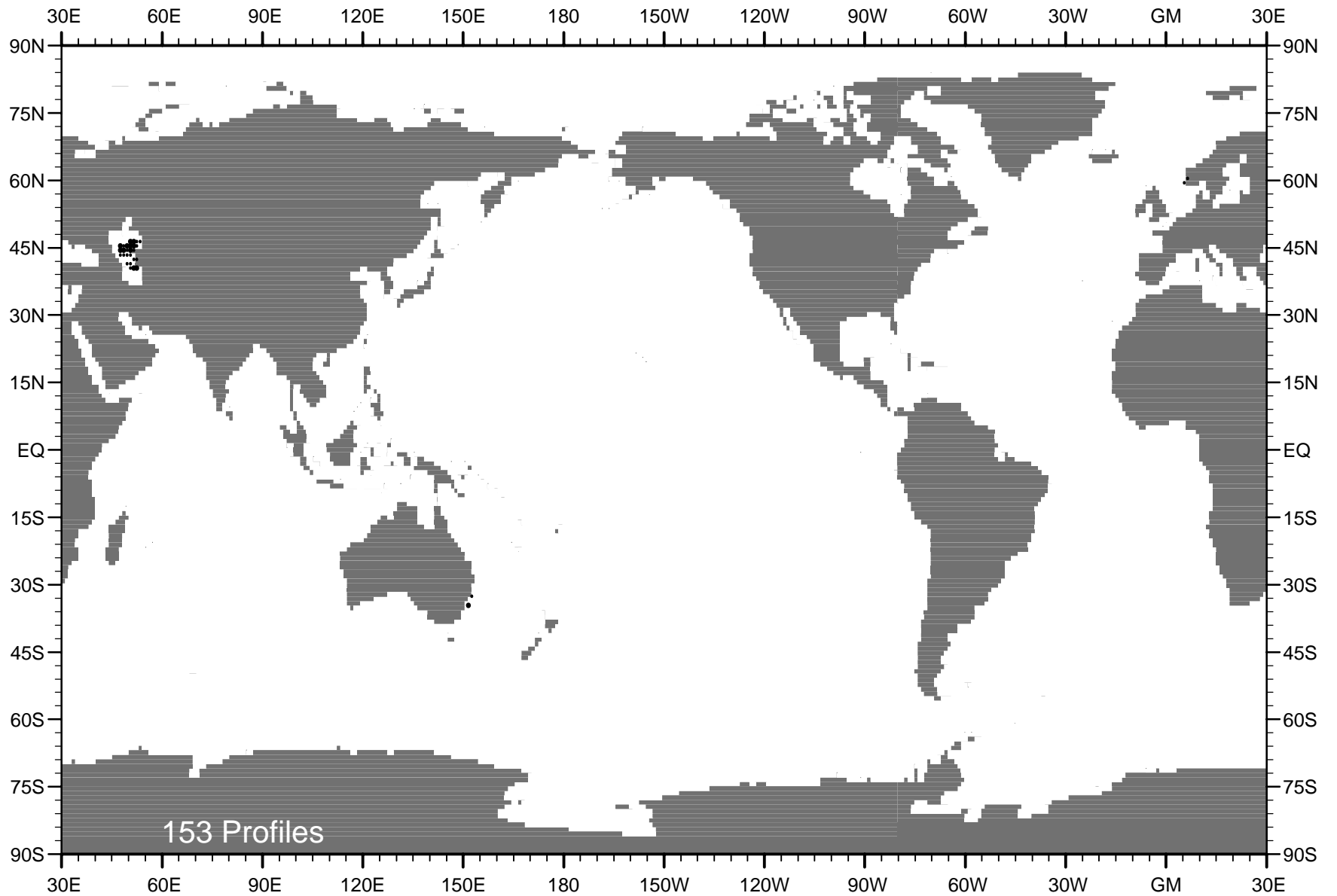


Fig. A22 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1943 .

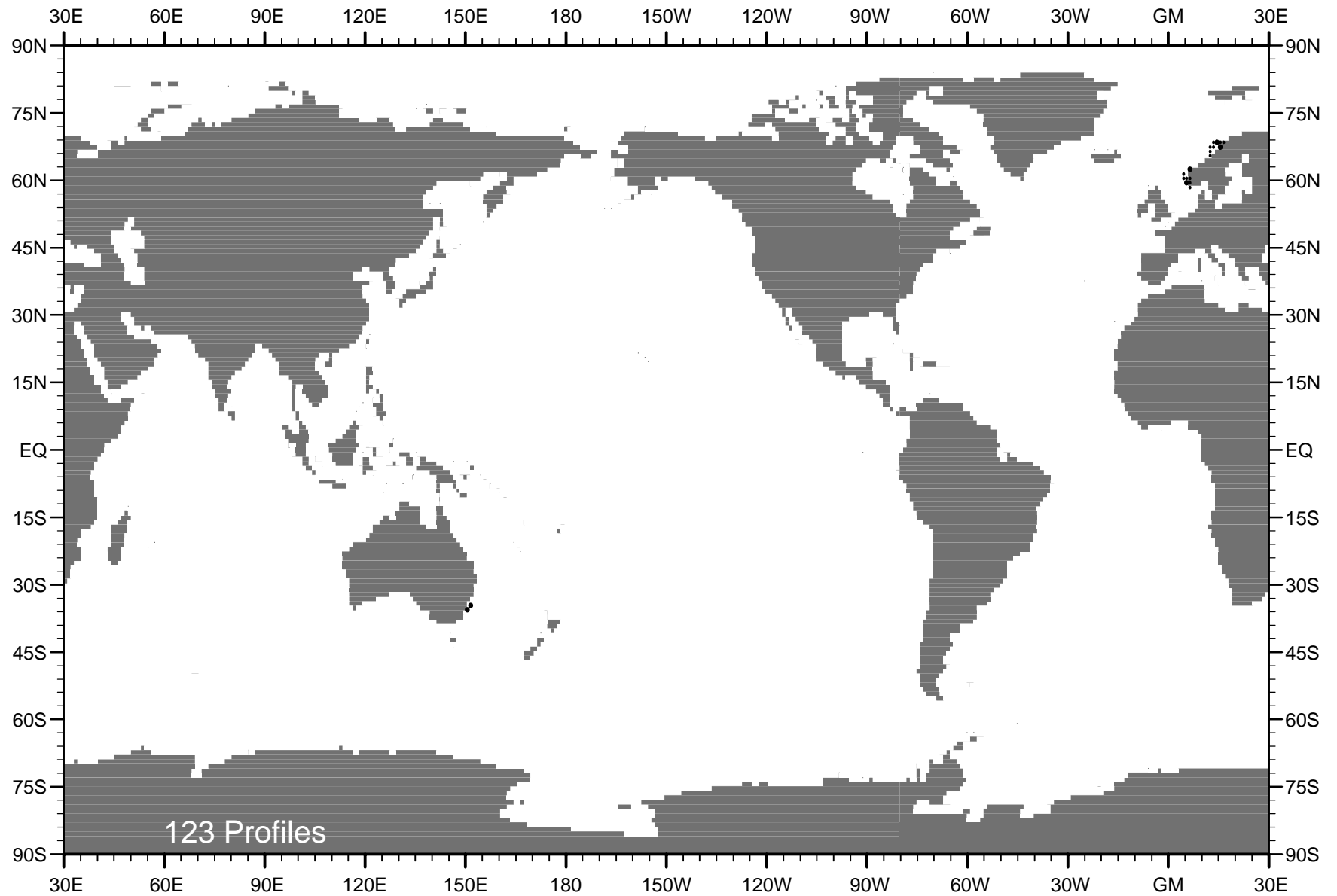


Fig. A23 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1944 .

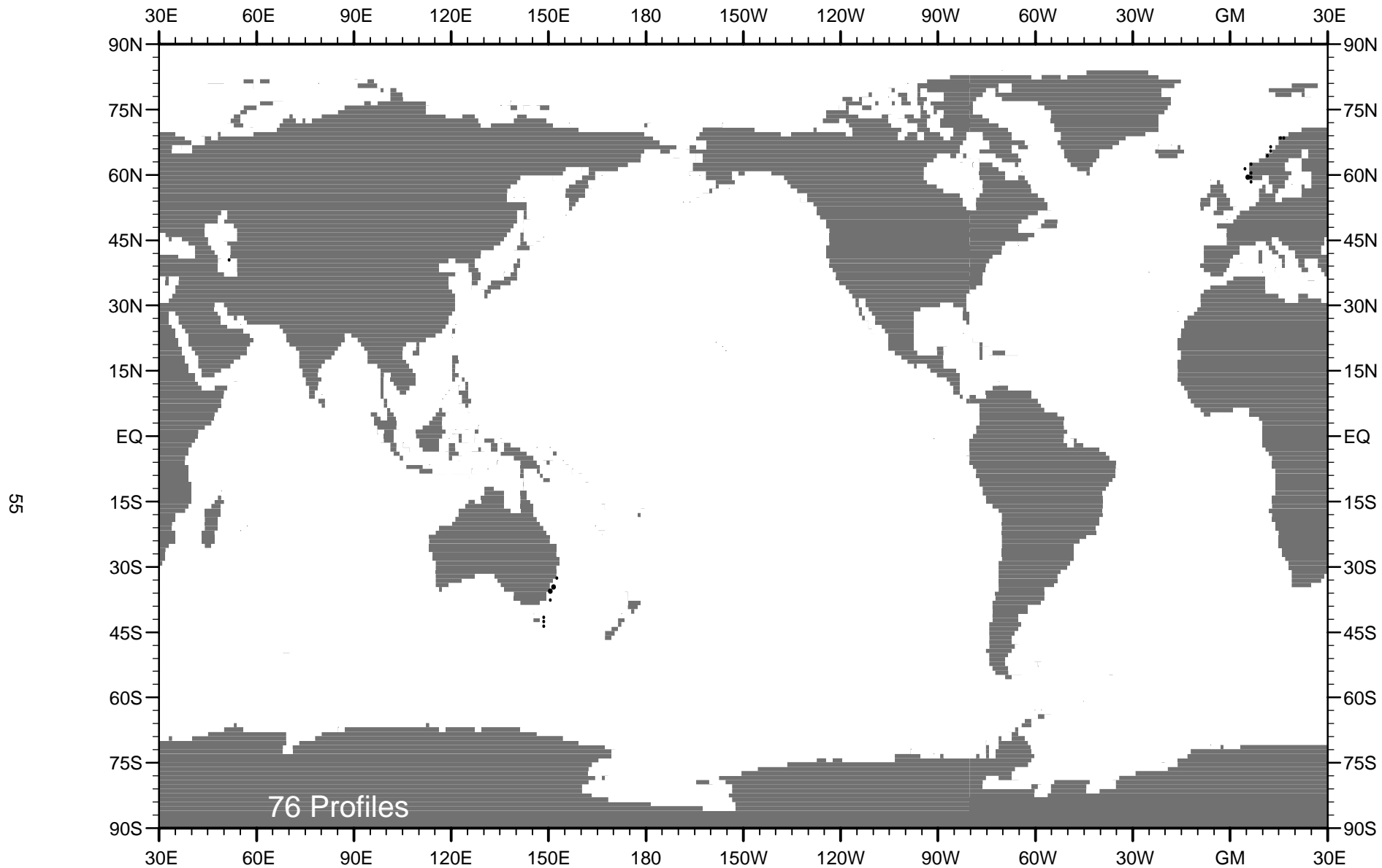


Fig. A24 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1945 .

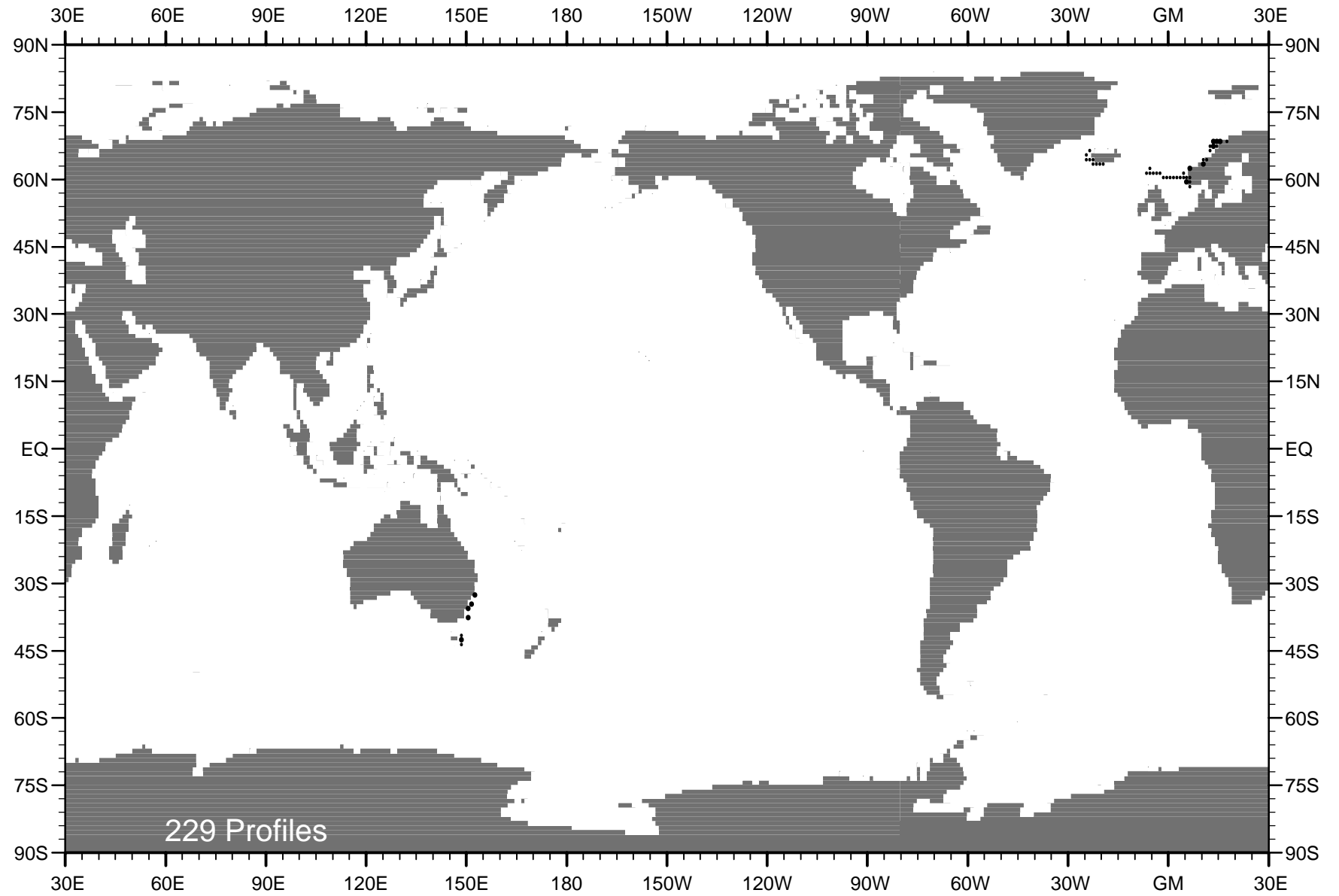


Fig. A25 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1946 .

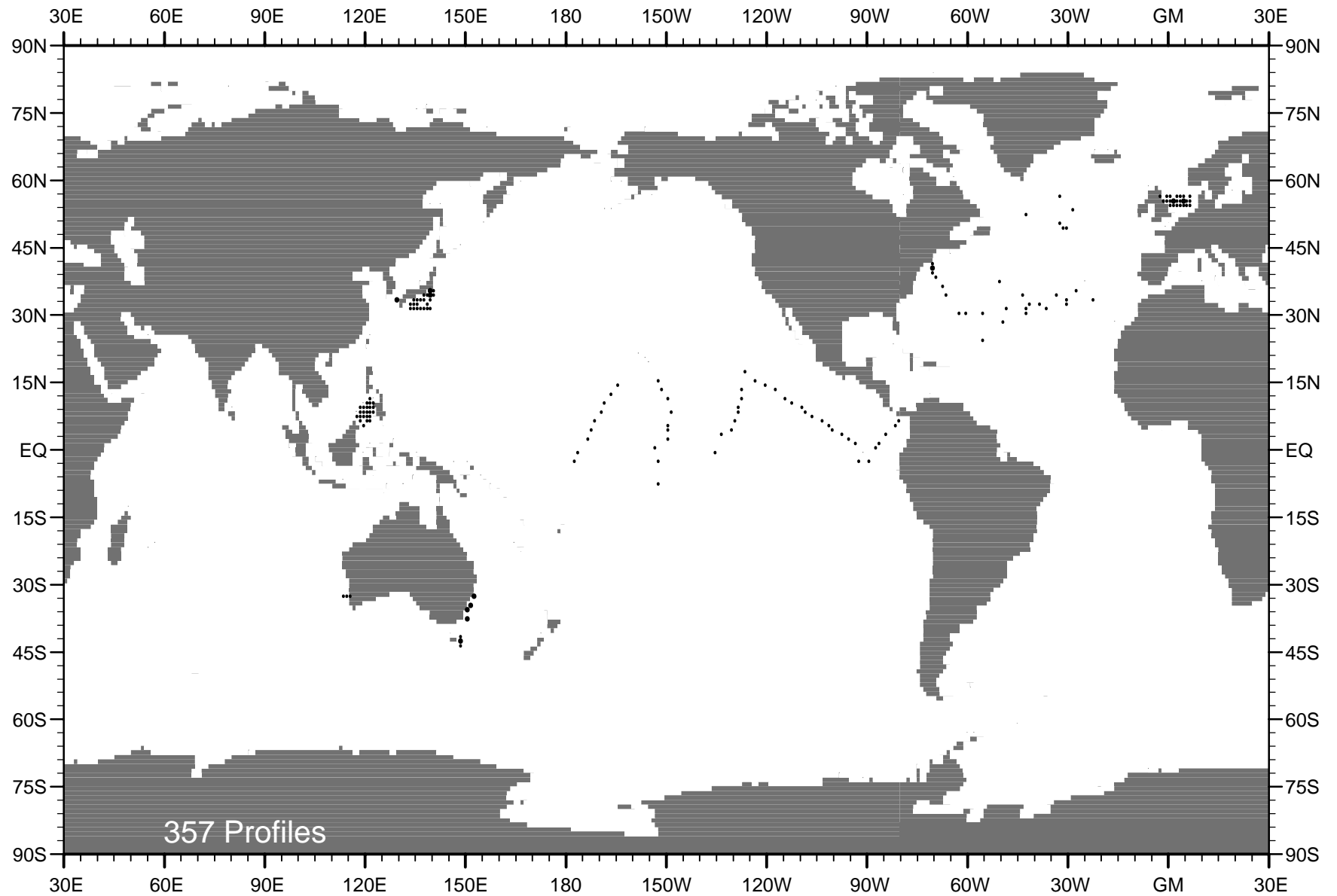


Fig. A26 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1947 .

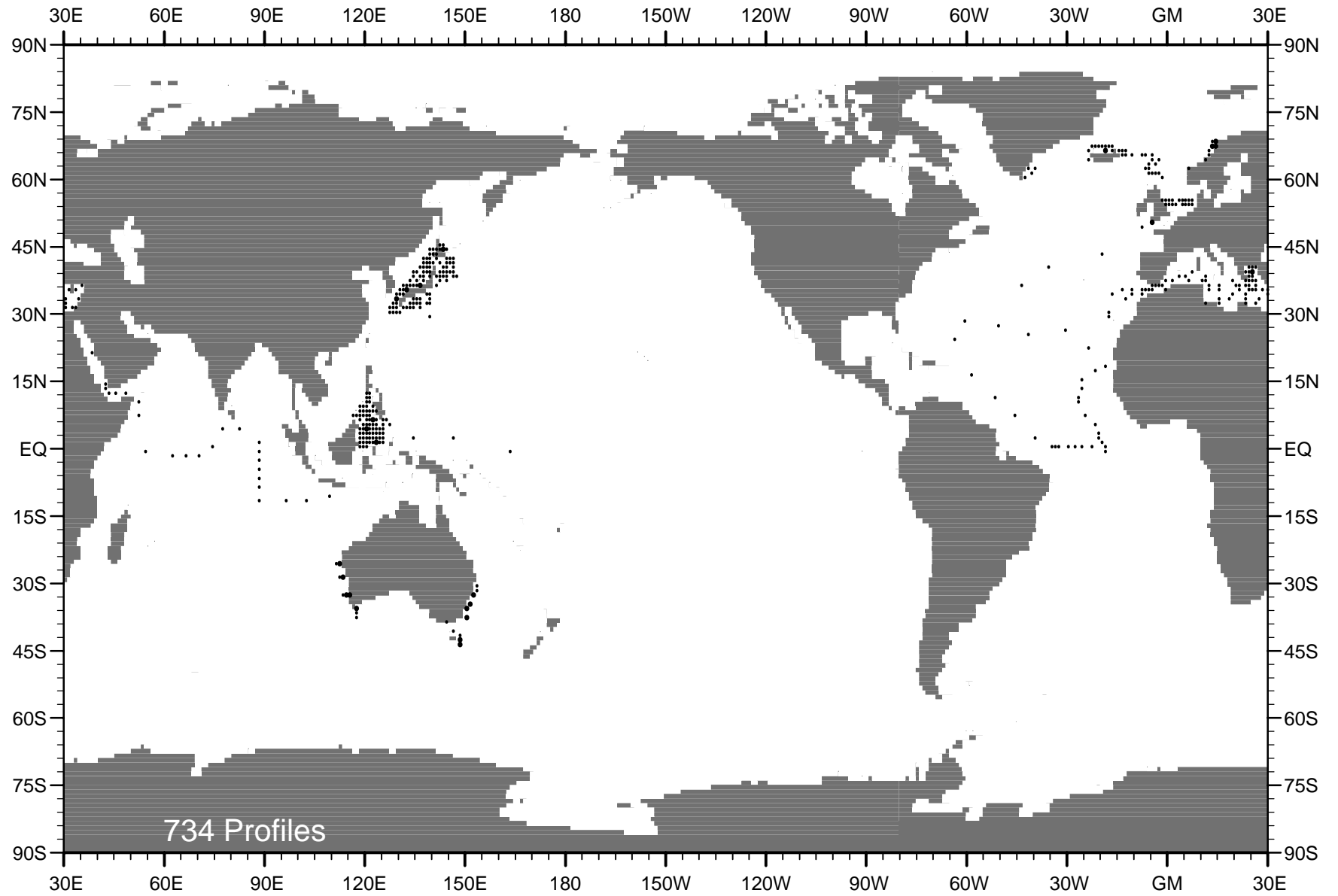


Fig. A27 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1948 .

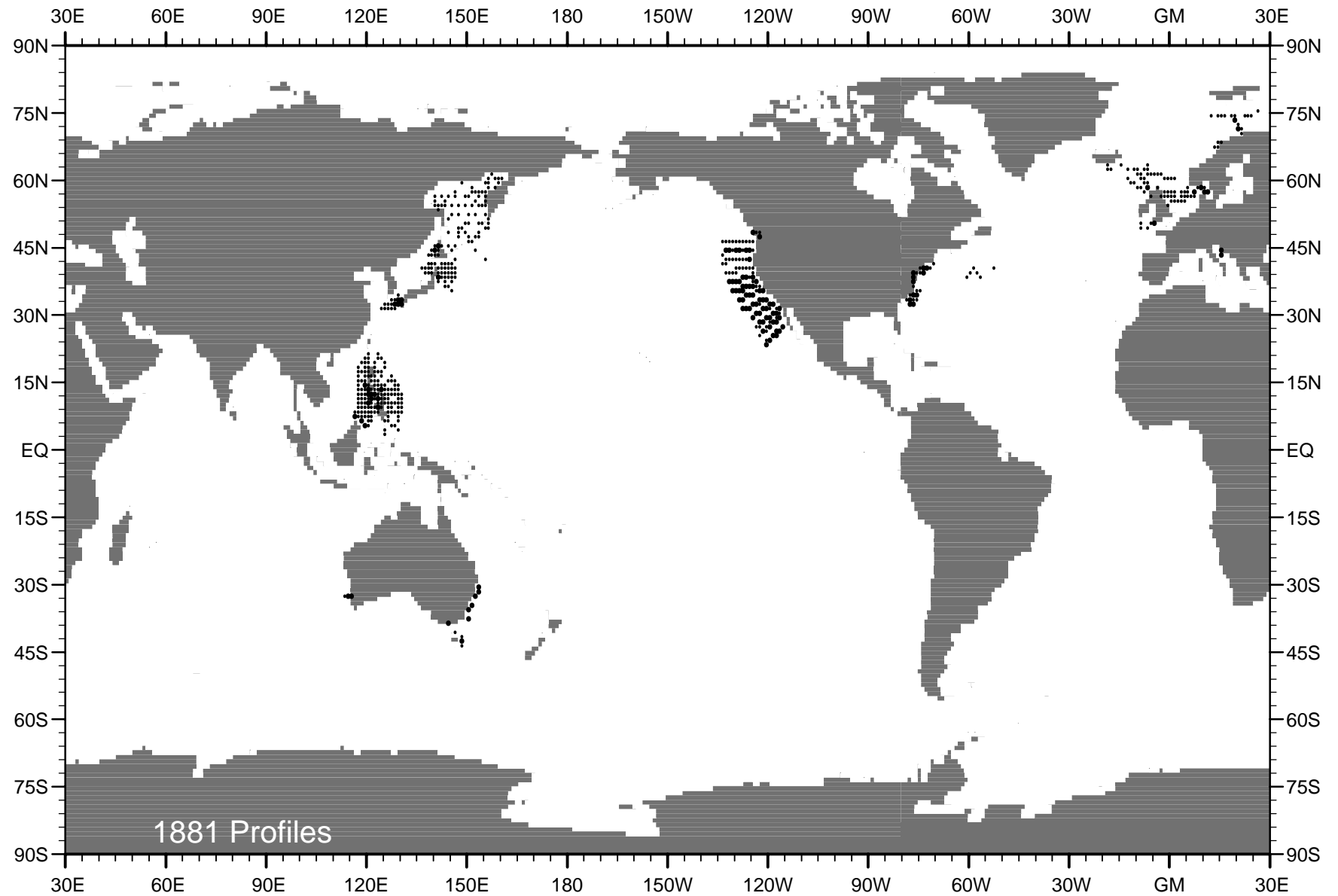


Fig. A28 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1949 .



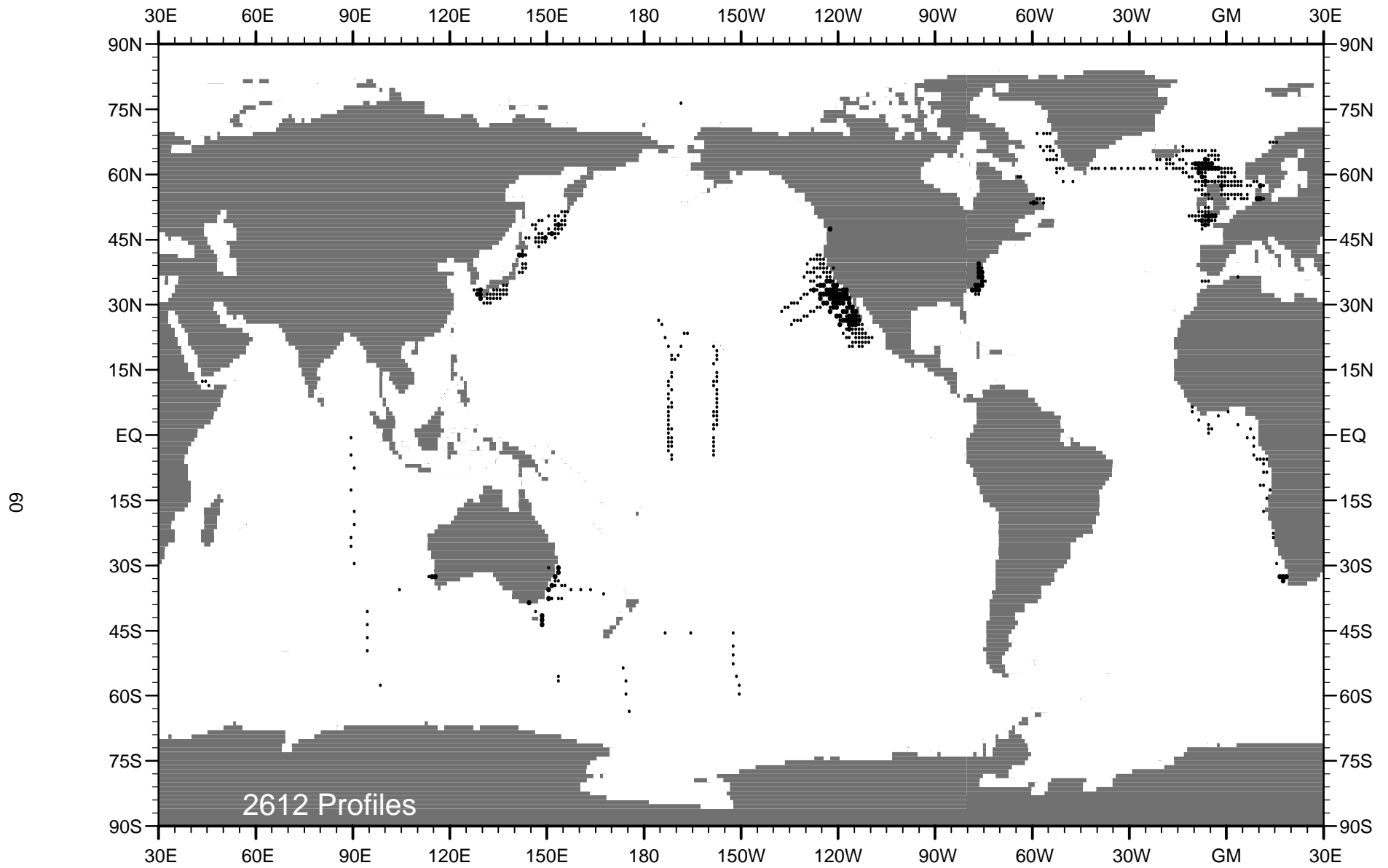


Fig. A29 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1950 .

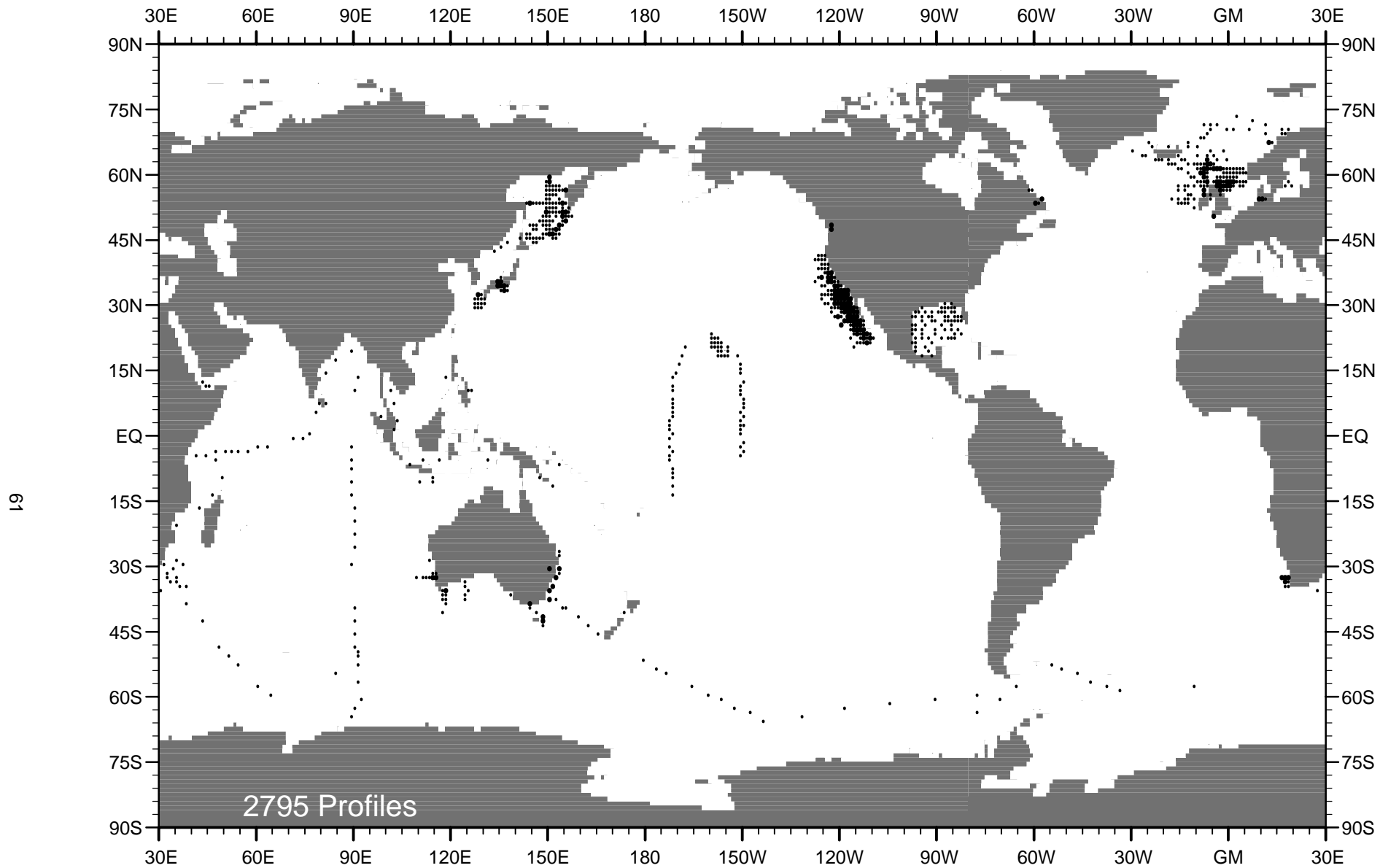


Fig. A30 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1951 .

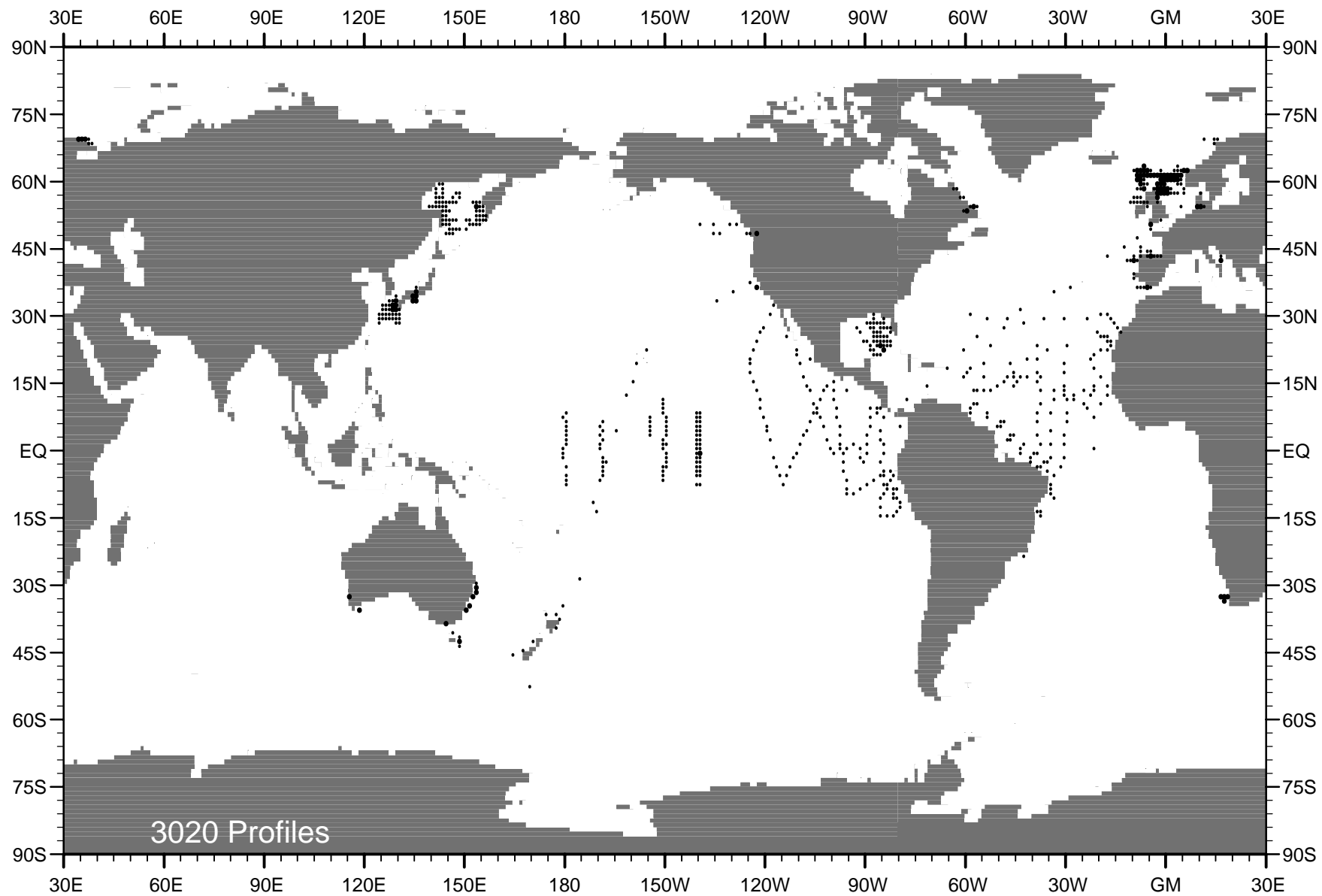


Fig. A31 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1952 .

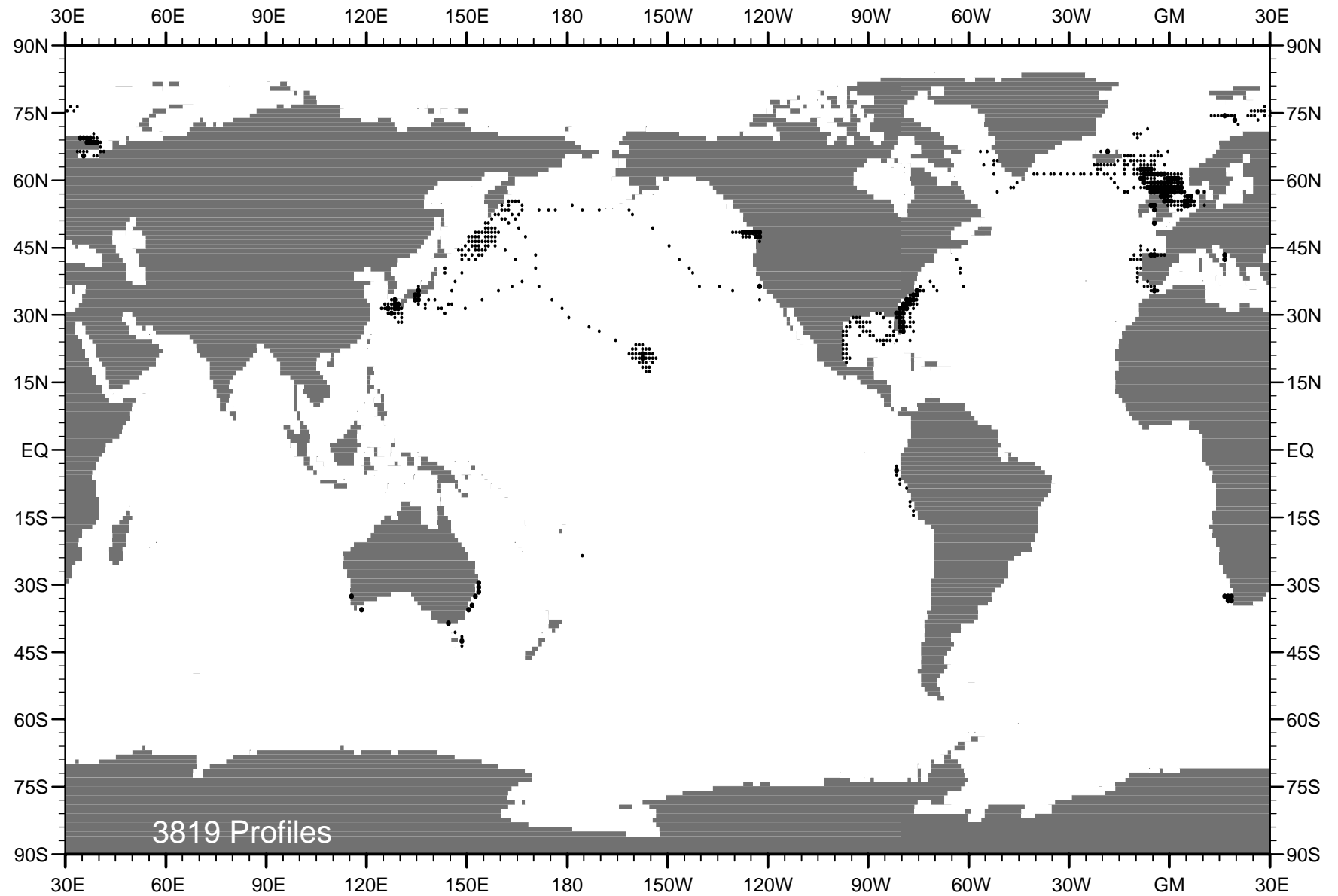


Fig. A32 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1953 .

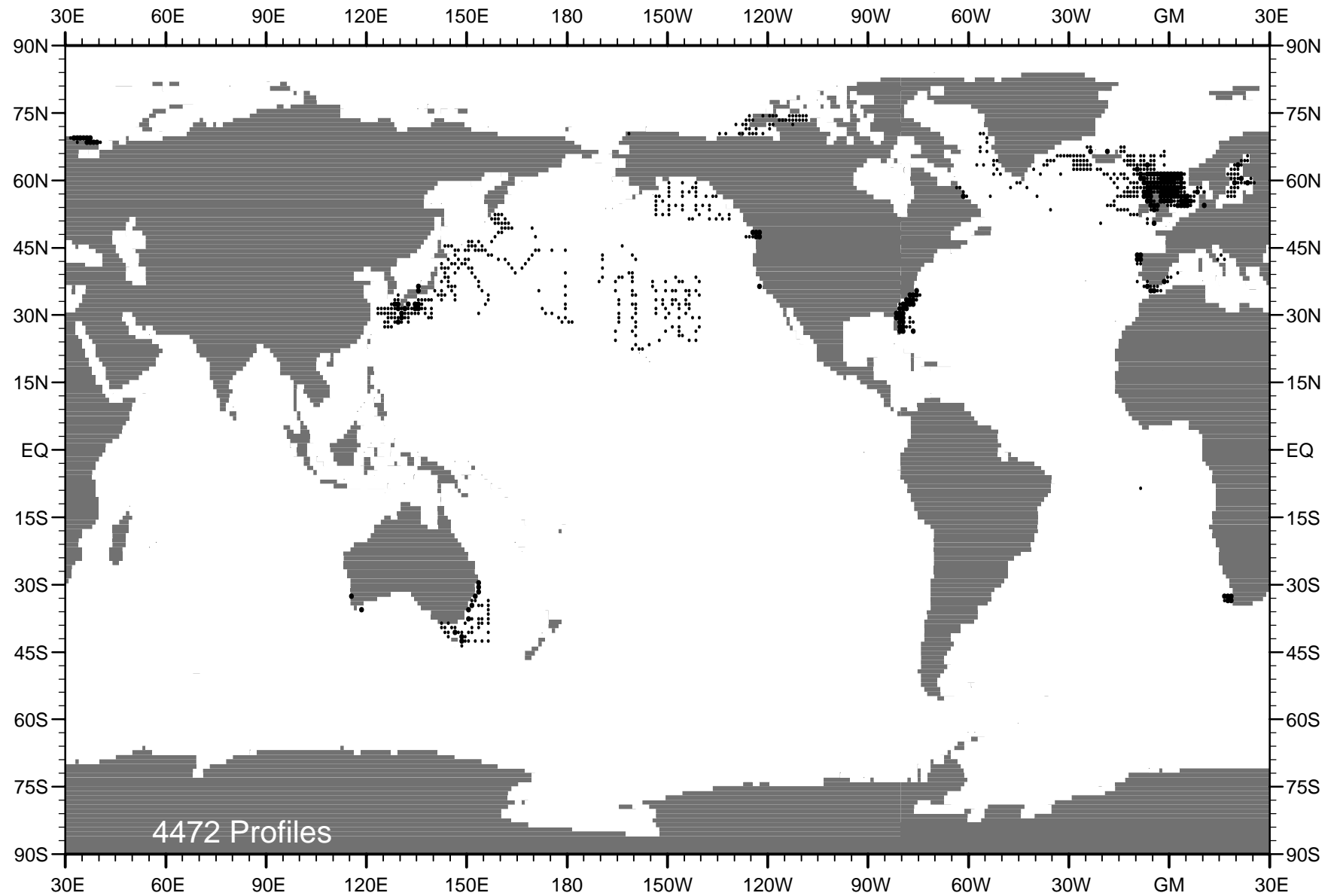


Fig. A33 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1954 .

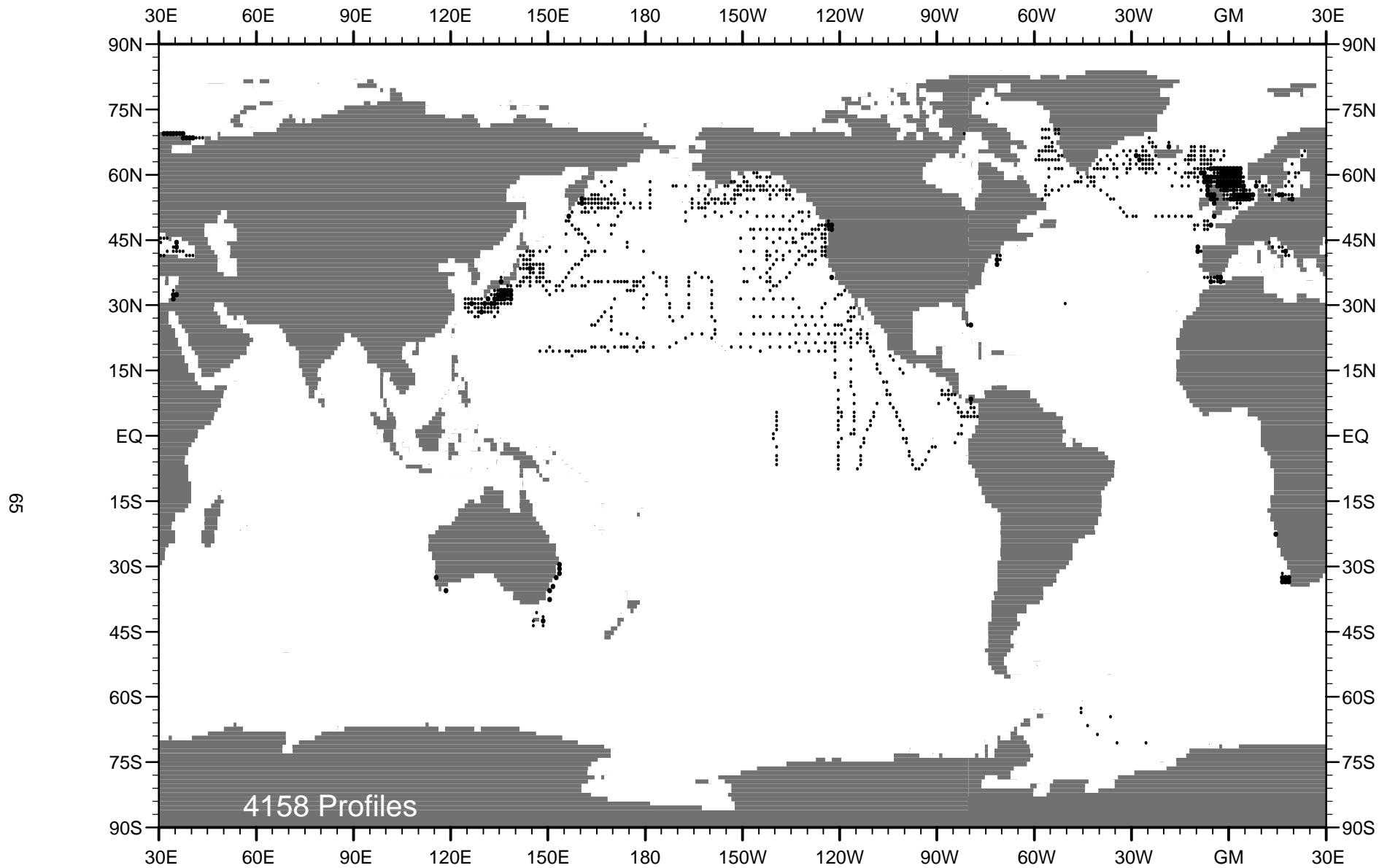


Fig. A34 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1955 .

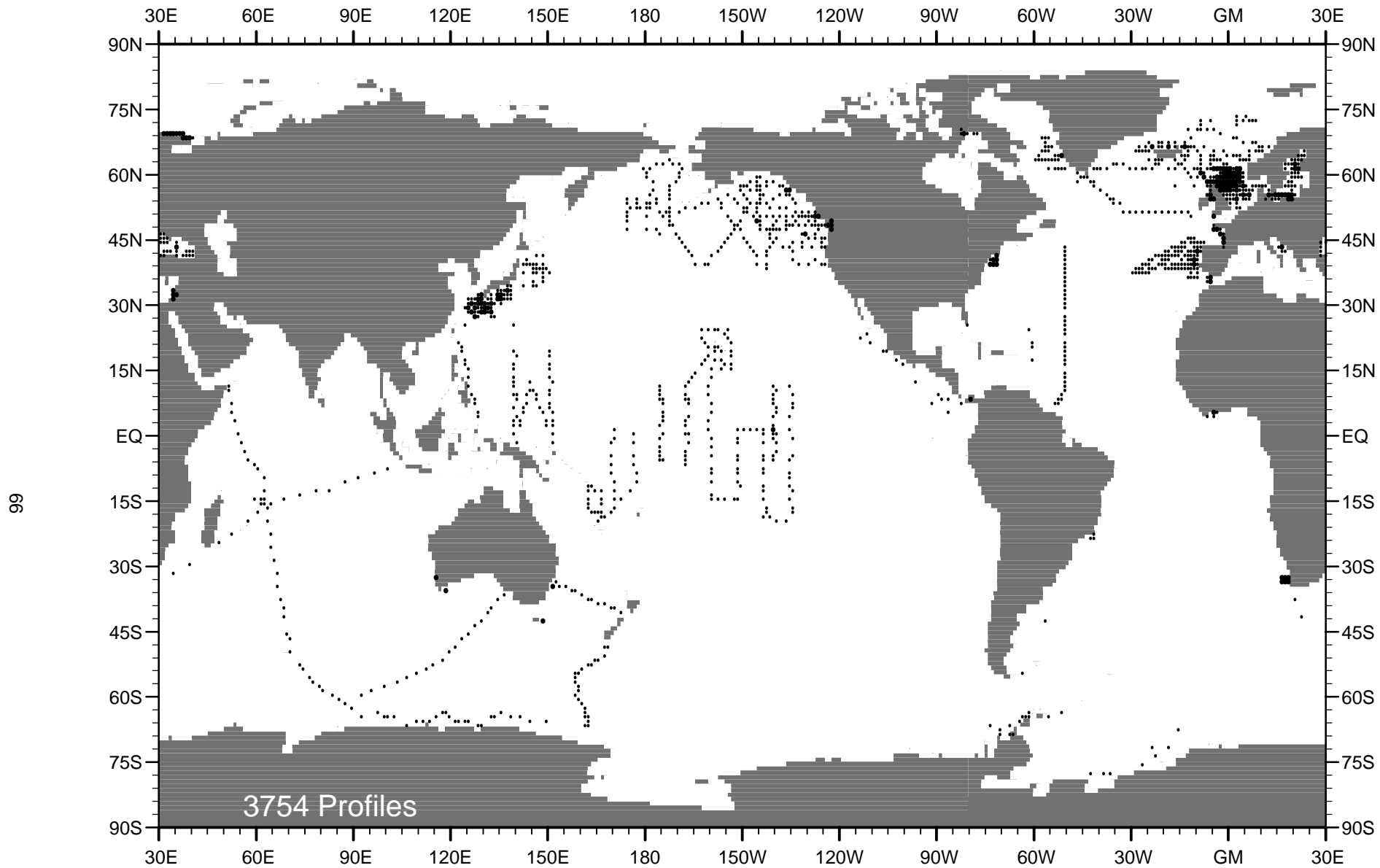


Fig. A35 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1956 .

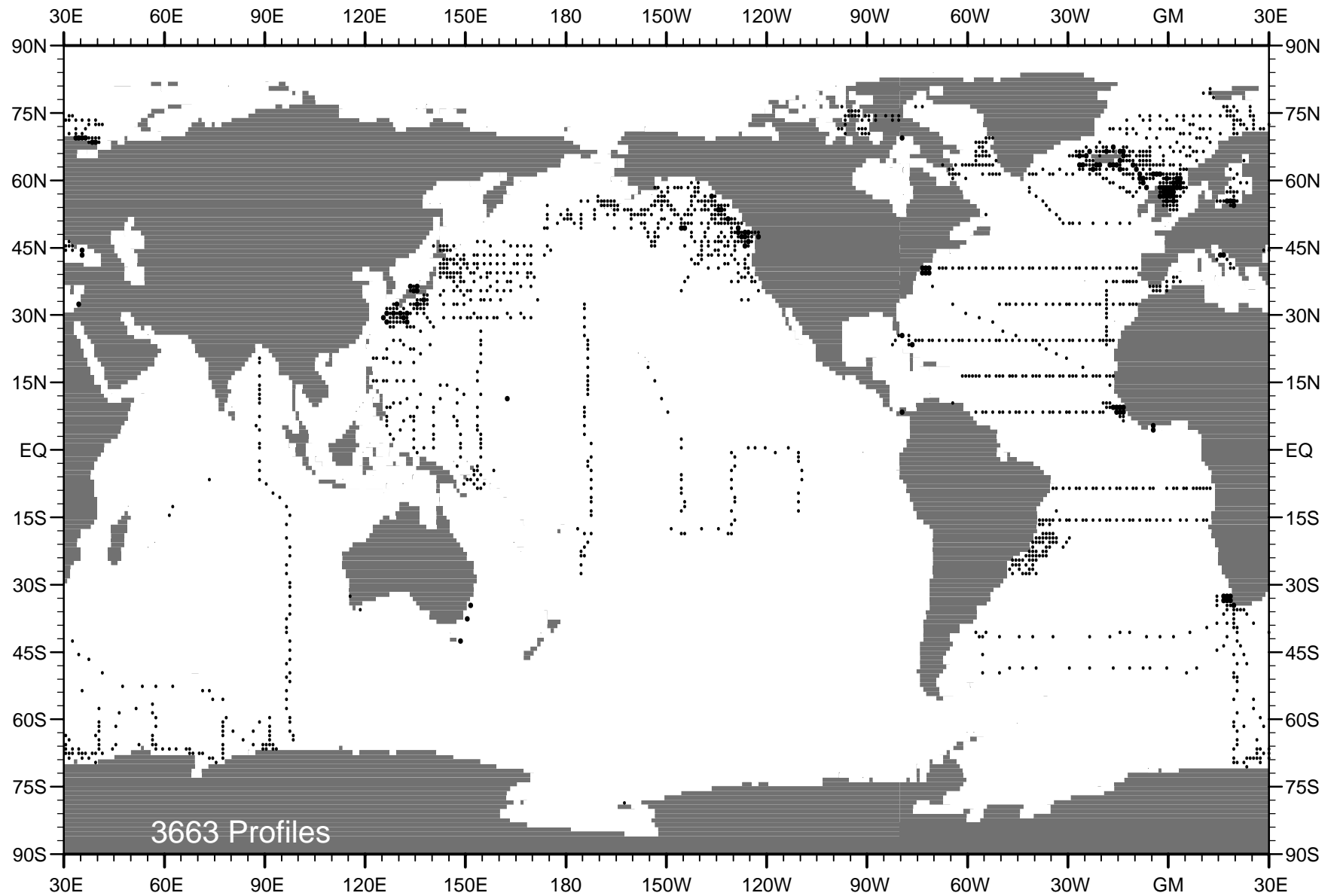


Fig. A36 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1957 .



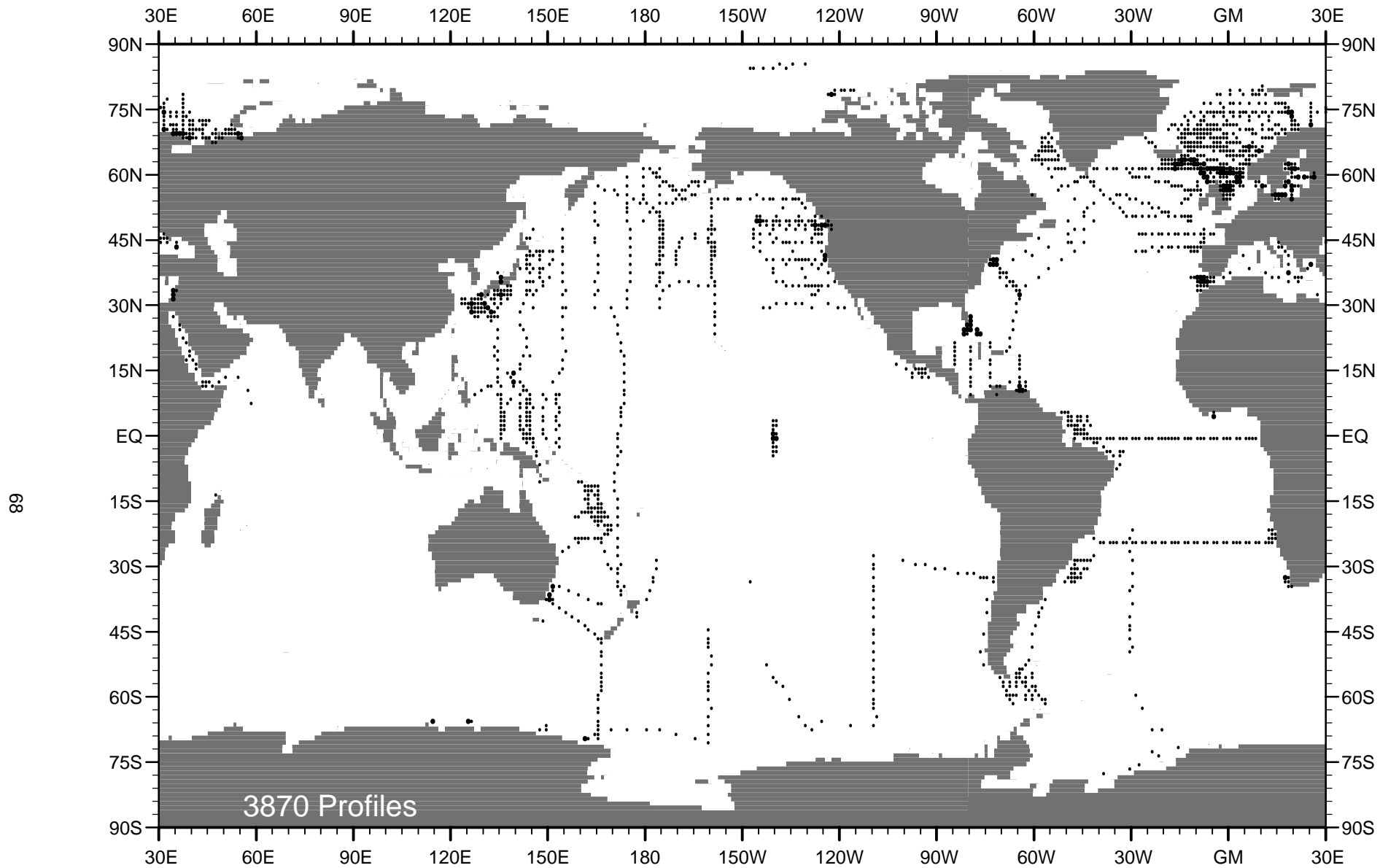


Fig. A37 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1958 .

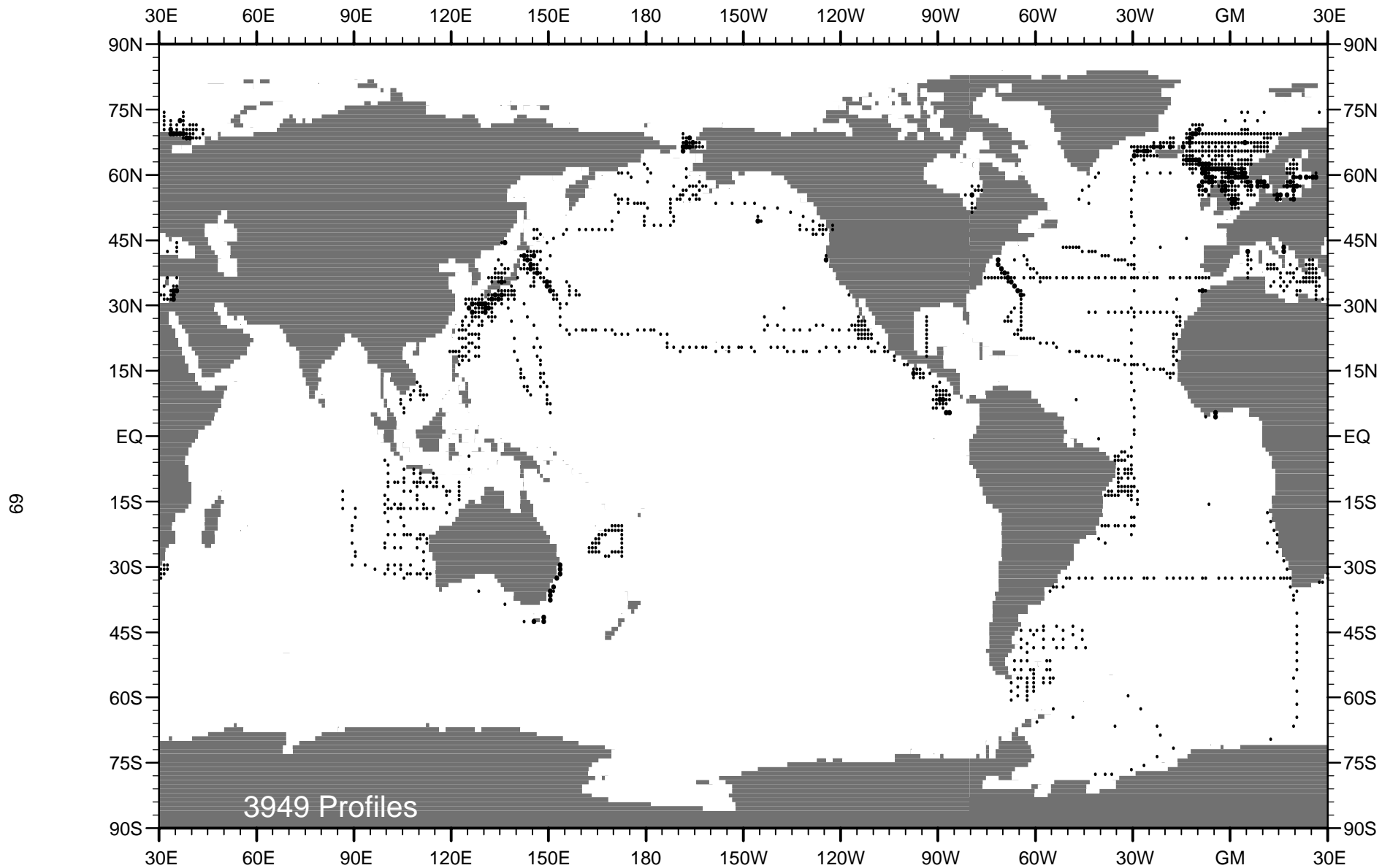


Fig. A38 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1959 .

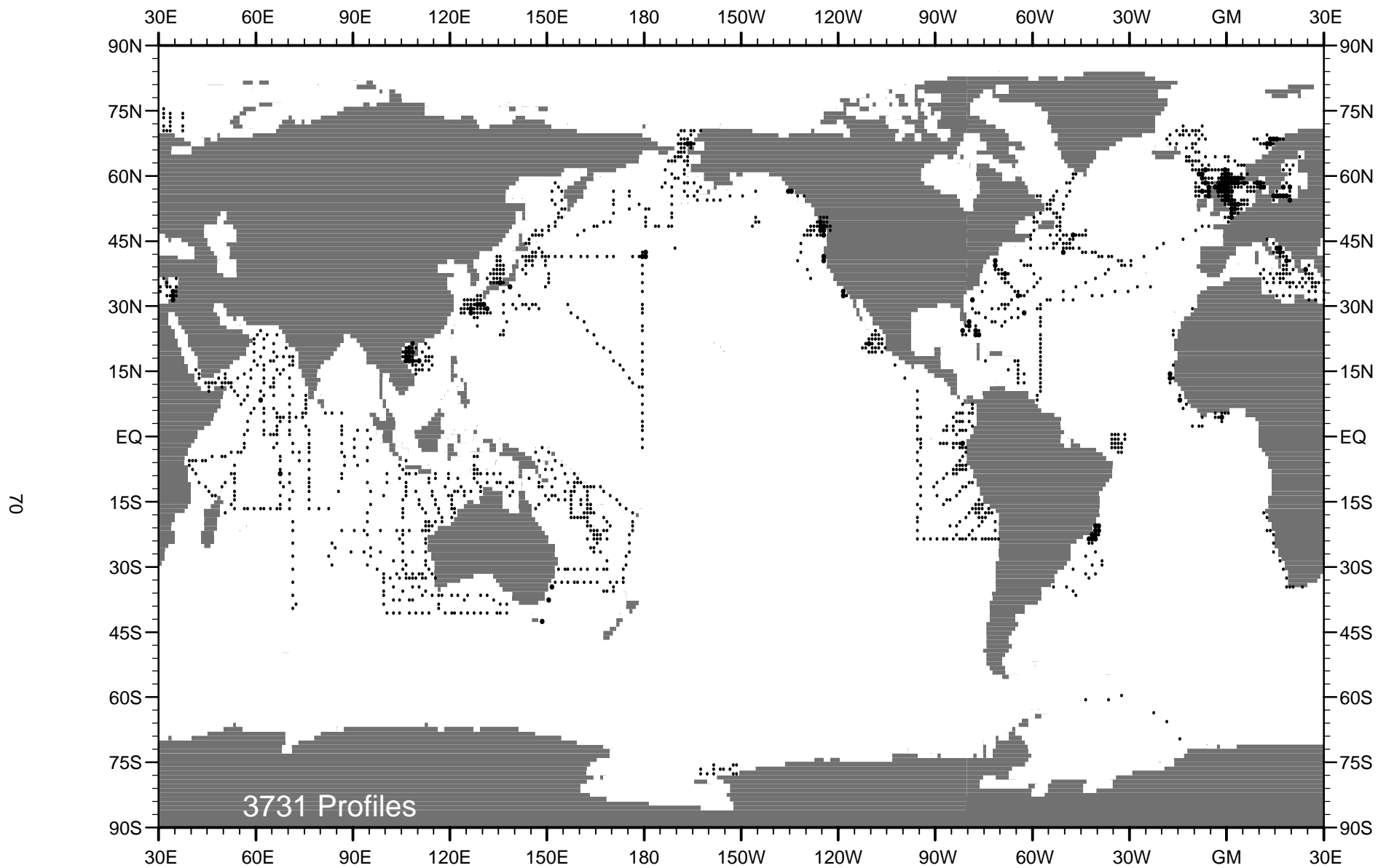


Fig. A39 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1960 .

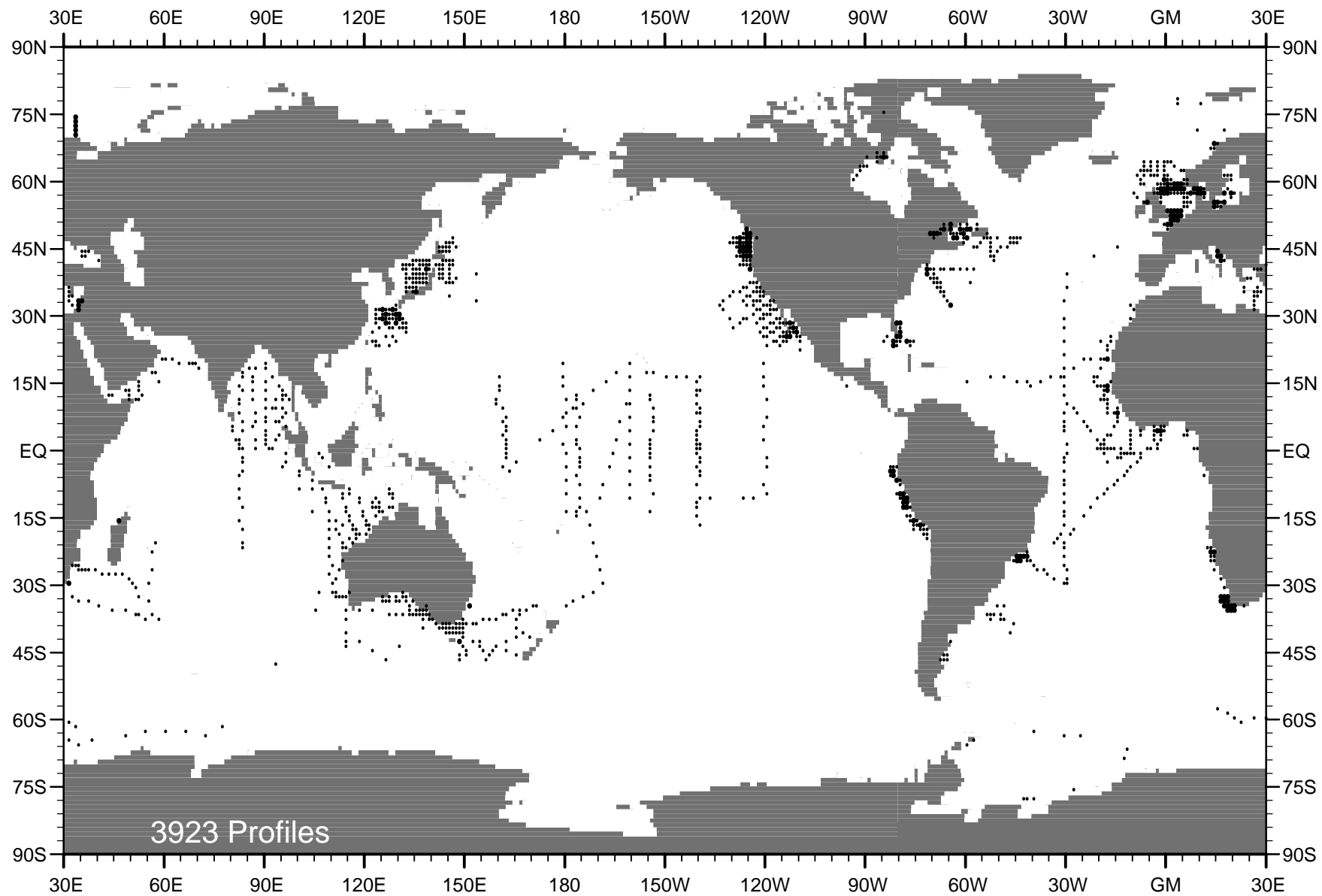


Fig. A40 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1961 .

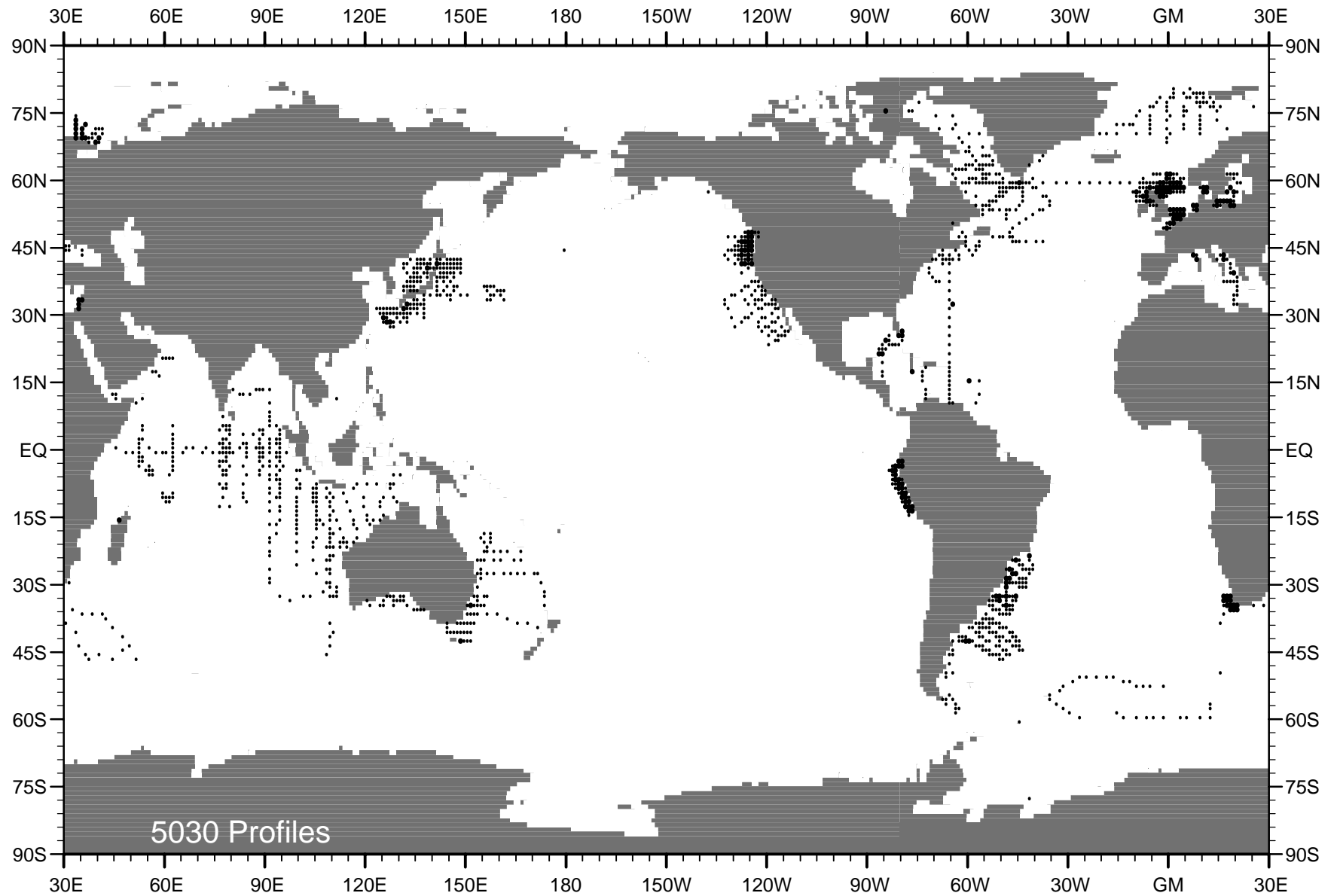


Fig. A41 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1962 .

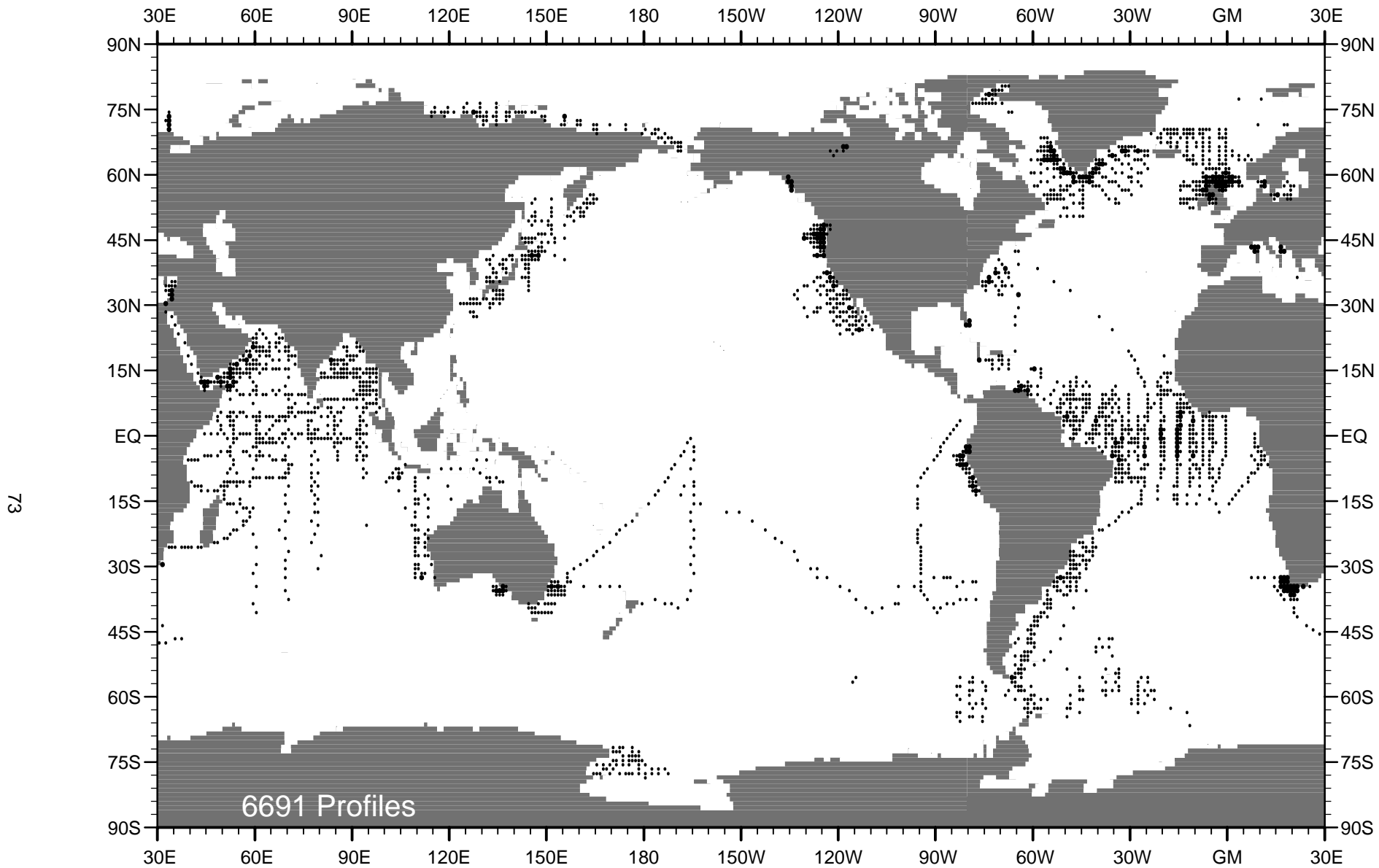


Fig. A42 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1963 .

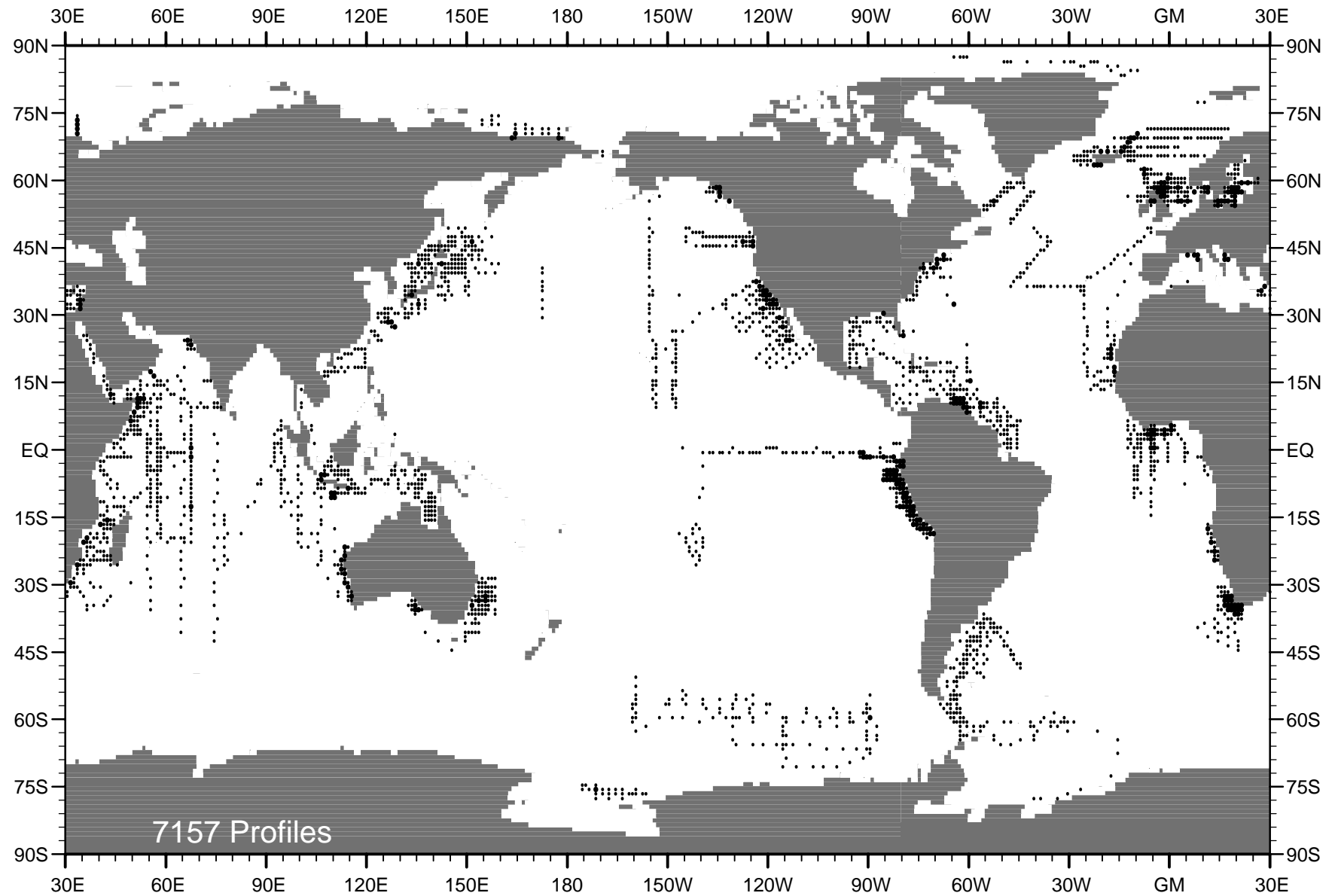


Fig. A43 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1964 .

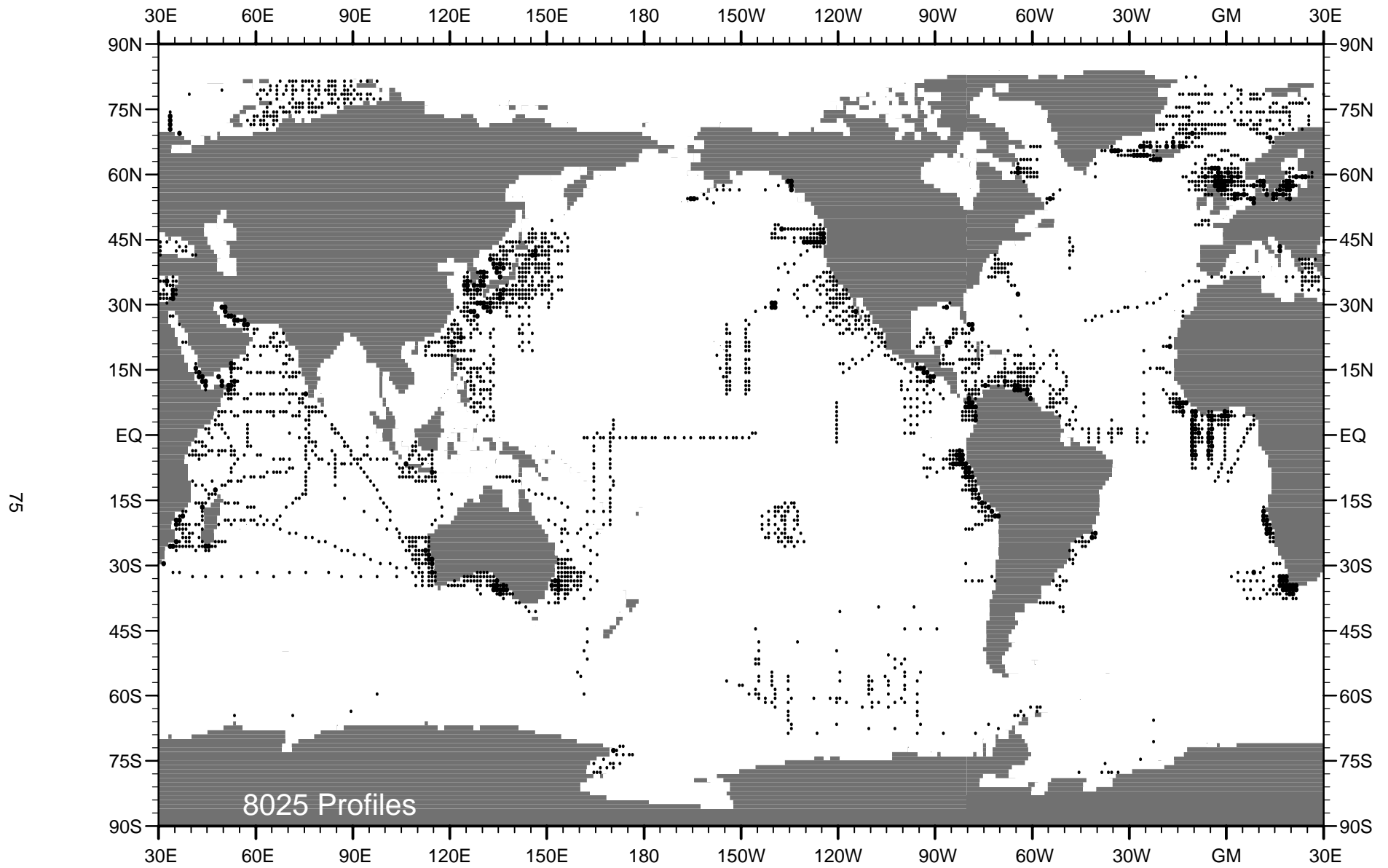


Fig. A44 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1965 .



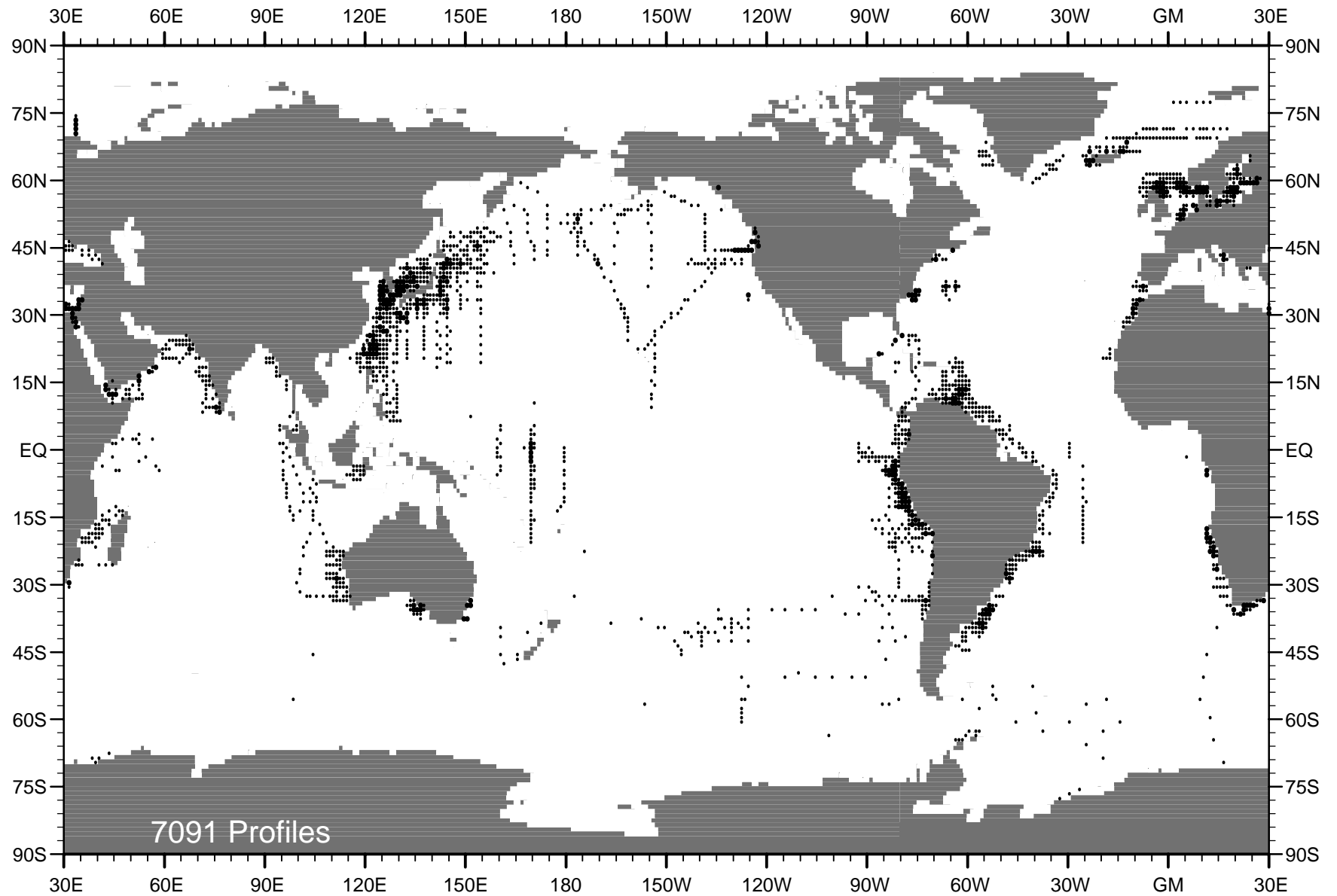


Fig. A45 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1966 .

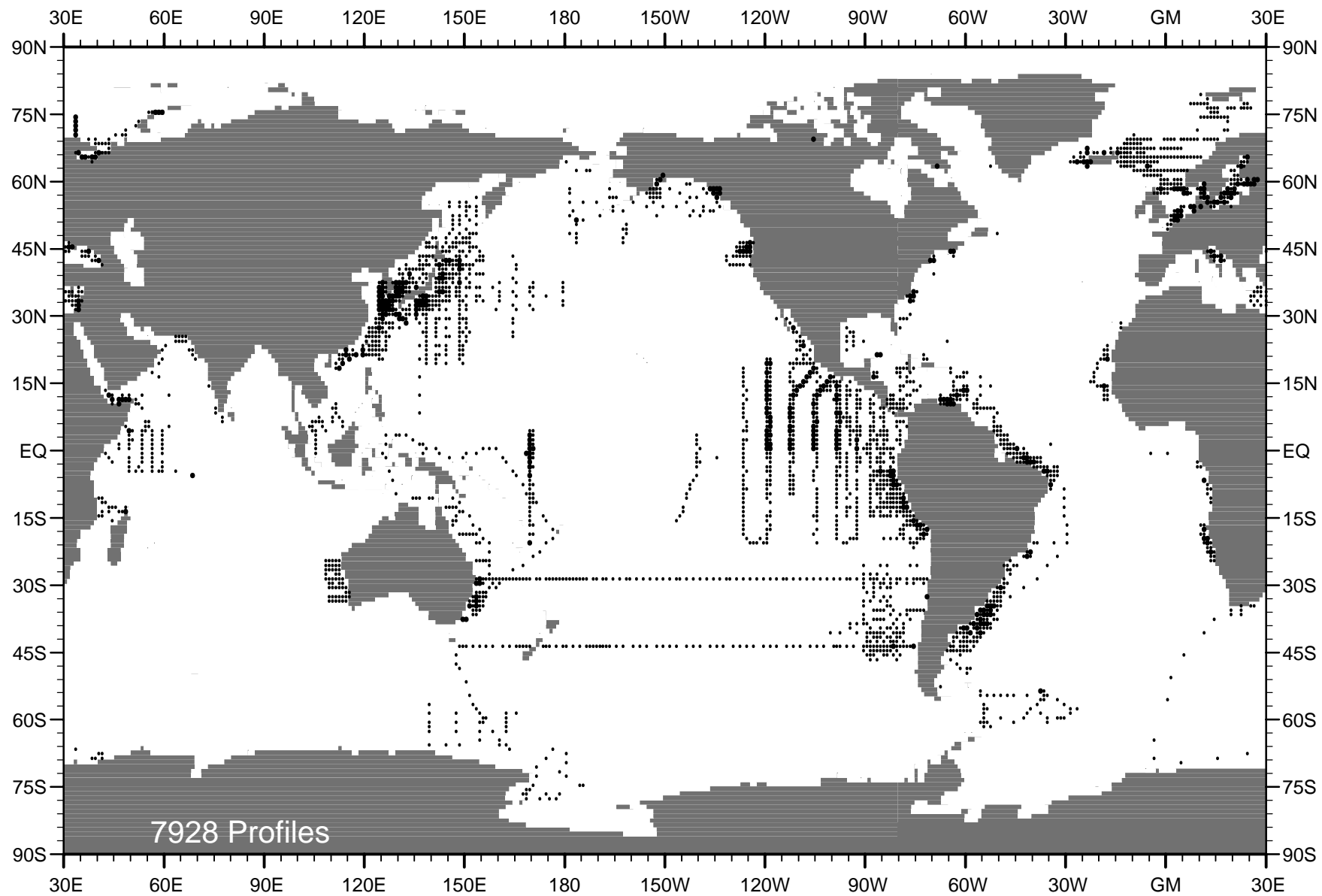


Fig. A46 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1967 .

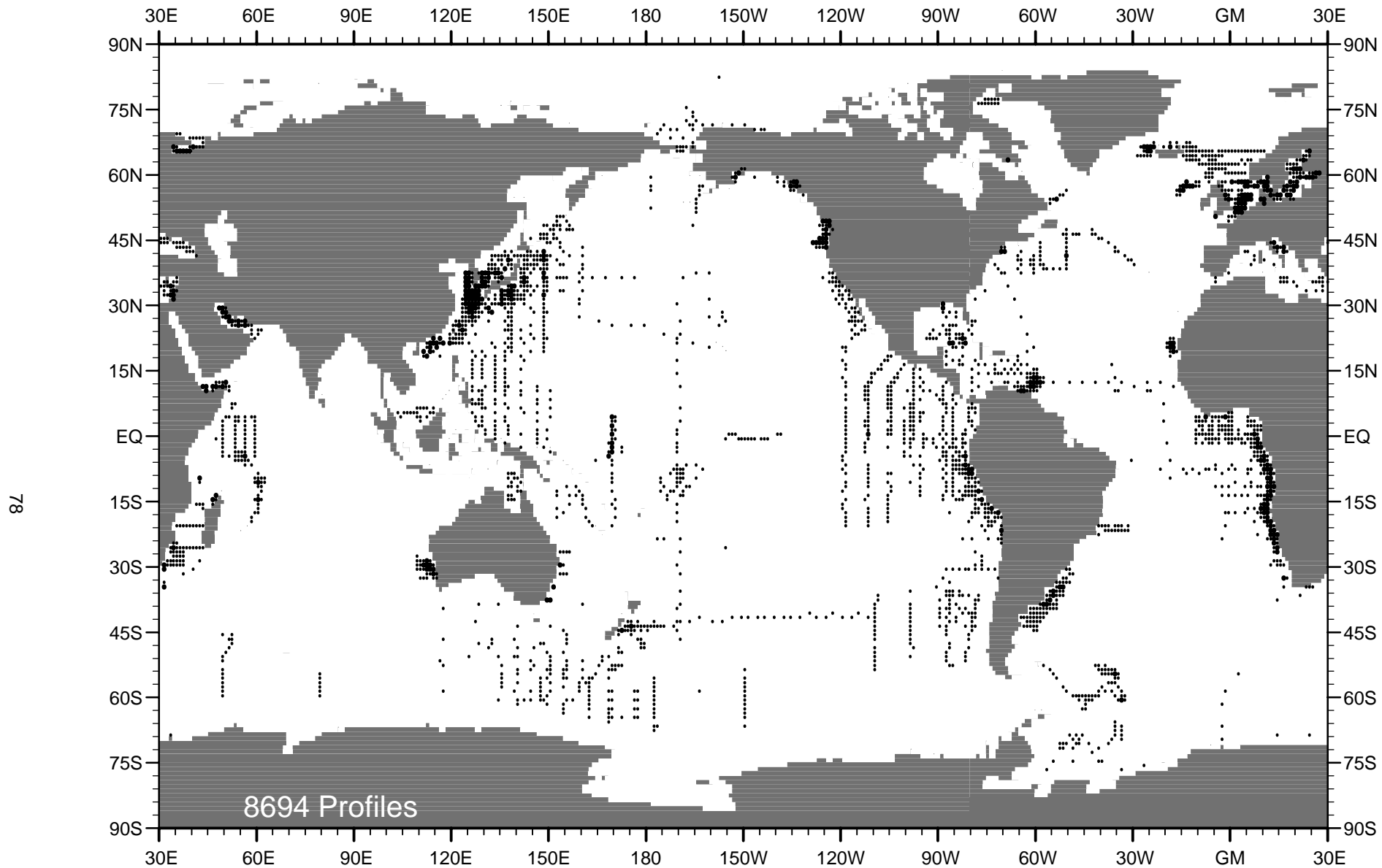


Fig. A47 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1968 .

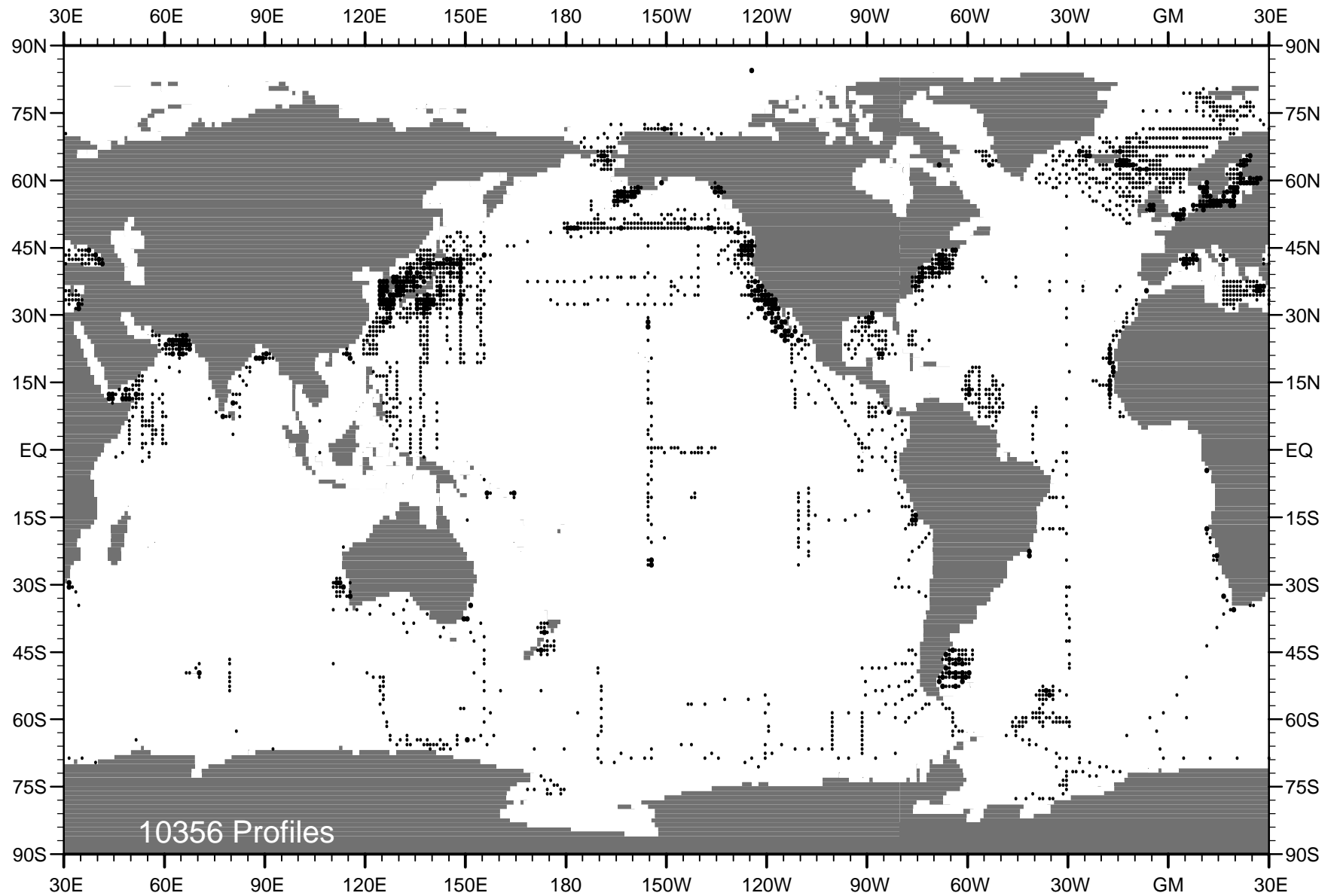


Fig. A48 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1969 .

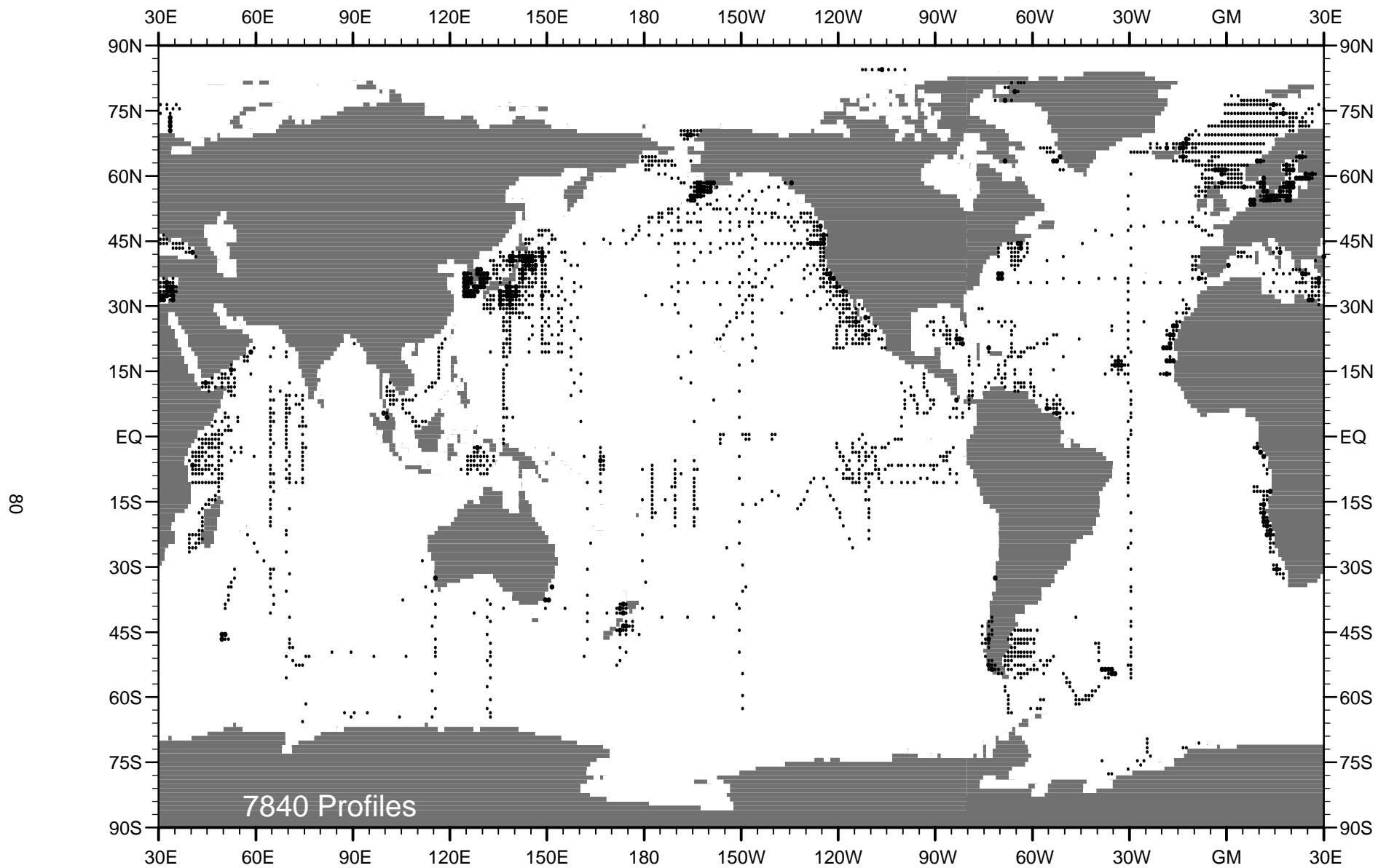


Fig. A49 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1970 .

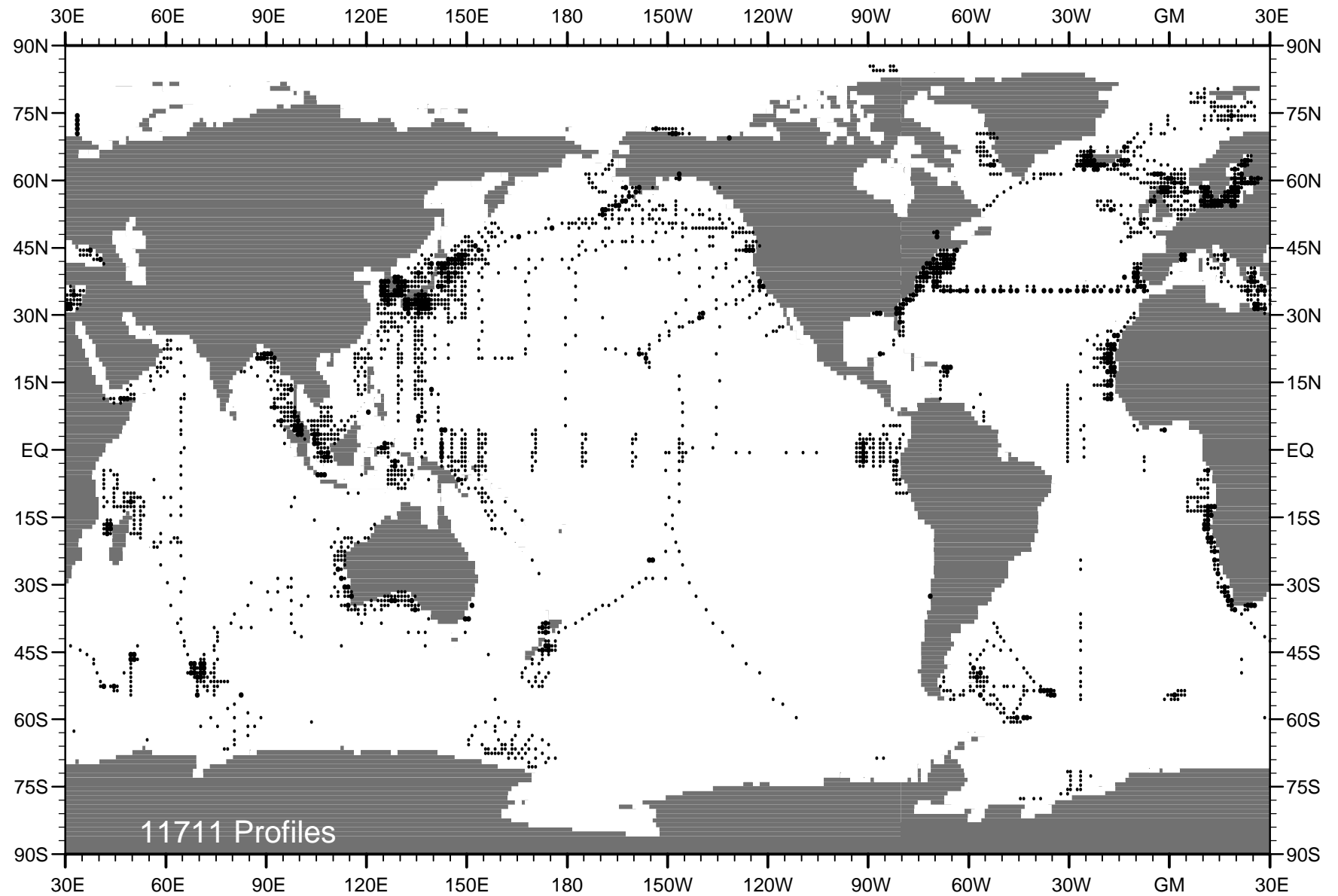


Fig. A50 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1971 .

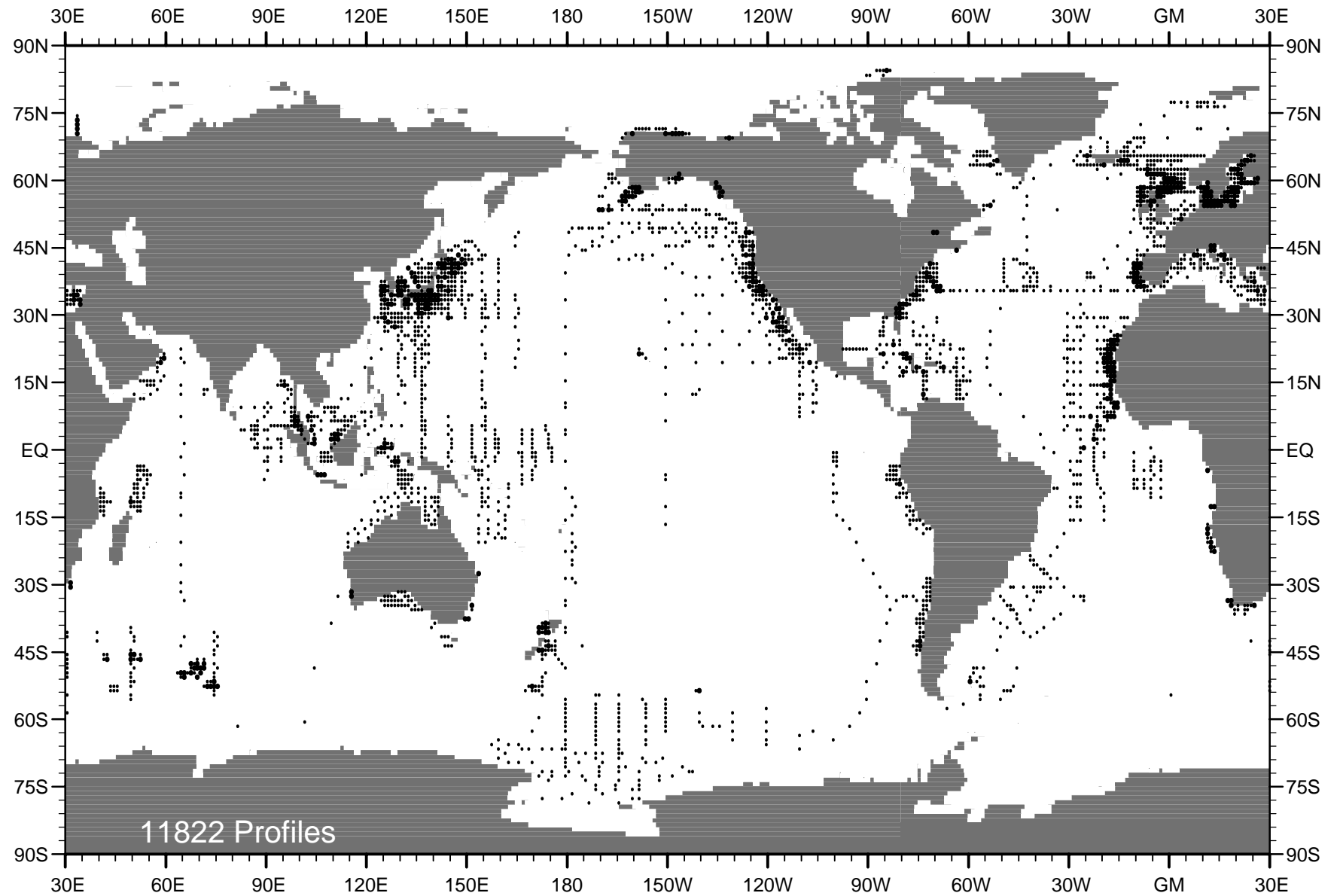


Fig. A51 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1972 .

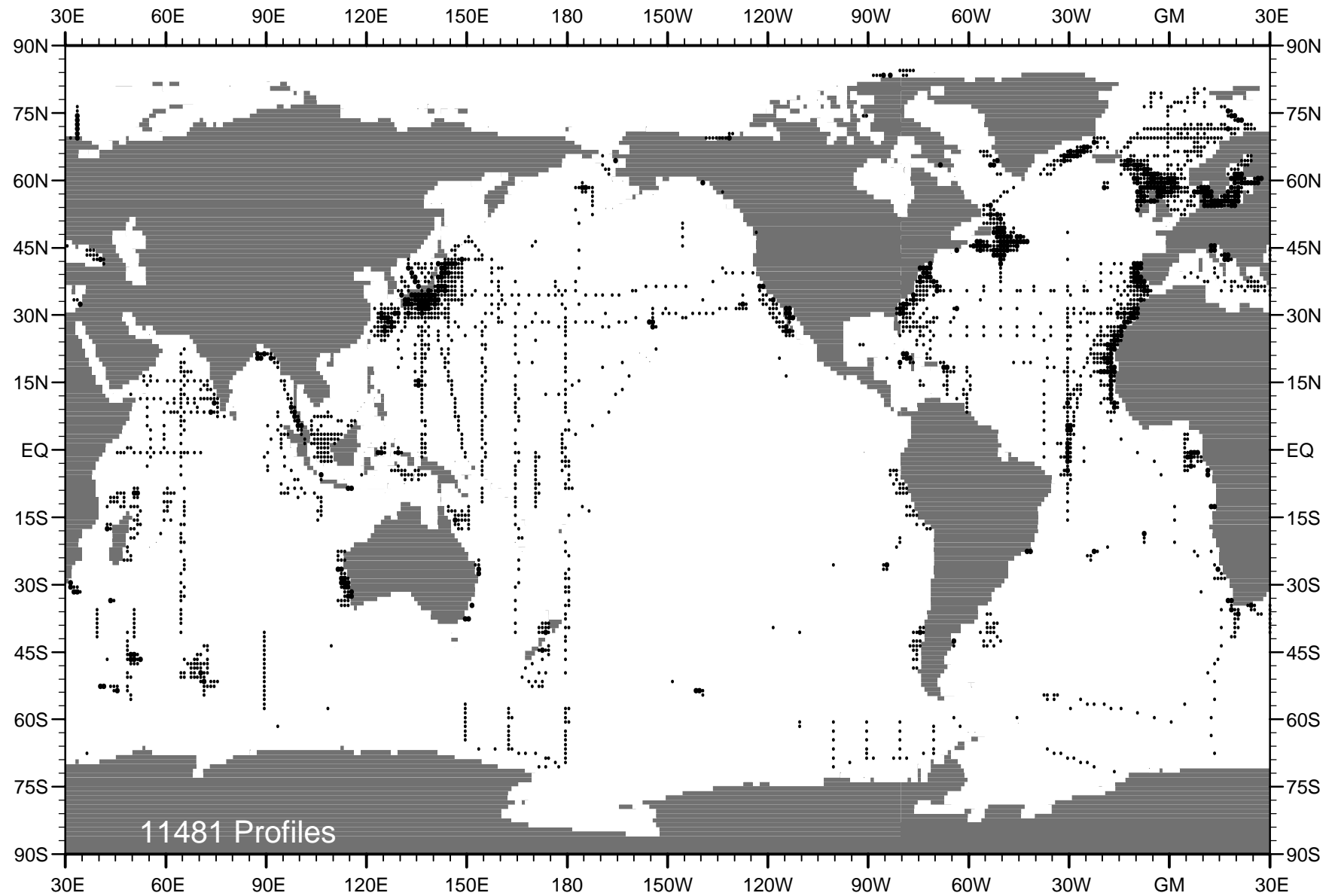


Fig. A52 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1973 .



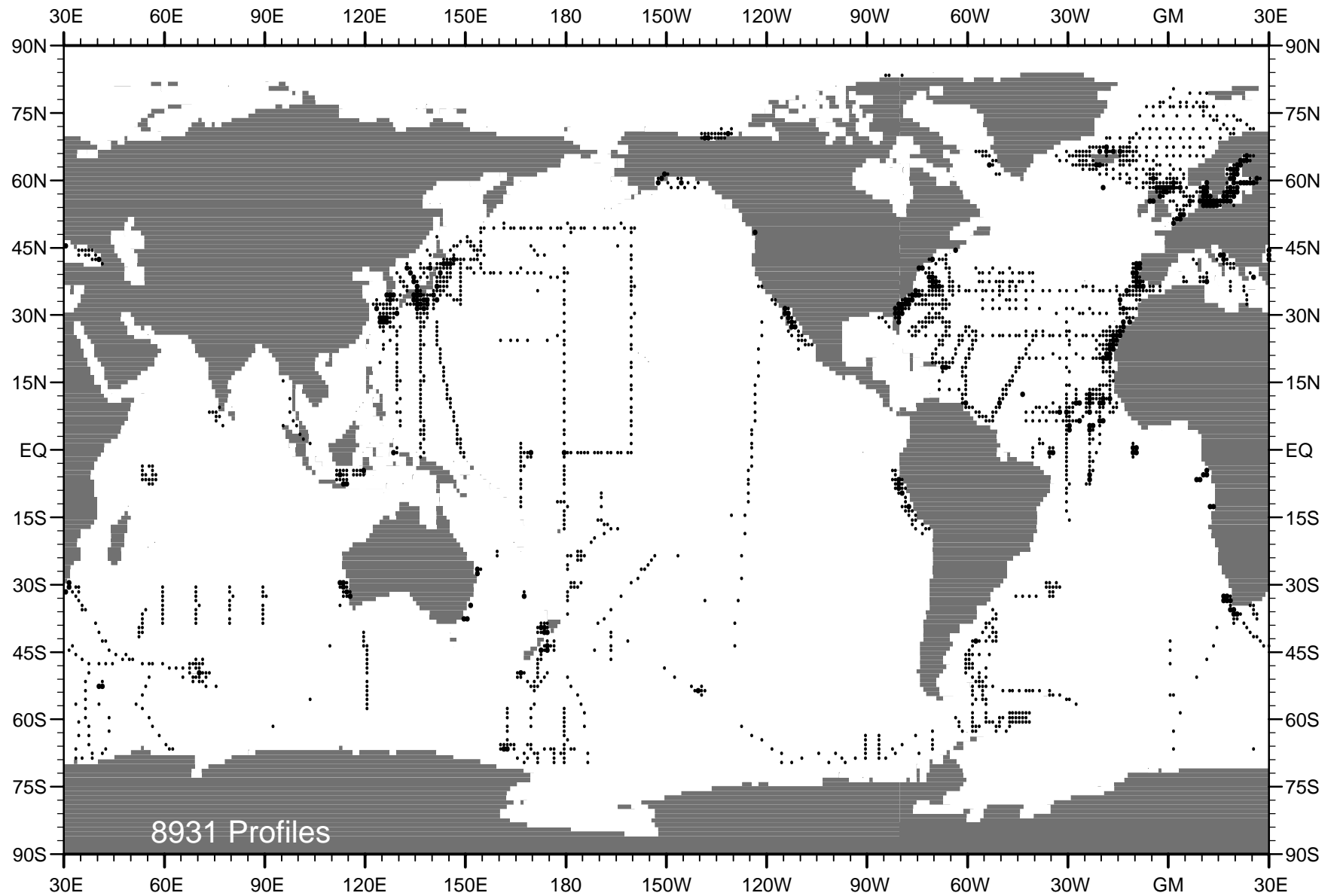


Fig. A53 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1974 .

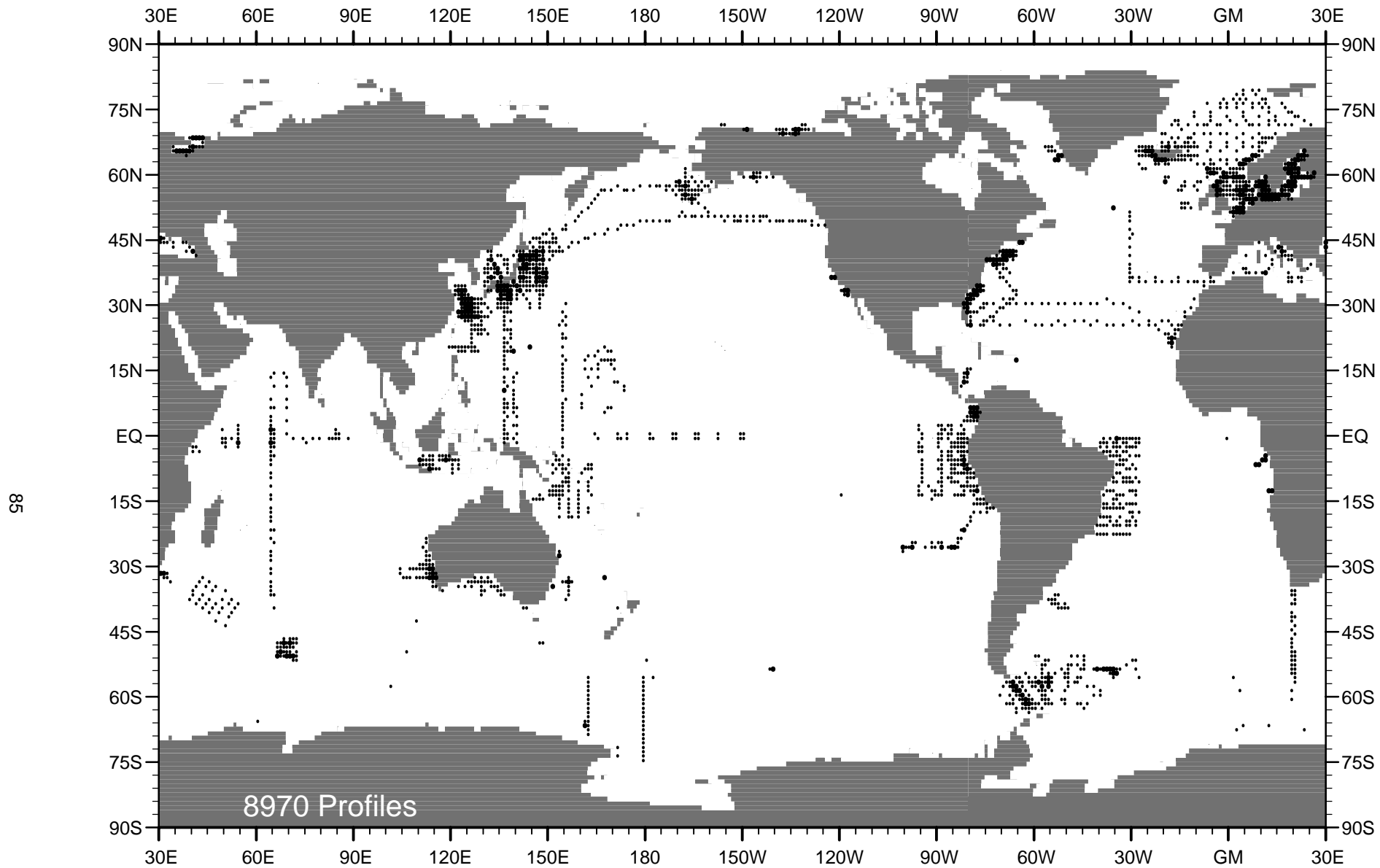


Fig. A54 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1975 .

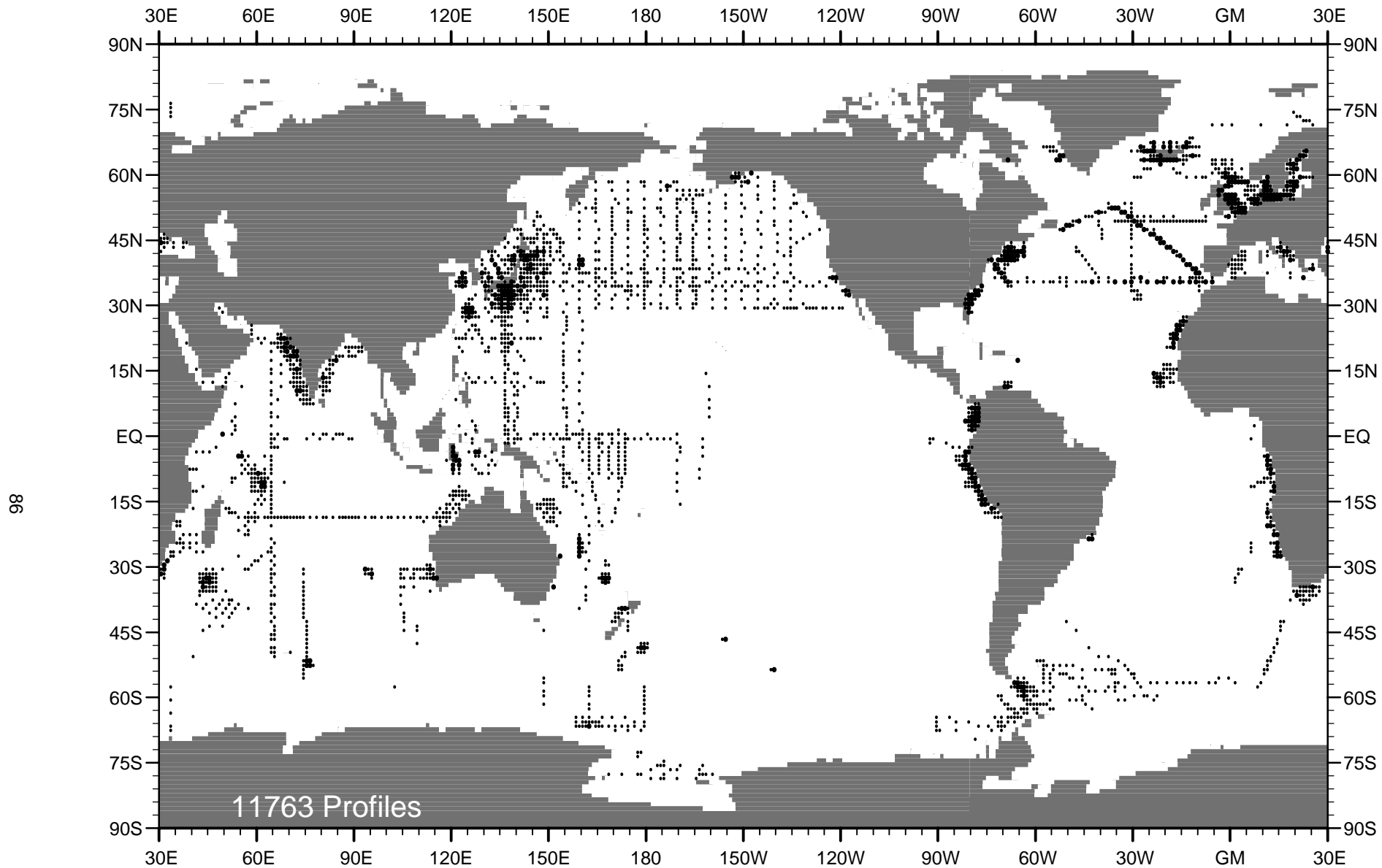


Fig. A55 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1976 .

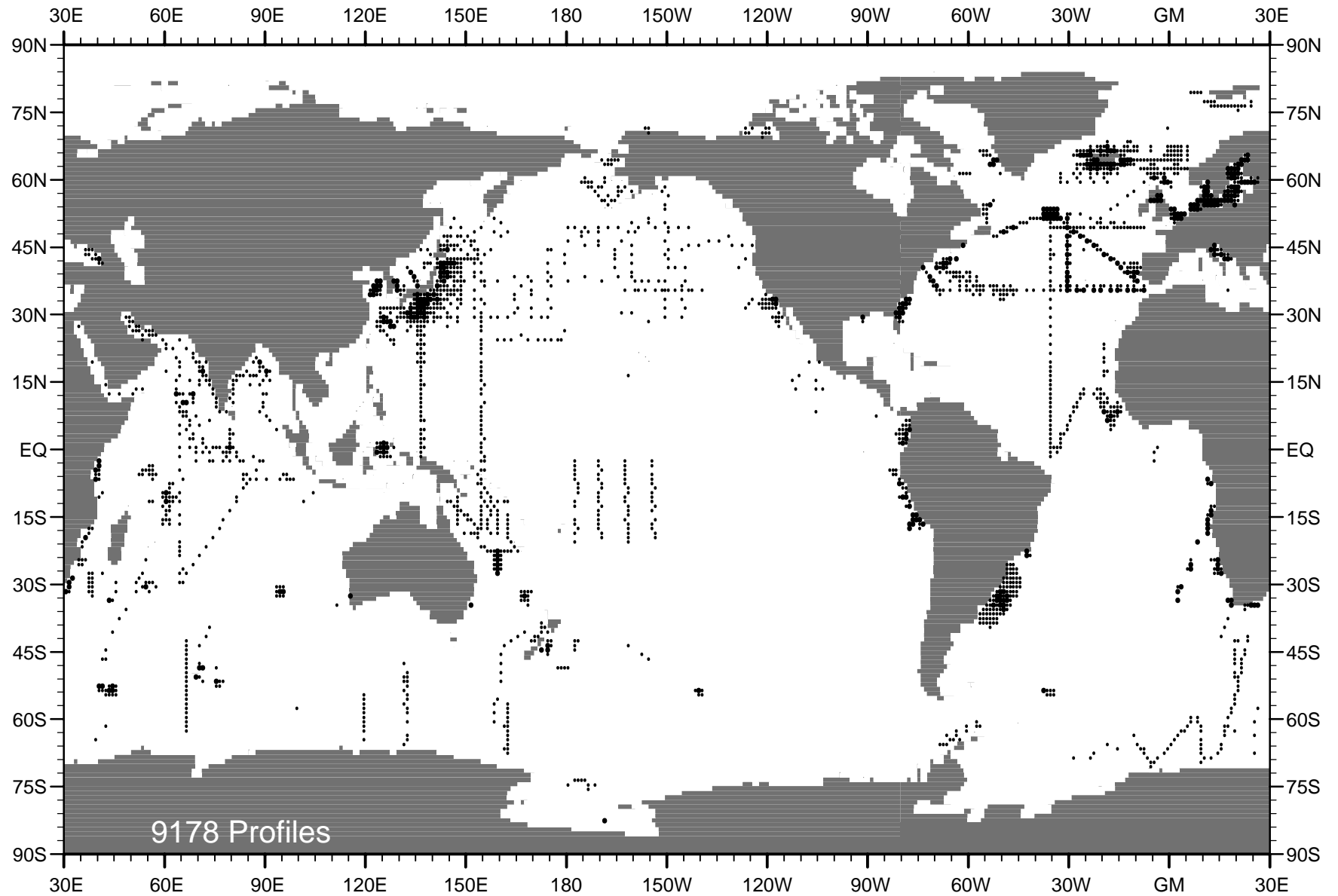


Fig. A56 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1977 .

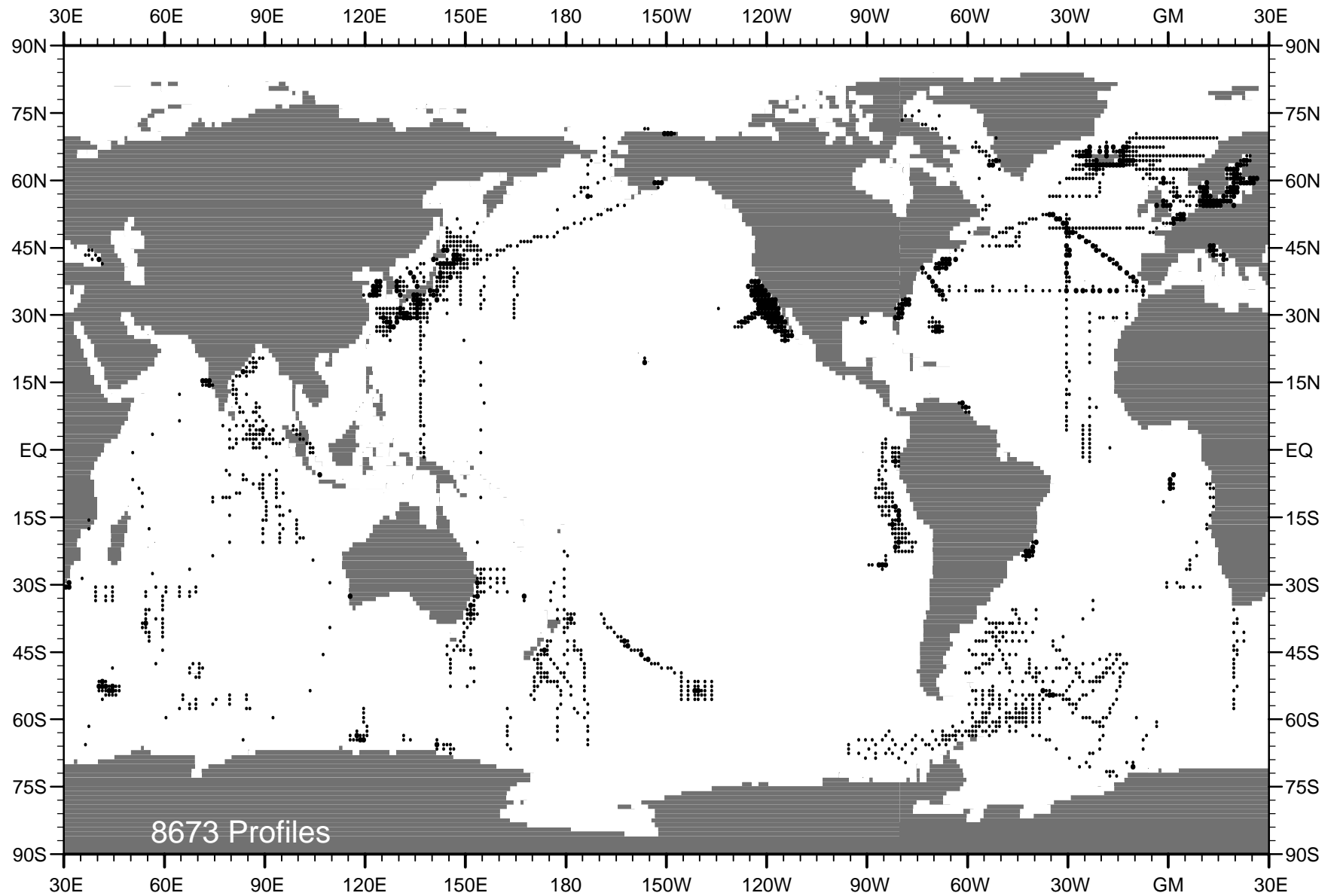


Fig. A57 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1978 .

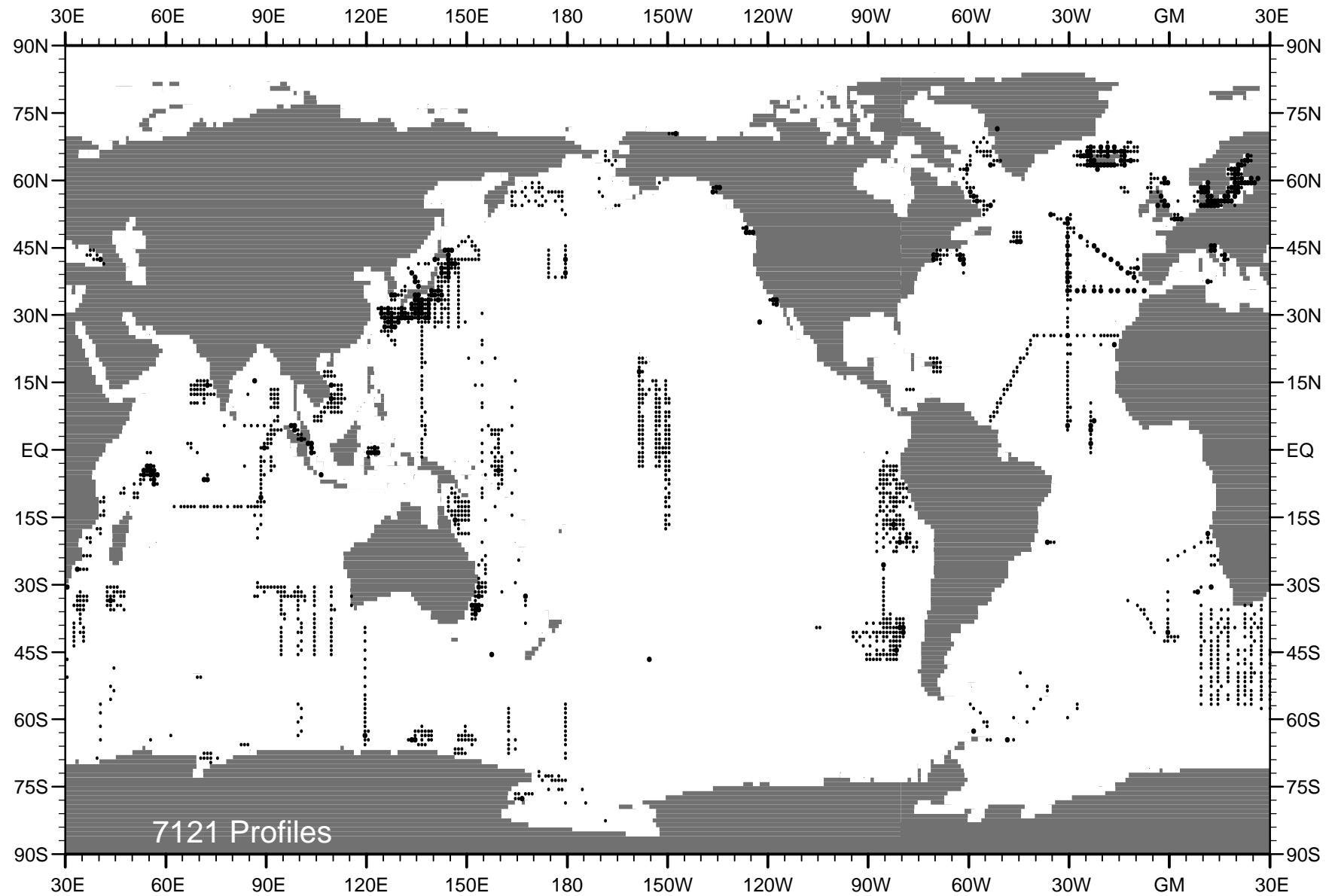


Fig. A58 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1979 .

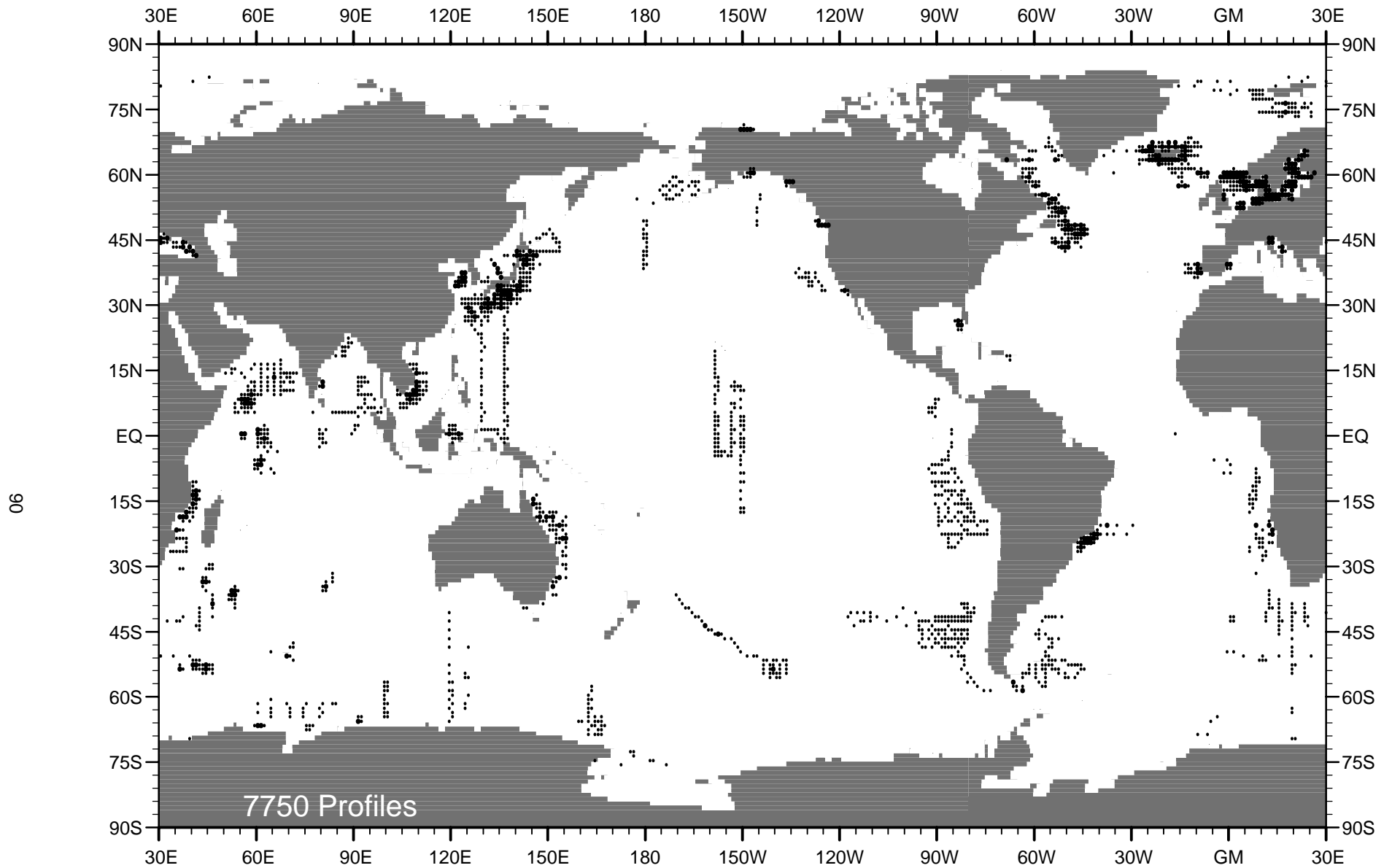


Fig. A59 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1980 .

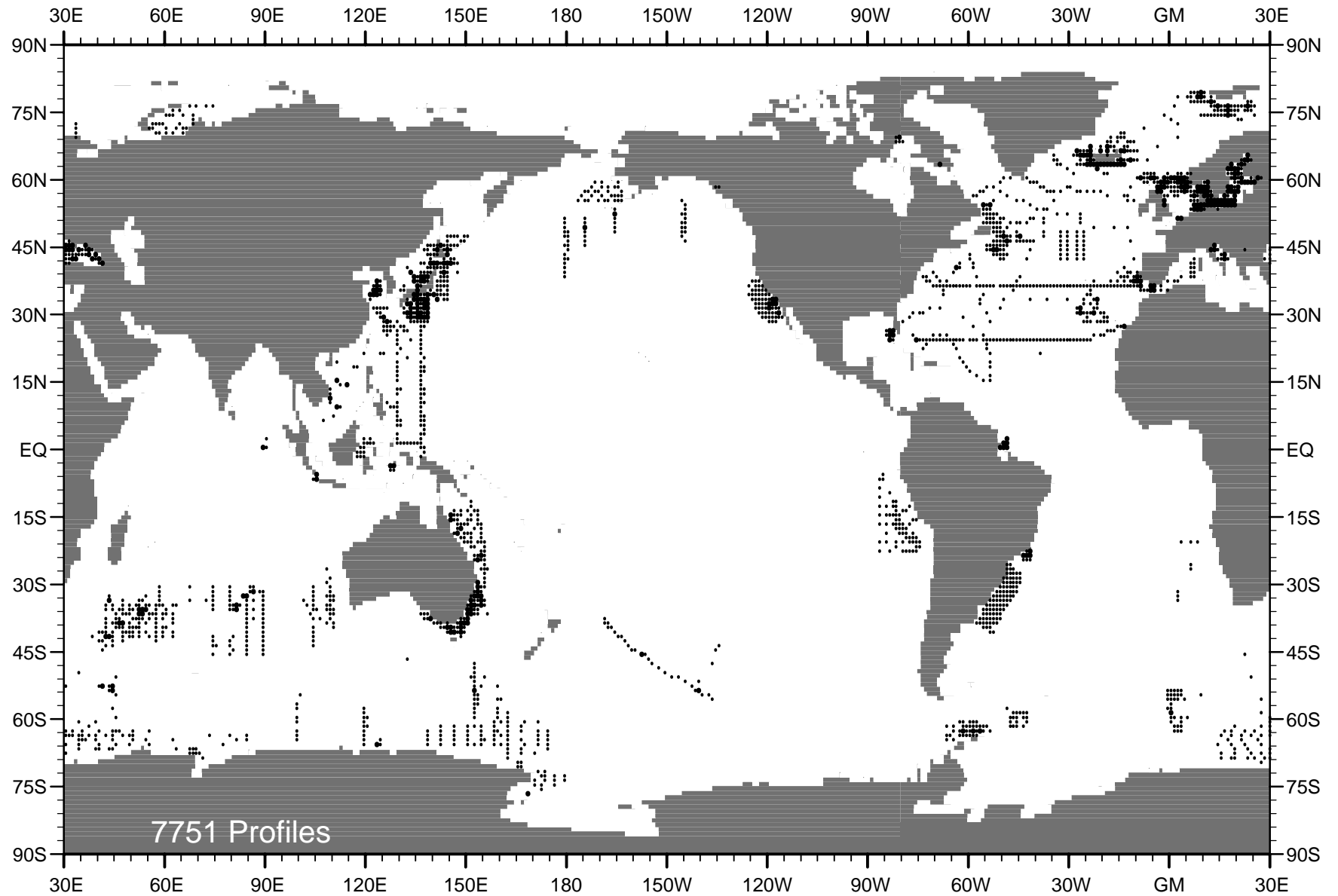


Fig. A60 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1981 .



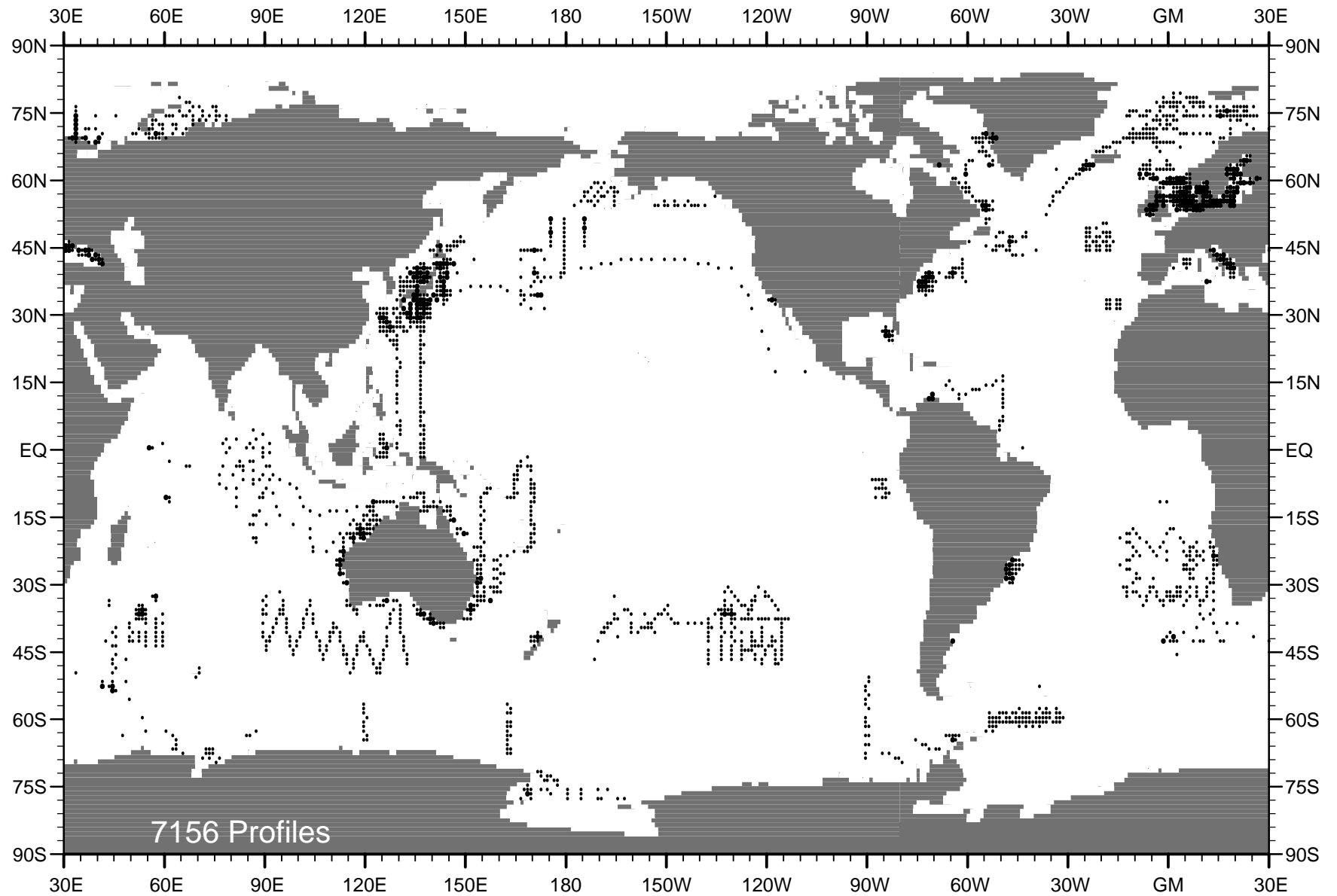


Fig. A61 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1982 .

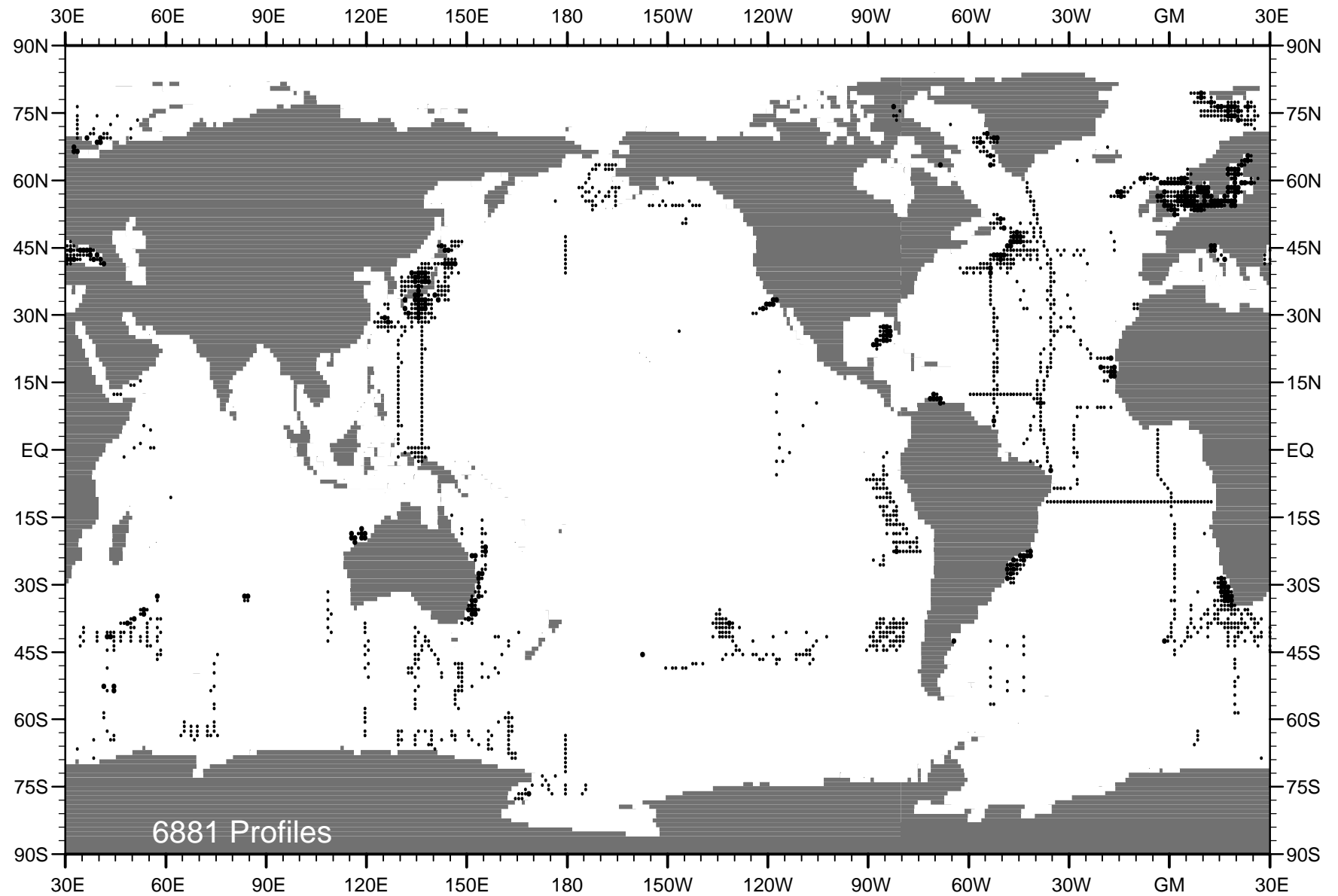


Fig. A62 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1983 .

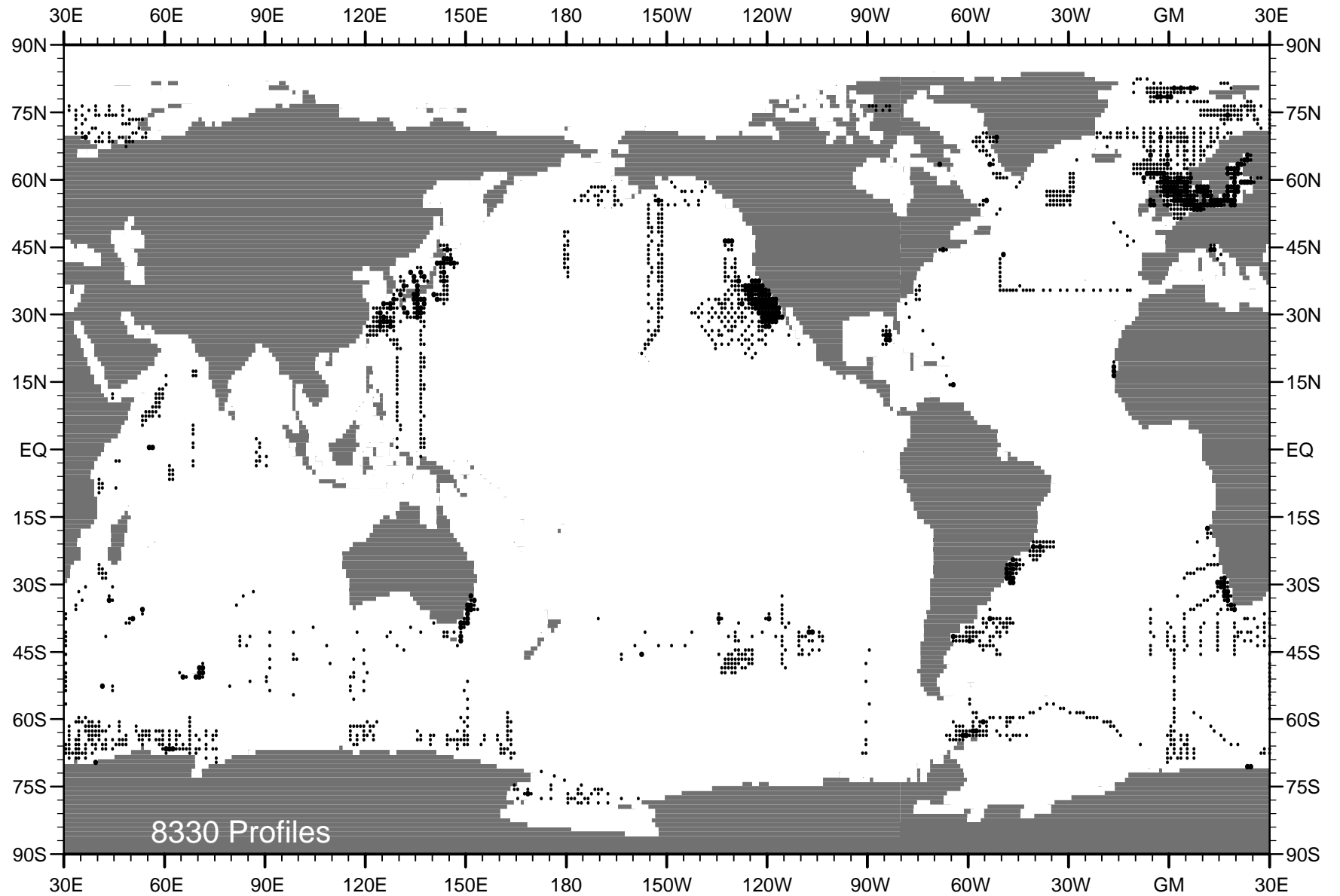


Fig. A63 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1984 .

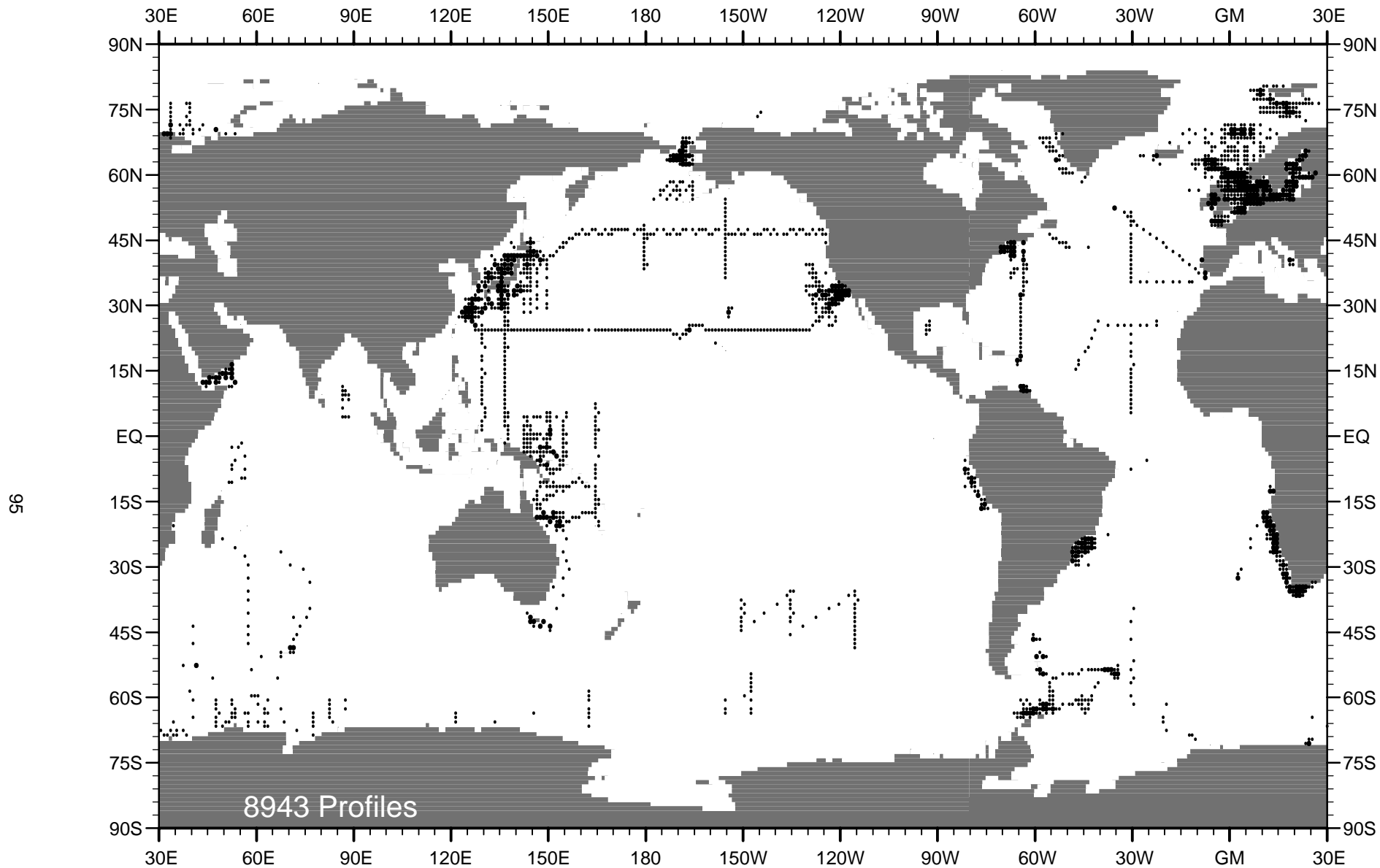


Fig. A64 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1985 .

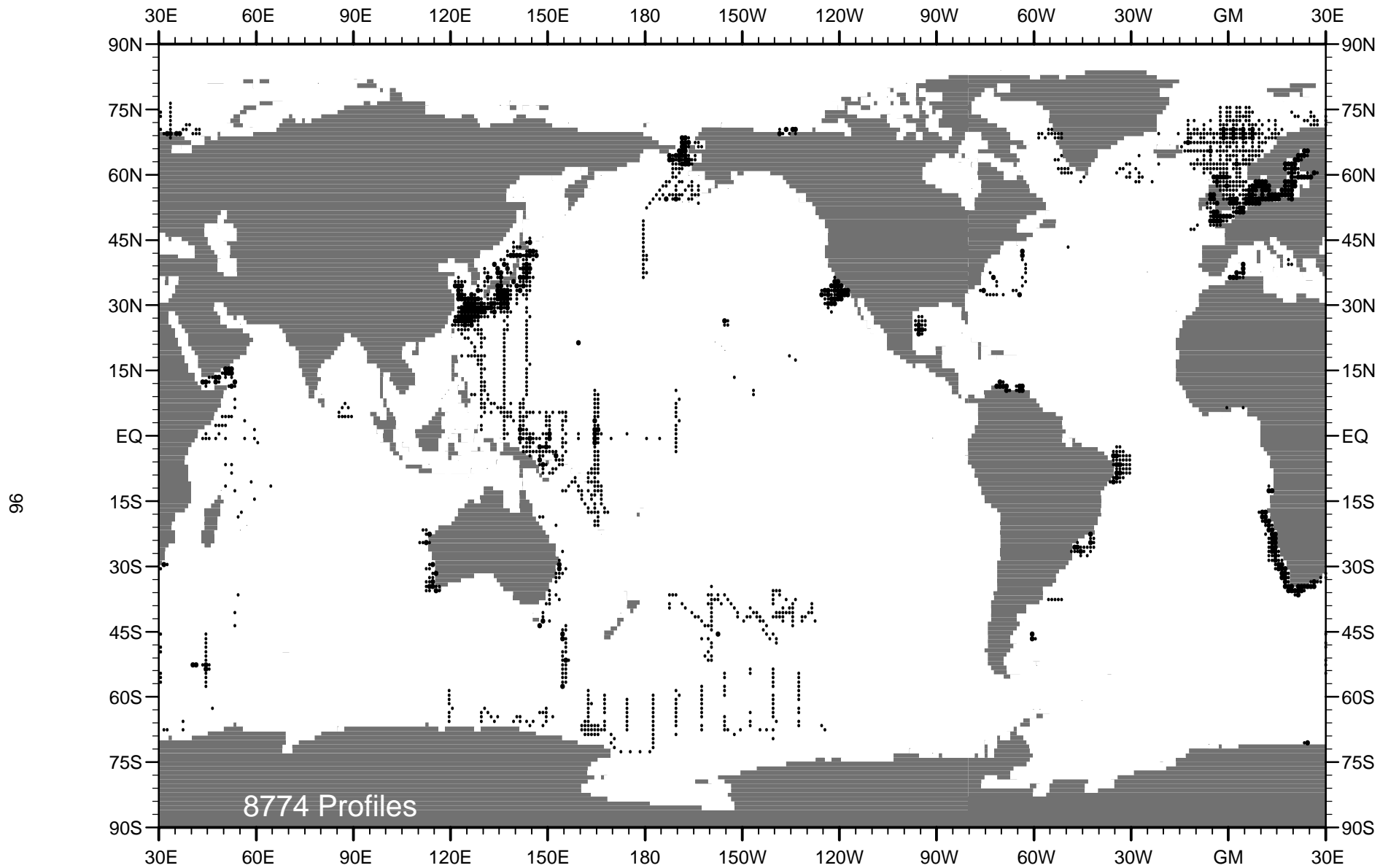


Fig. A65 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1986 .

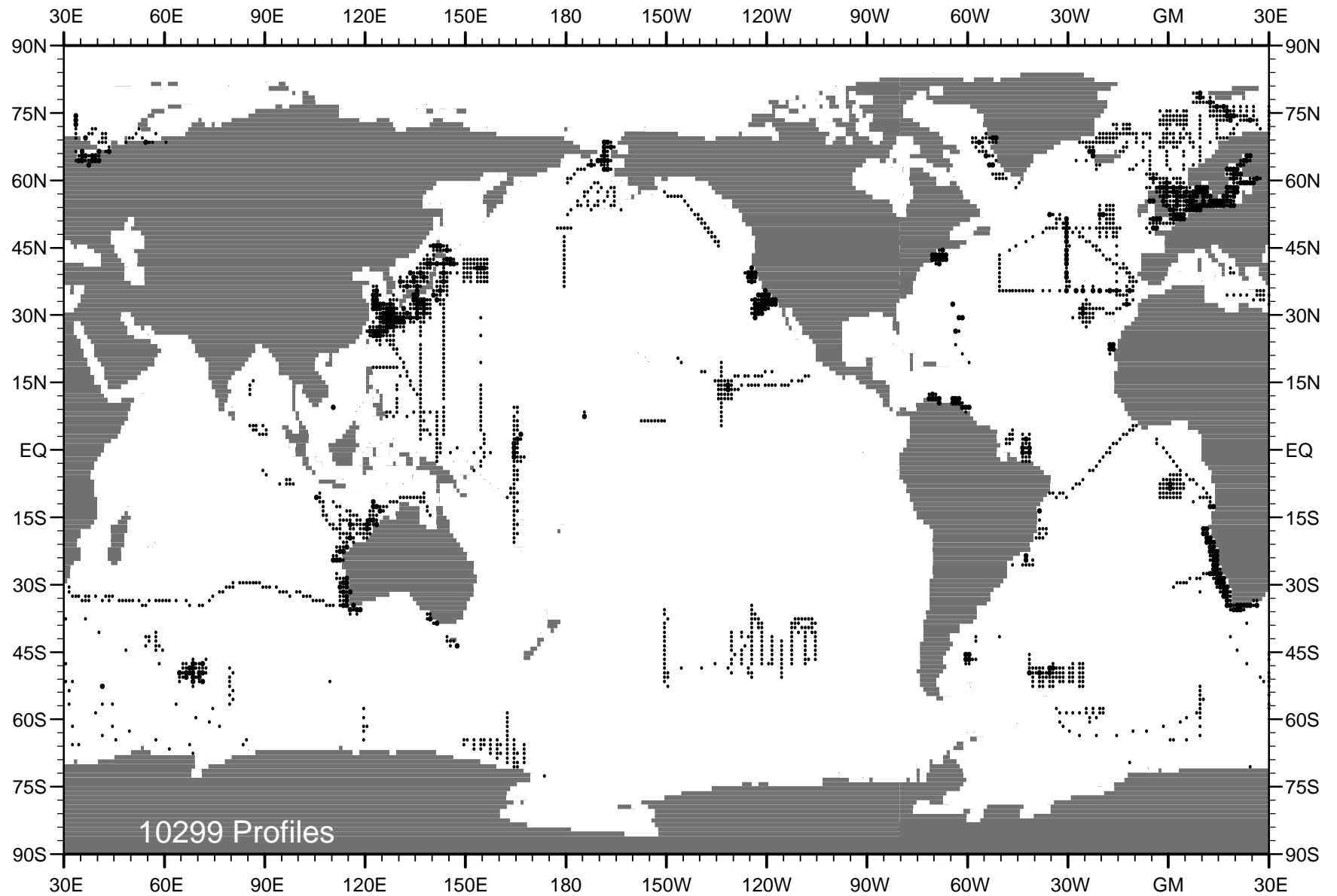


Fig. A66 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1987 .

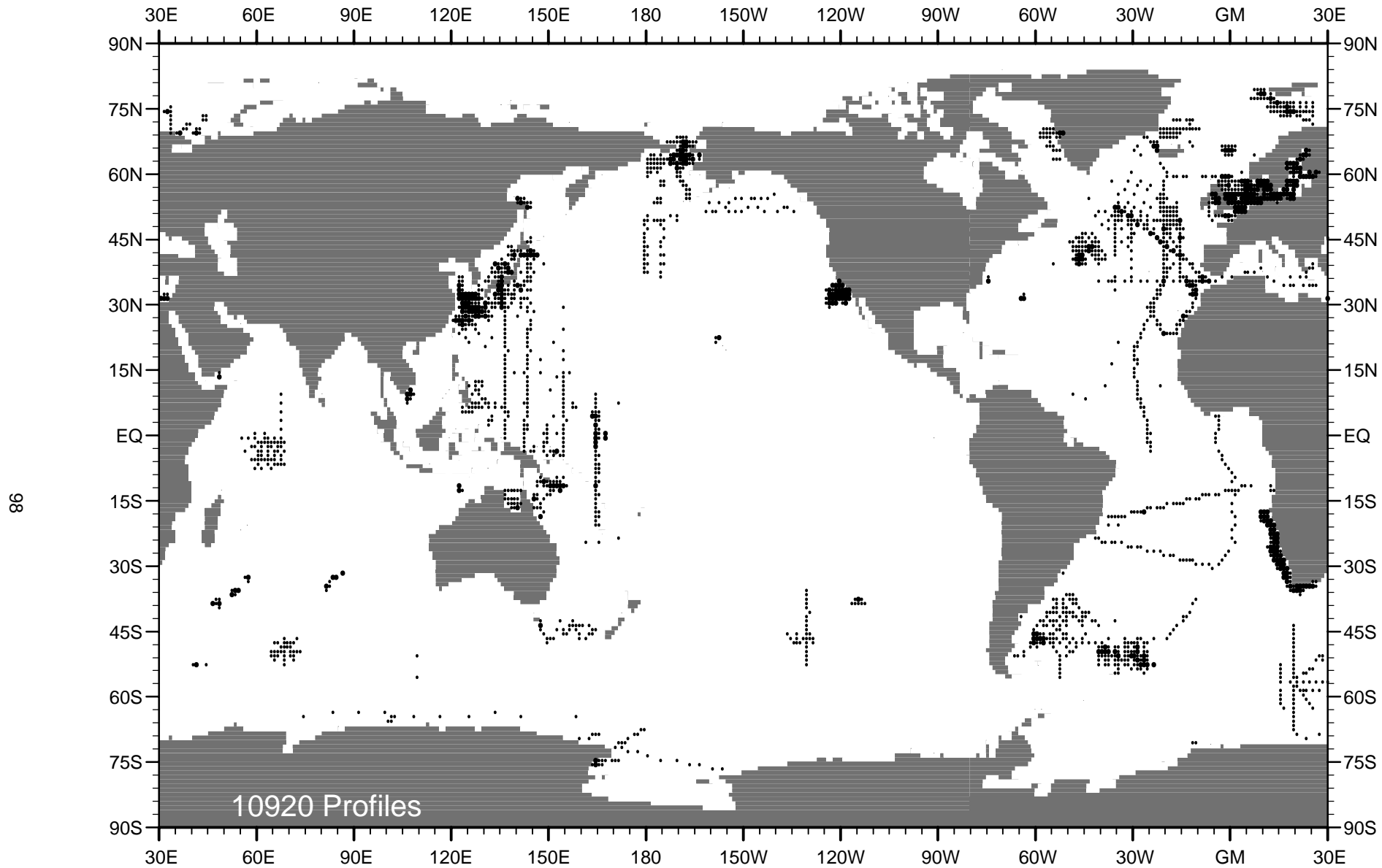


Fig. A67 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1988 .

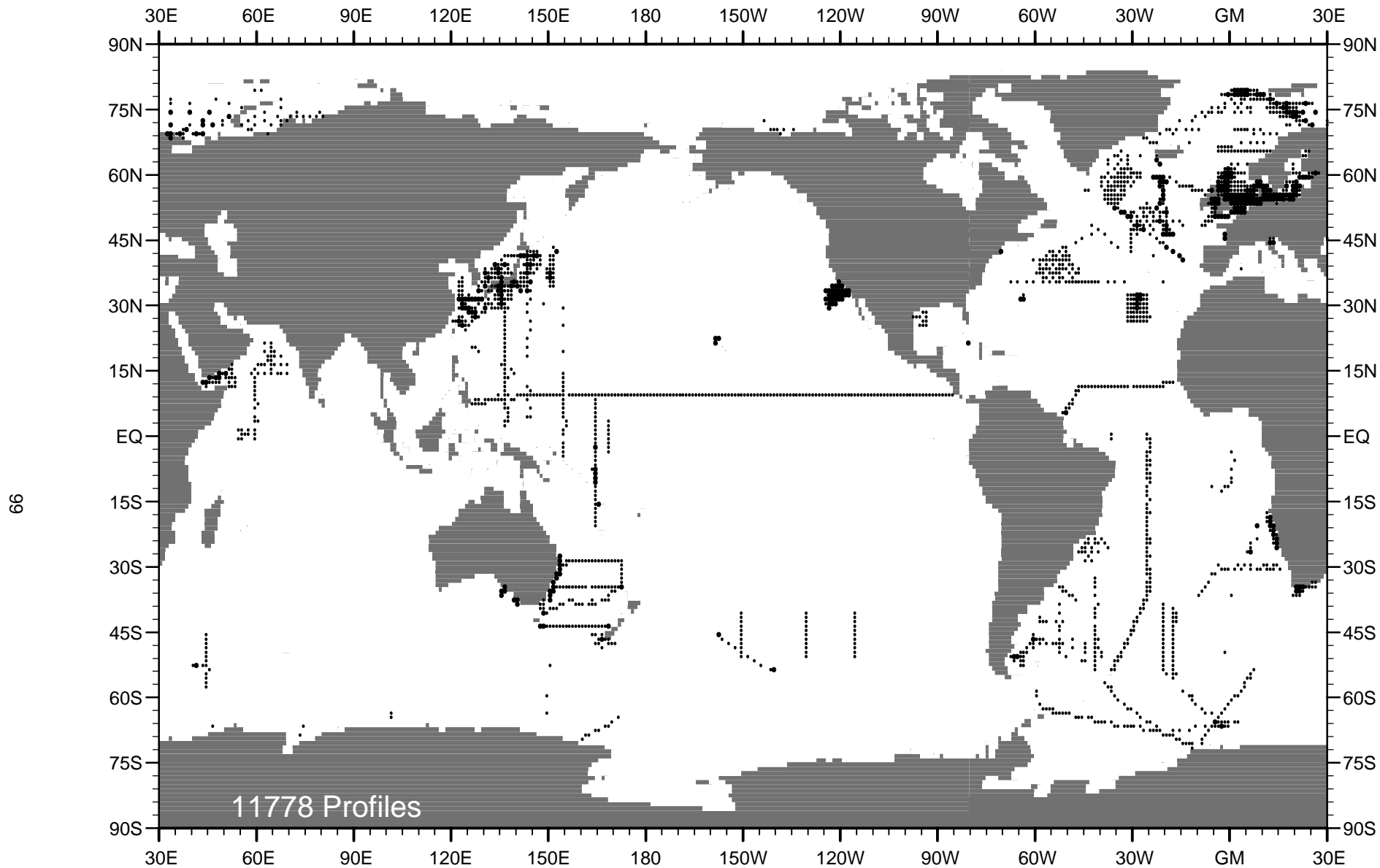


Fig. A68 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1989 .



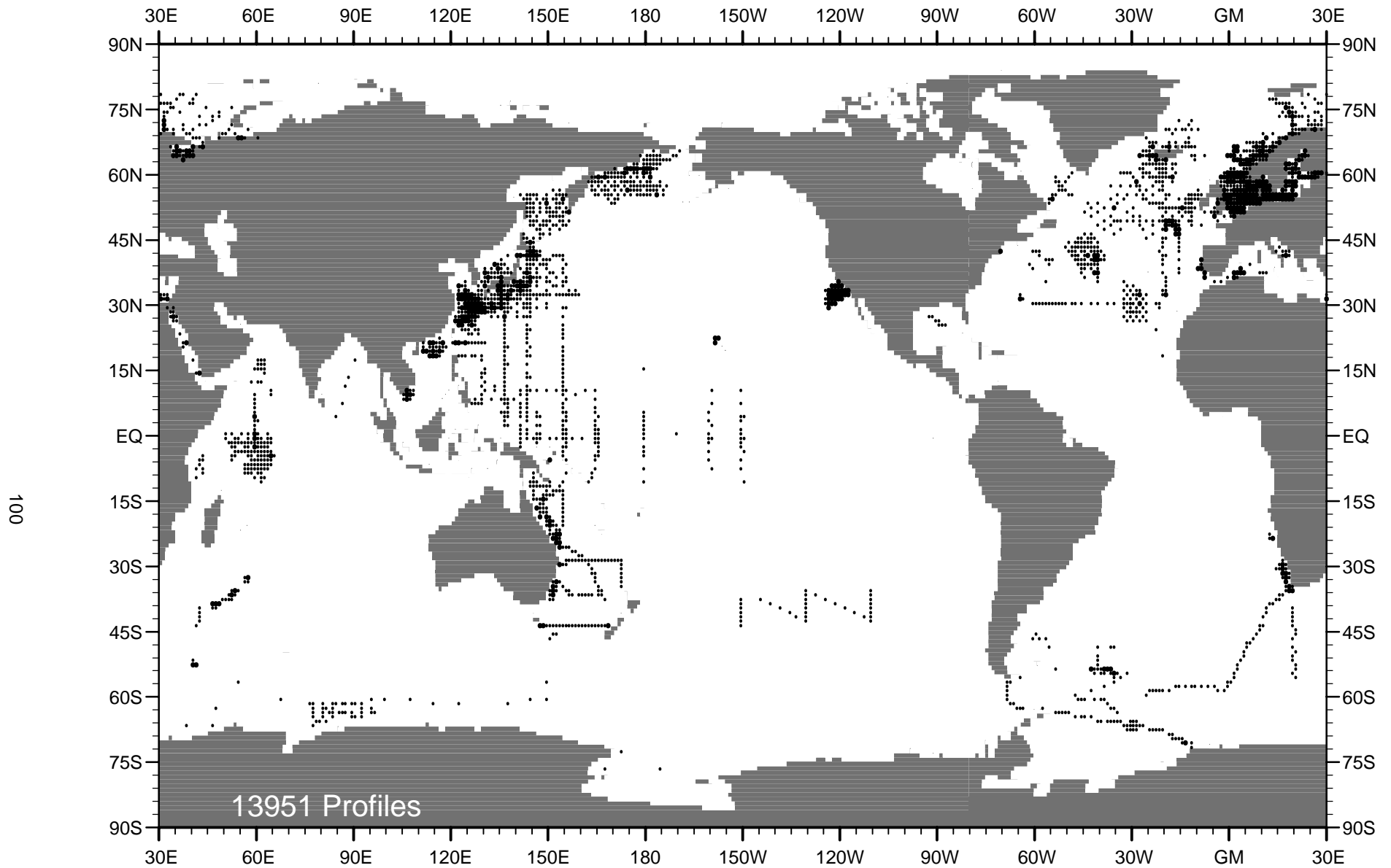


Fig. A69 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1990 .

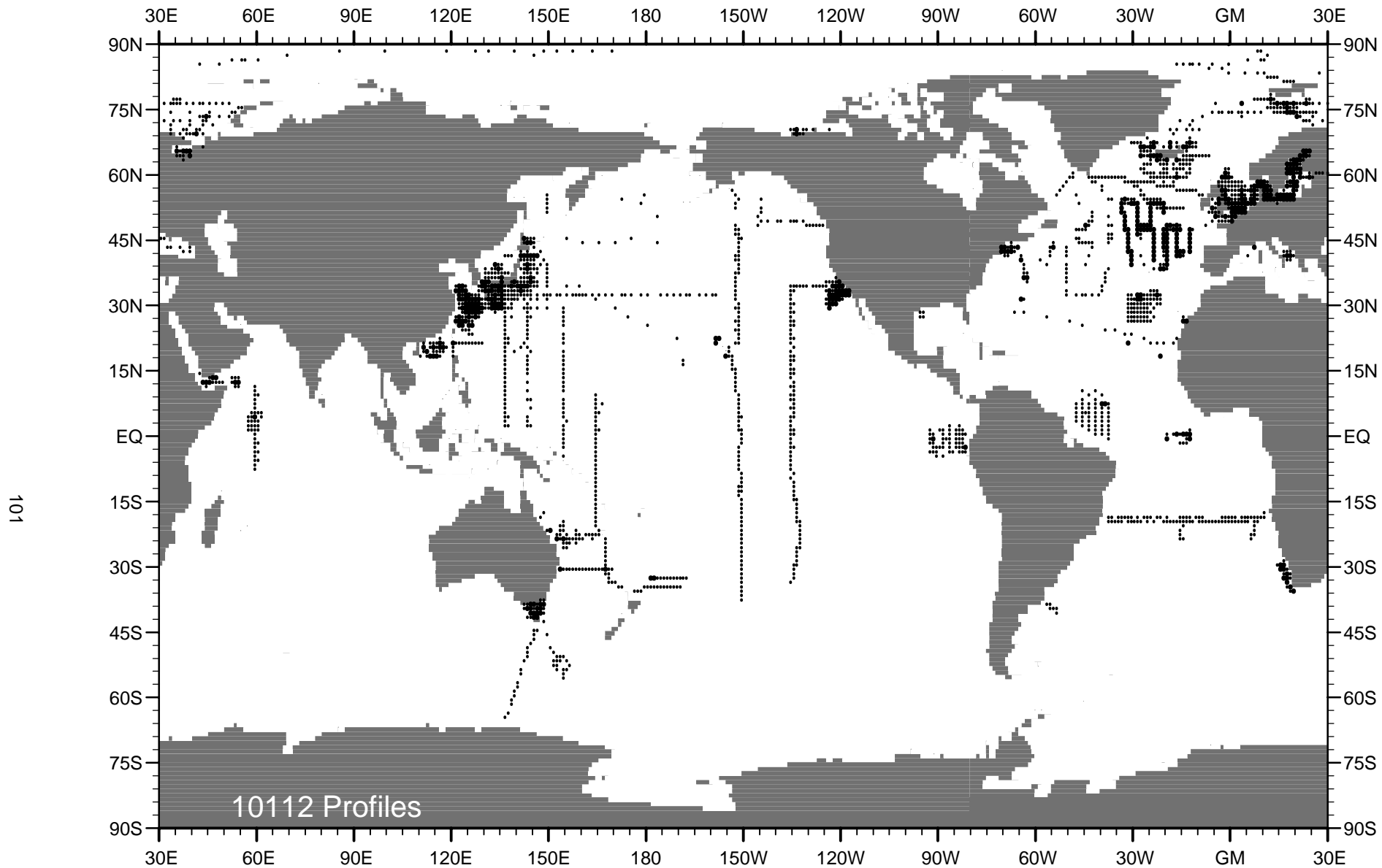


Fig. A70 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1991 .

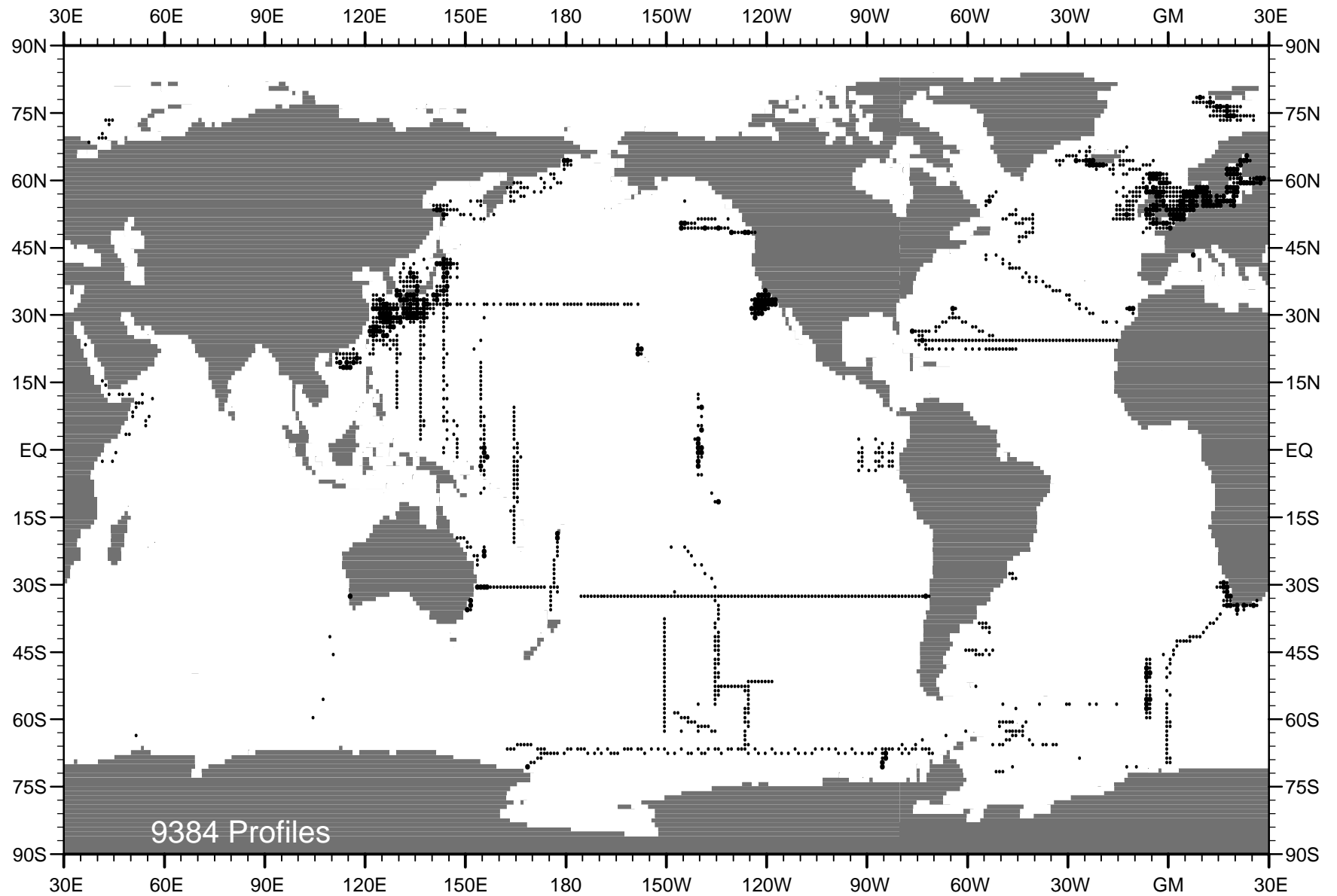


Fig. A71 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1992 .

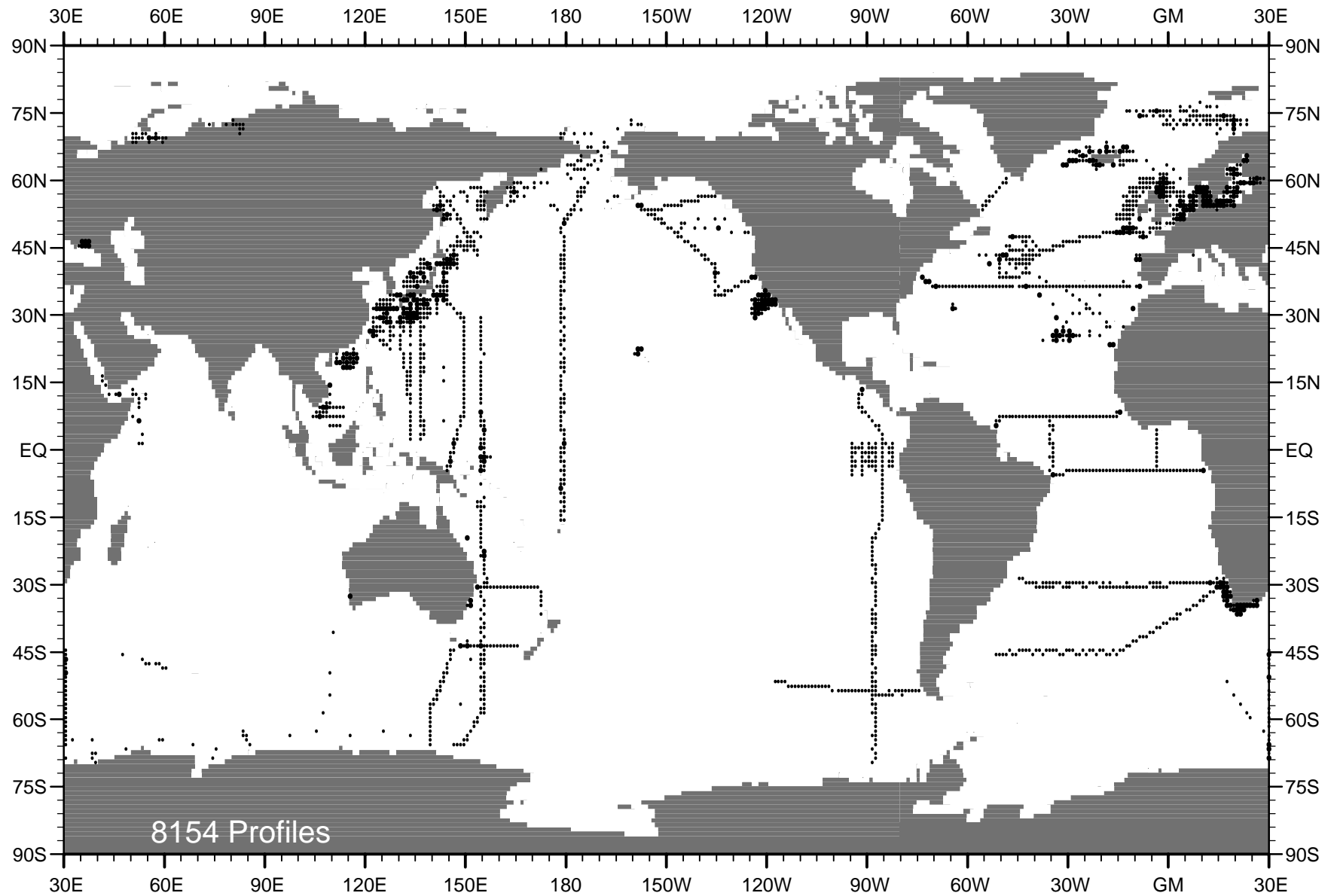


Fig. A72 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1993 .

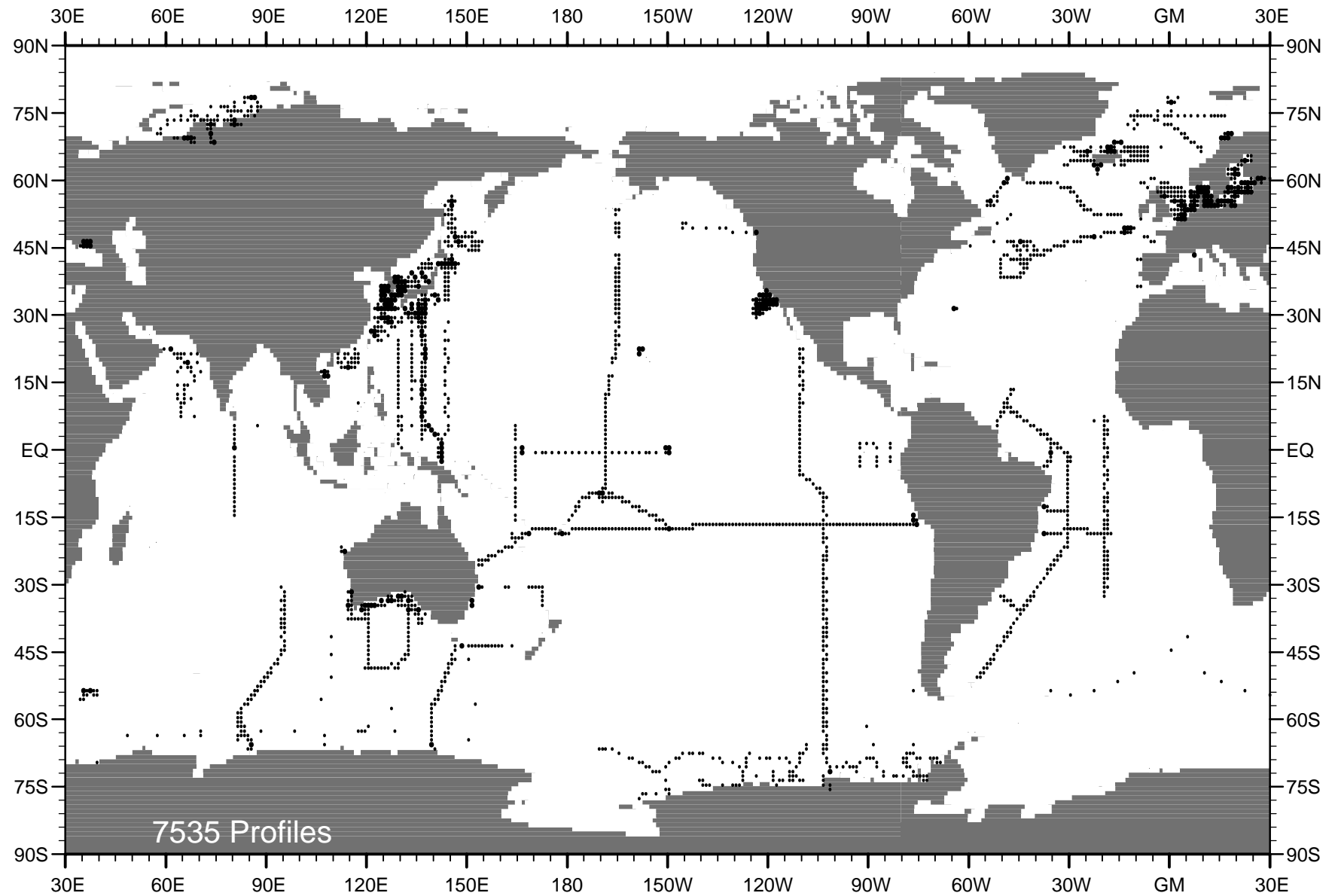


Fig. A73 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1994 .

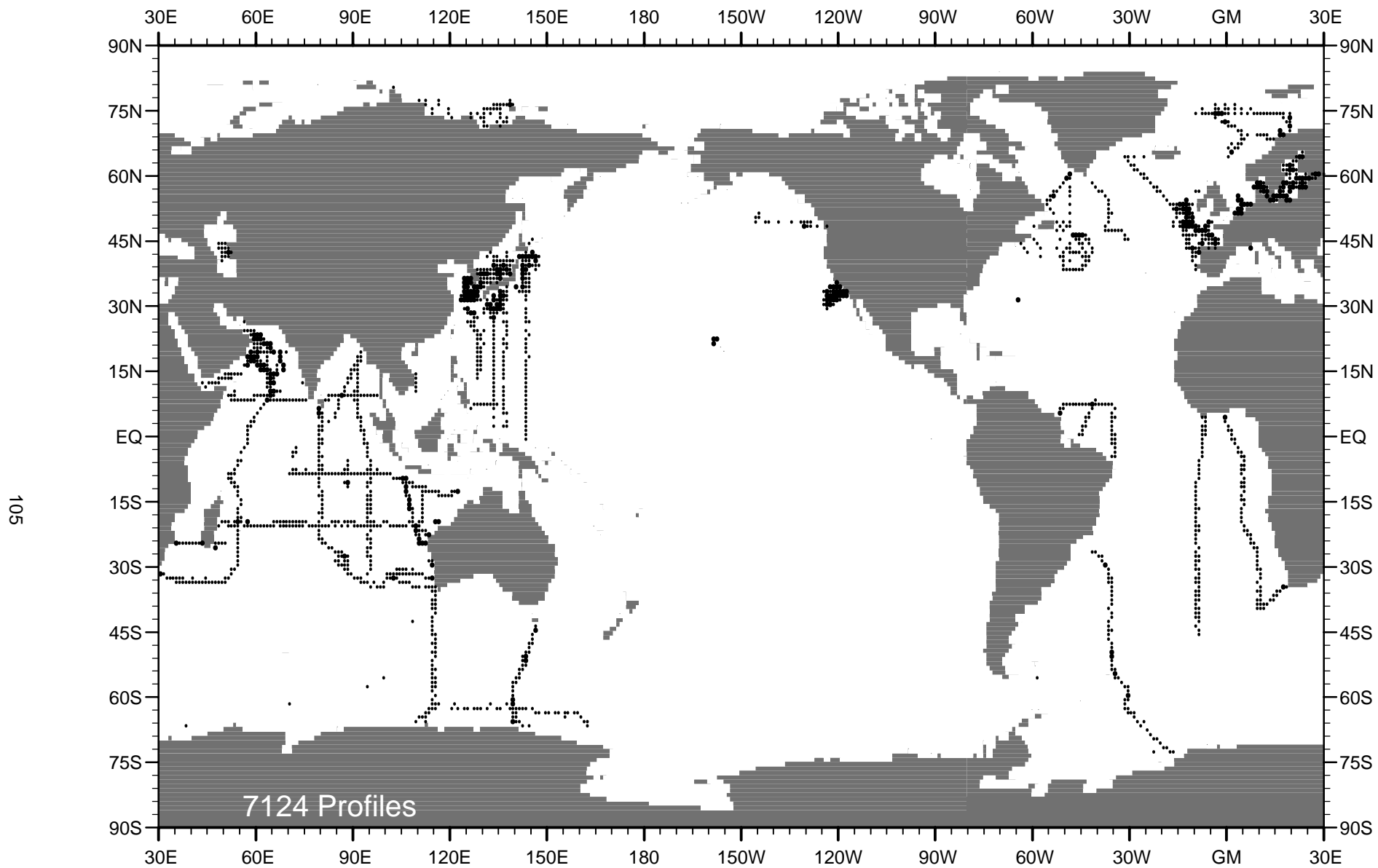


Fig. A74 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1995 .

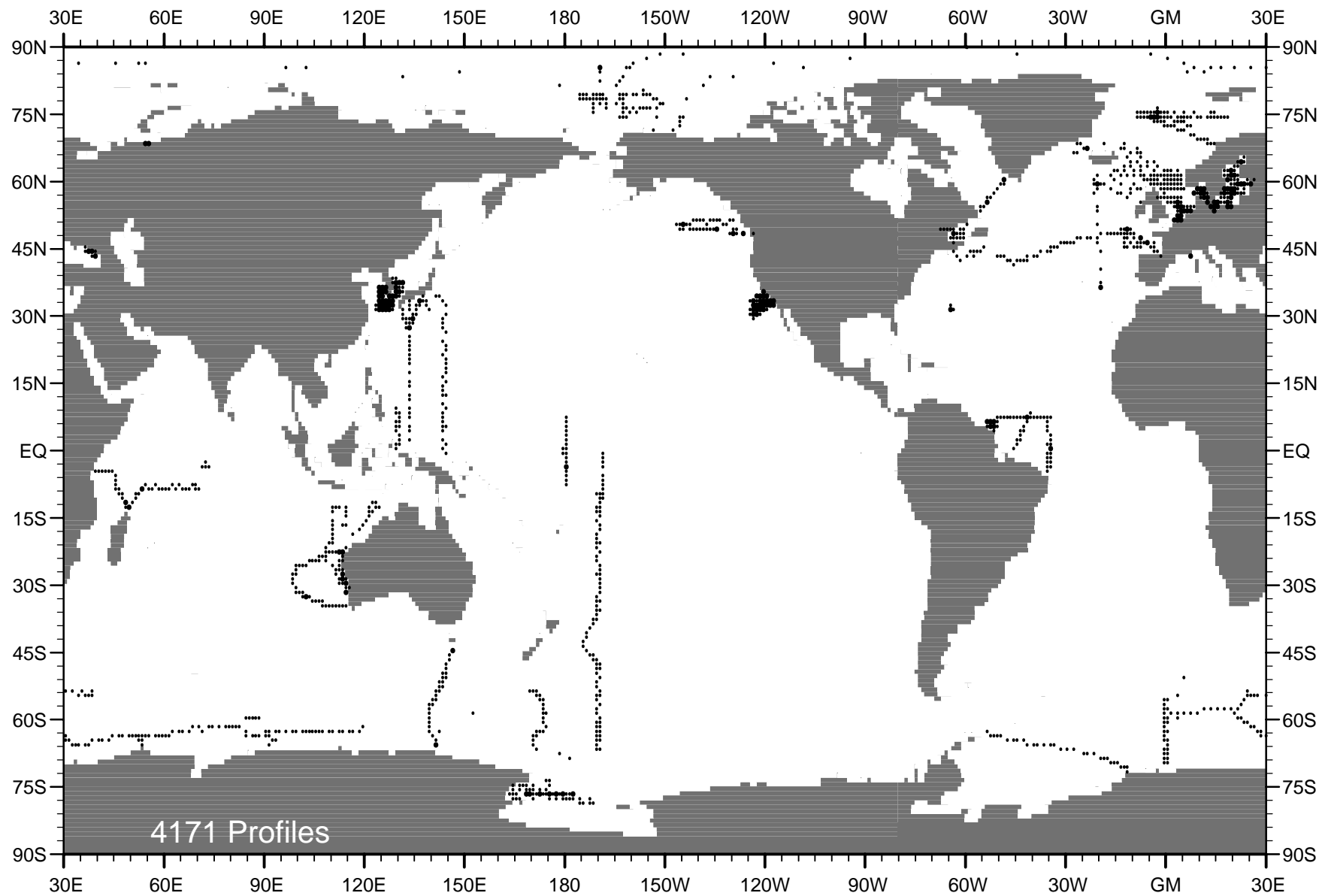


Fig. A75 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1996 .

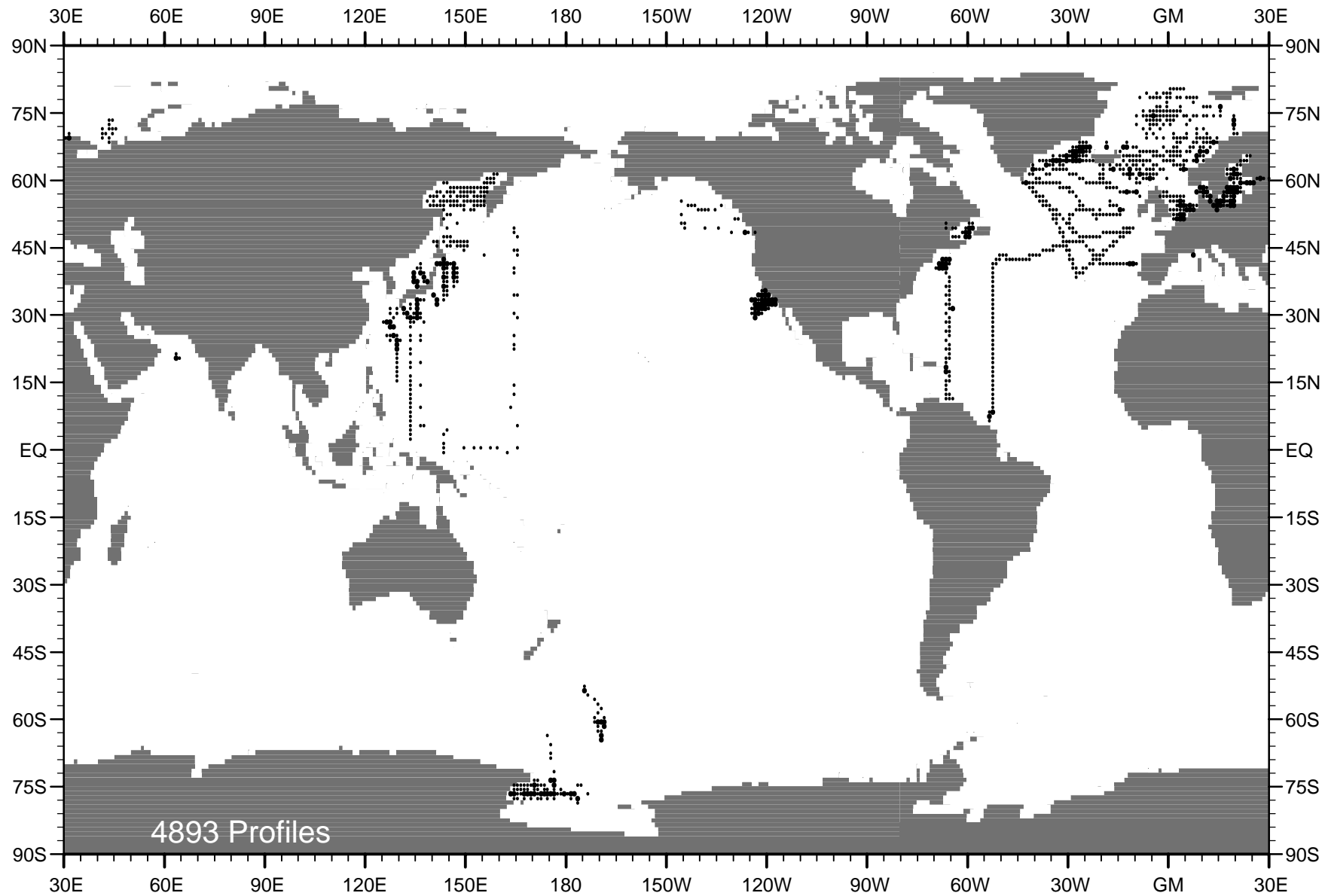


Fig. A76 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1997 .



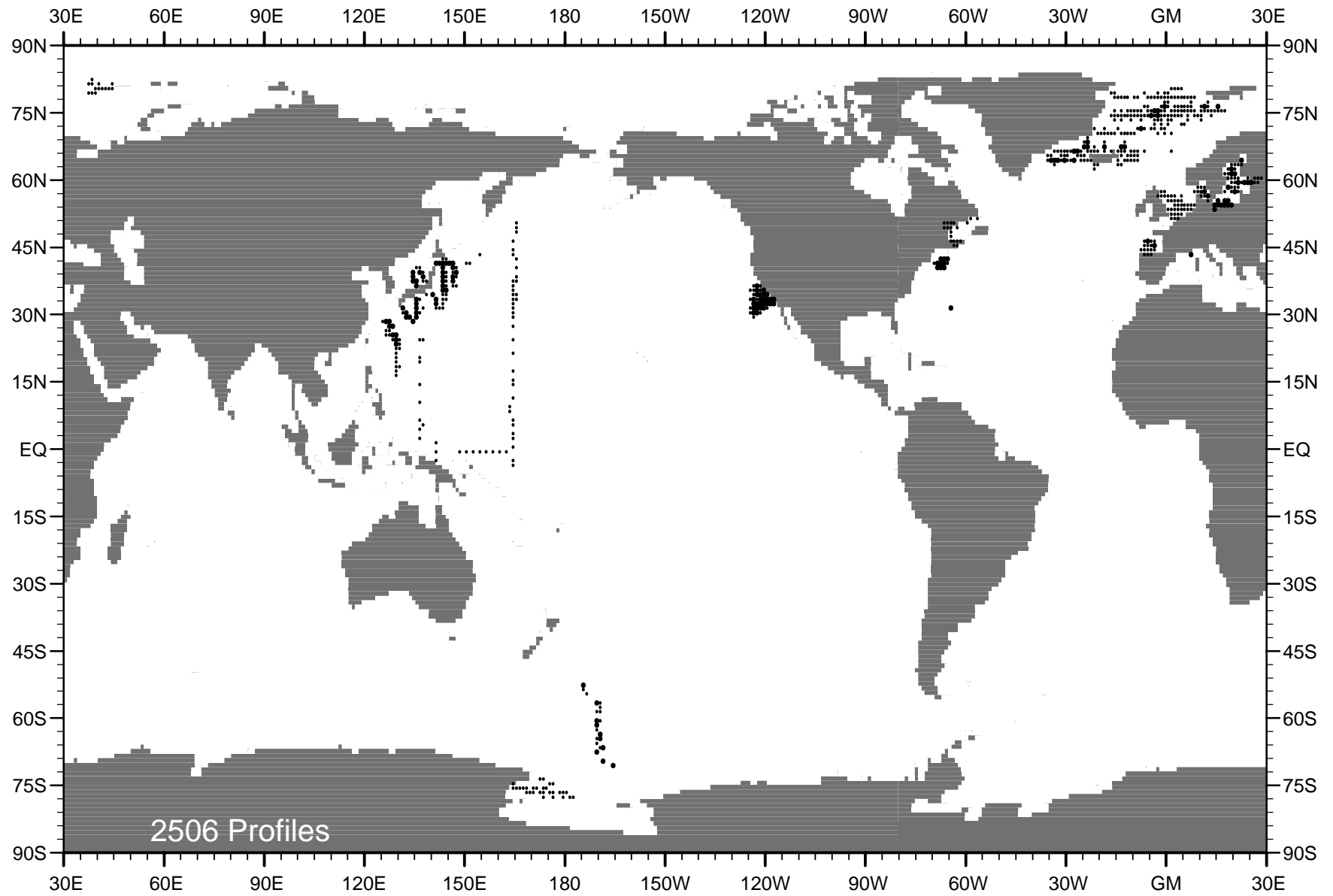


Fig. A77 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1998 .

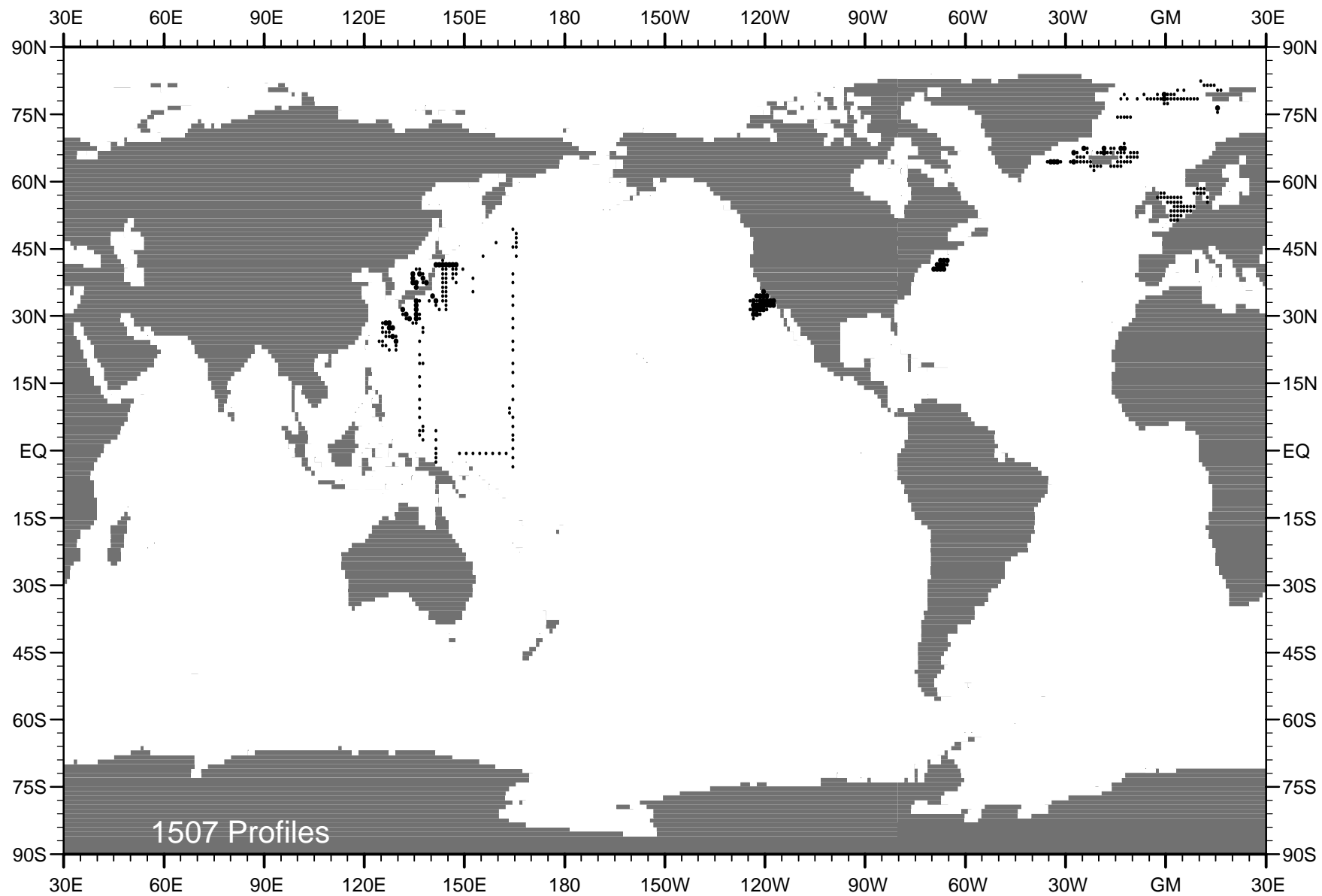


Fig. A78 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 1999 .

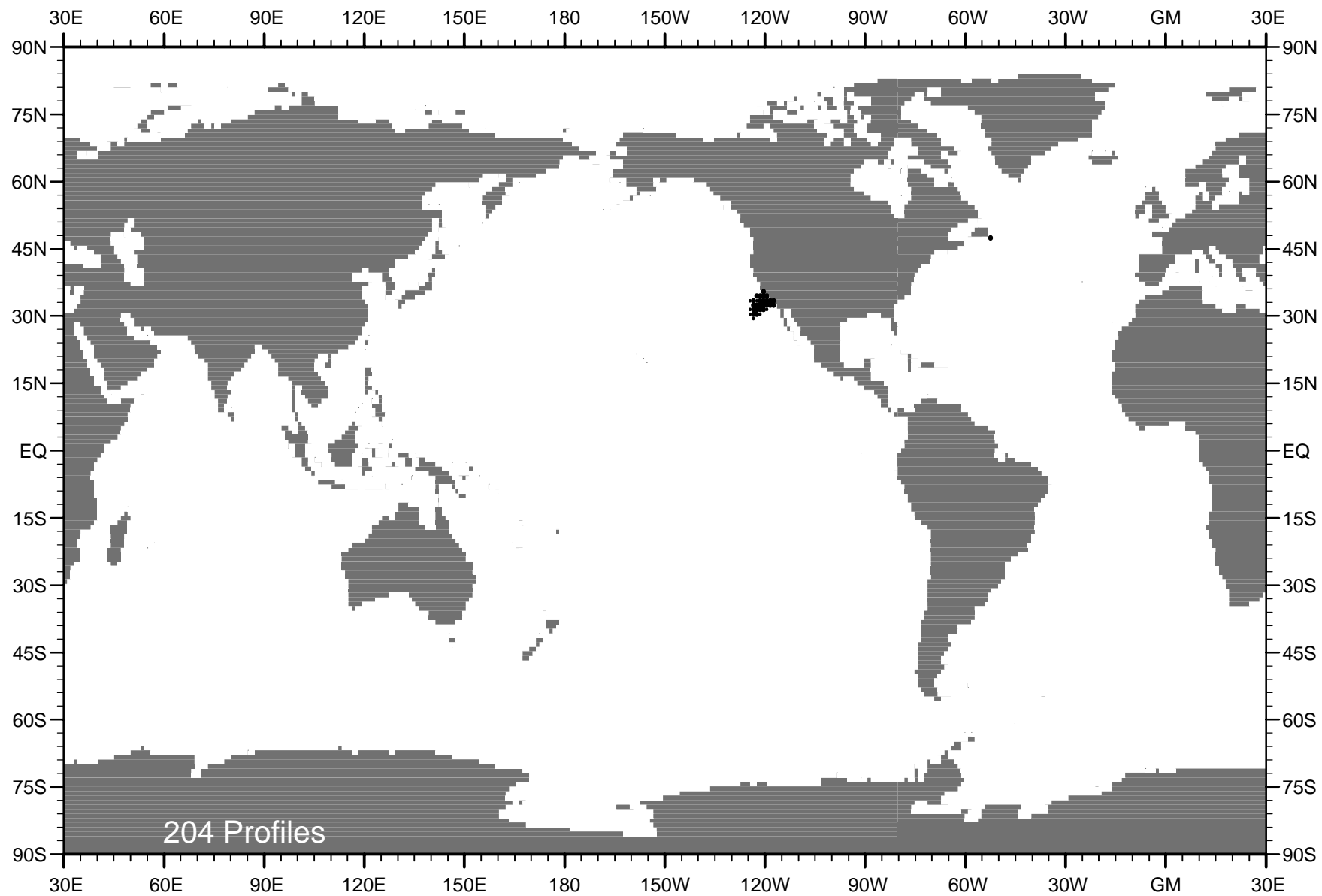


Fig. A79 Distribution of all Ocean Station Data (OSD) phosphate profiles in WOD01 for year 2000 .

**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.

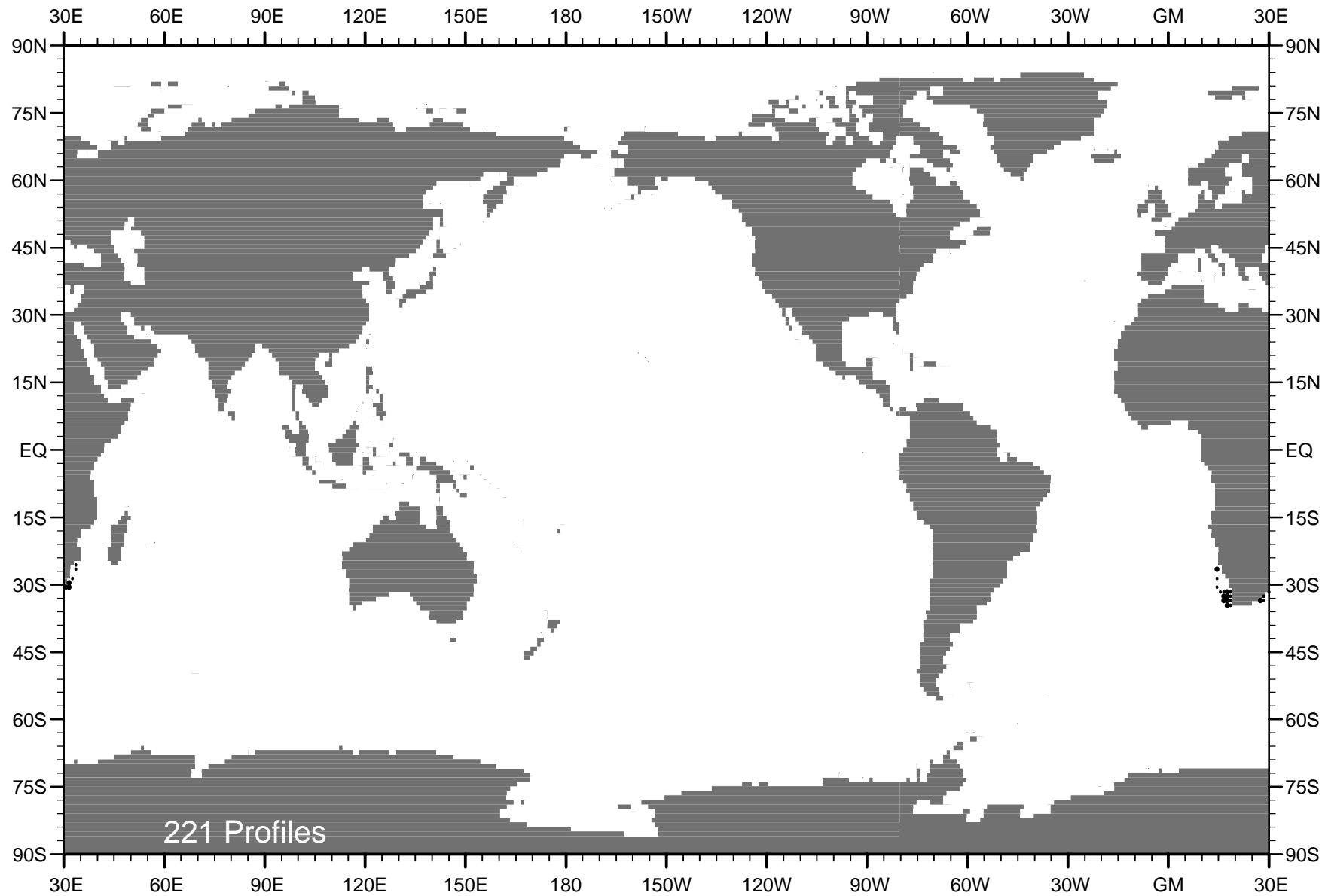


Fig. B1 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1921 .

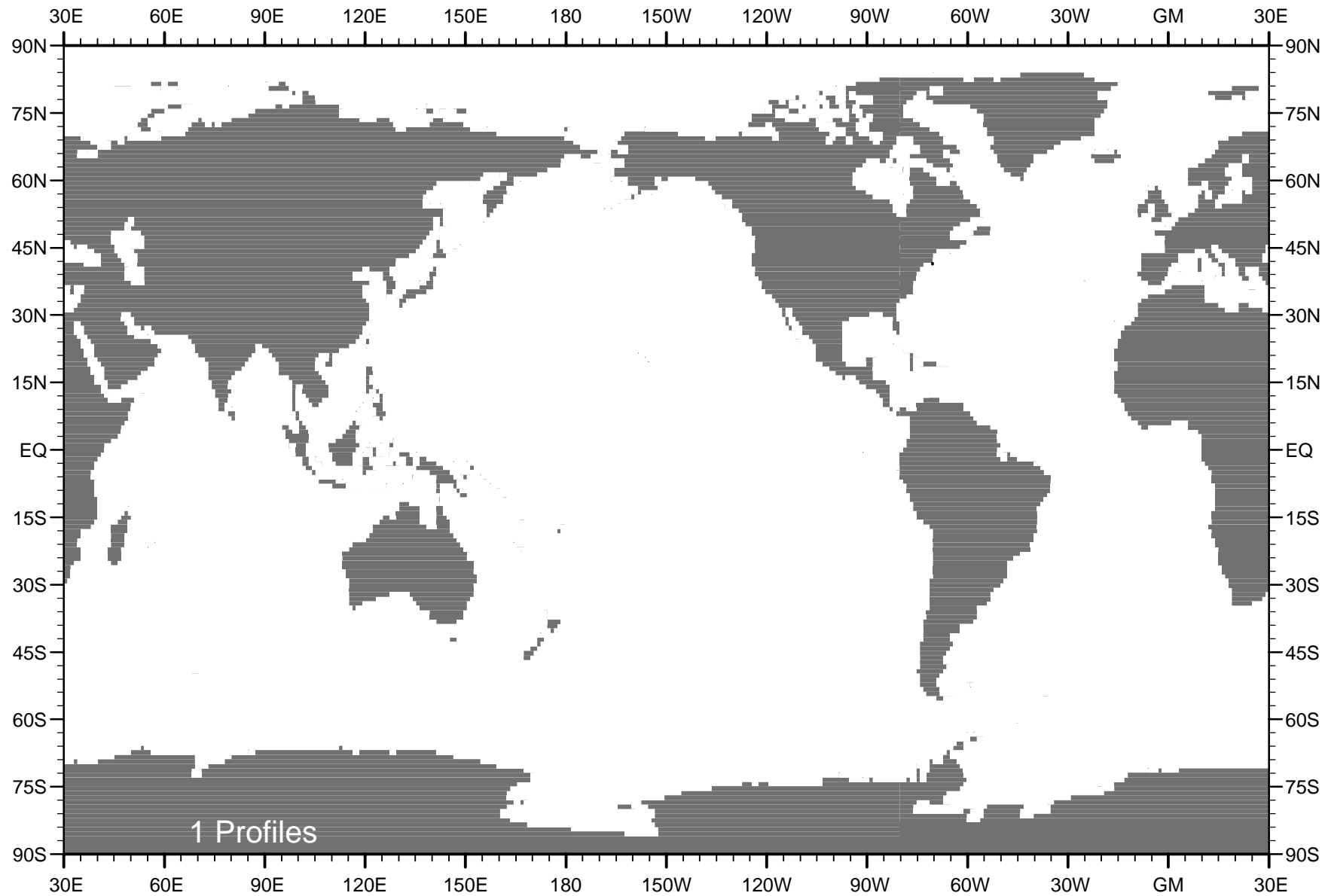


Fig. B2 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1925 .

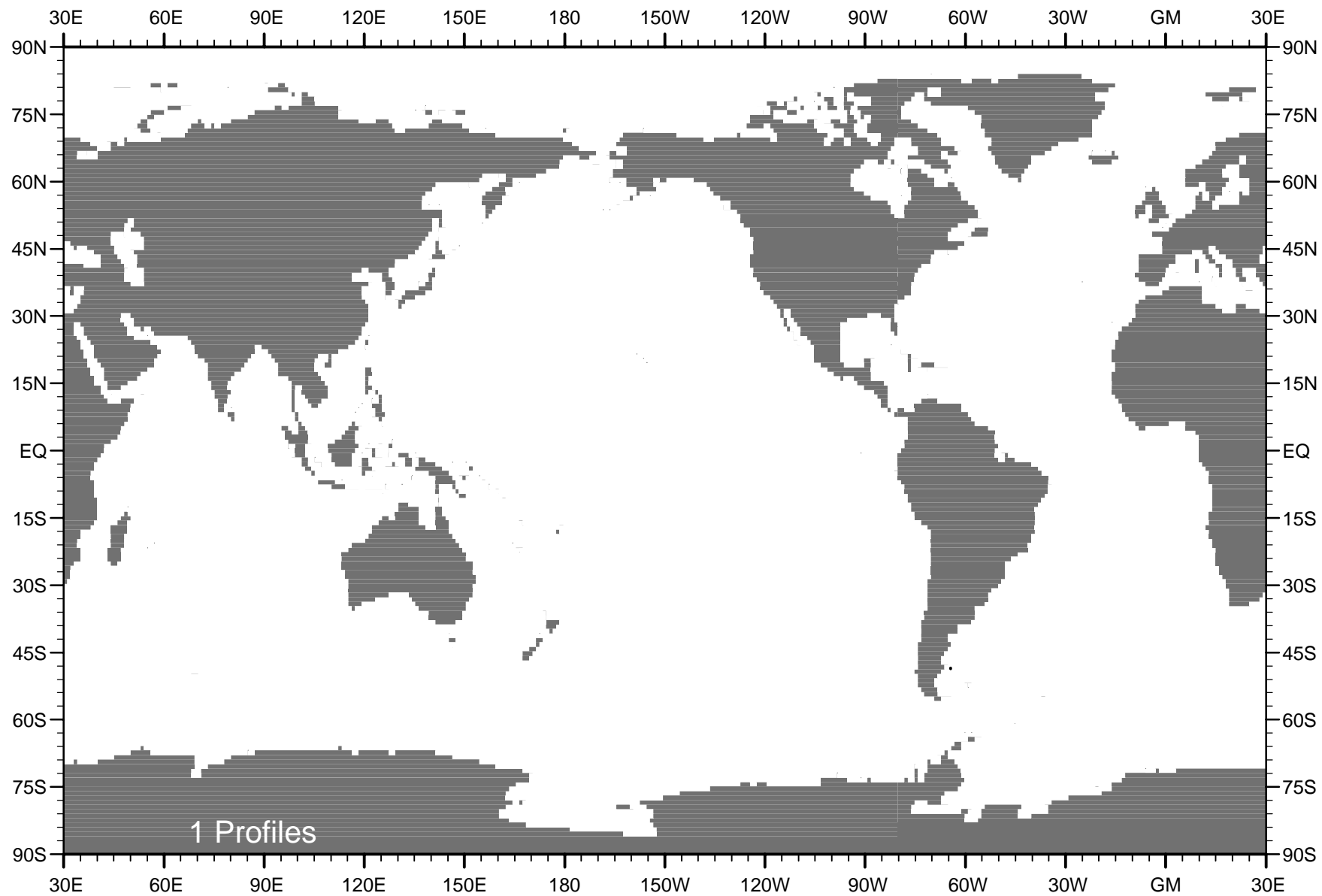


Fig. B3 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1927 .

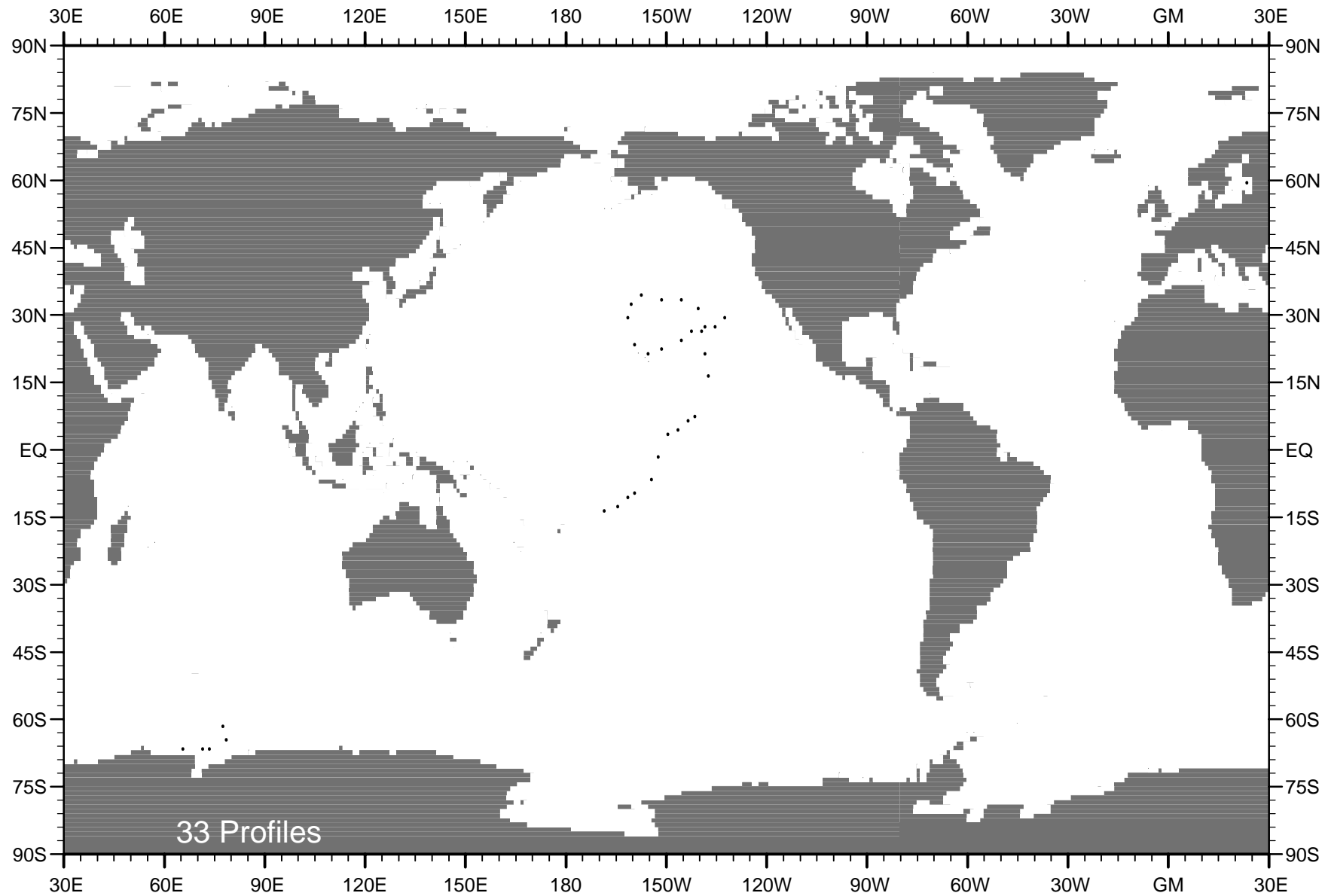


Fig. B4 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1929 .



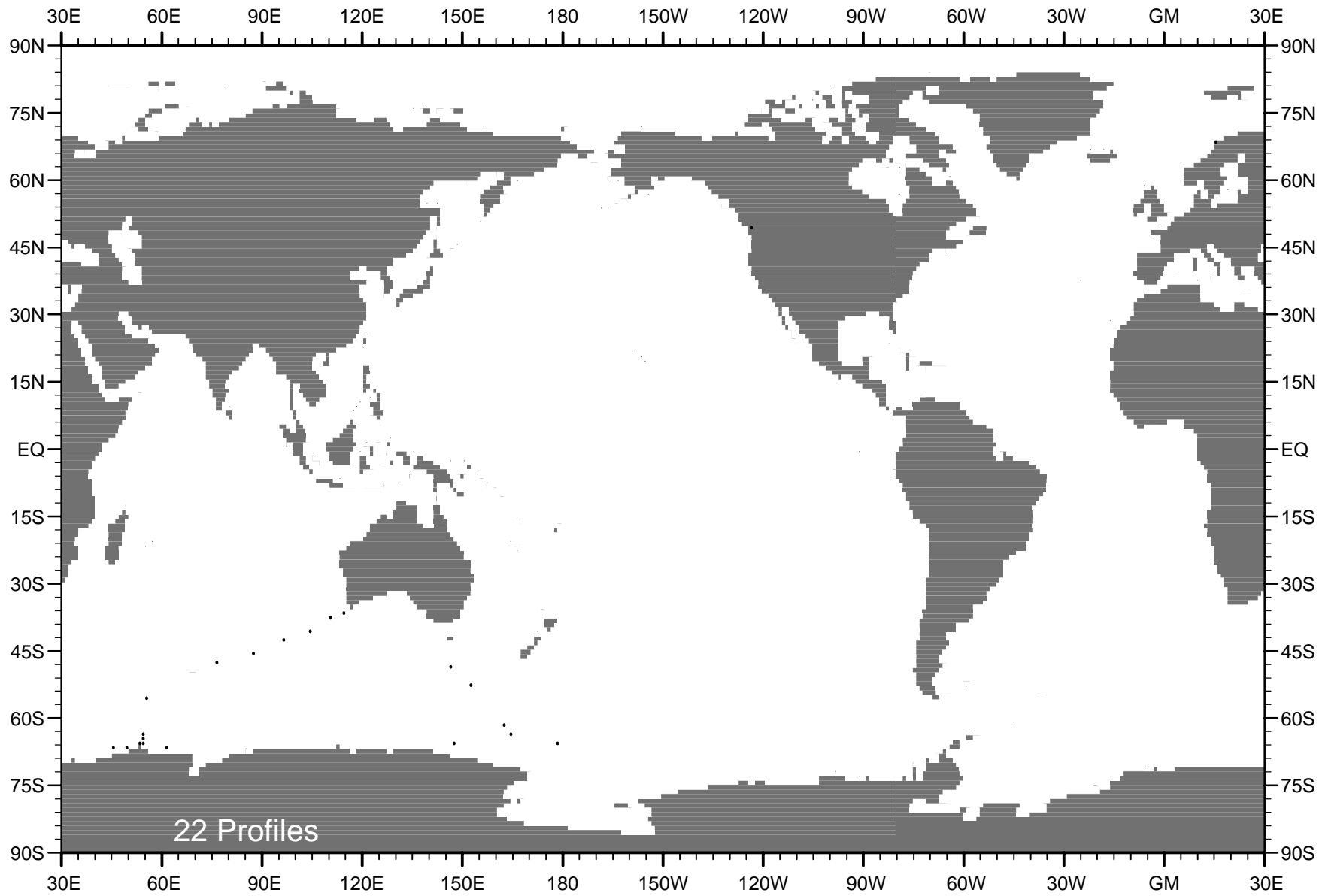


Fig. B5 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1930 .

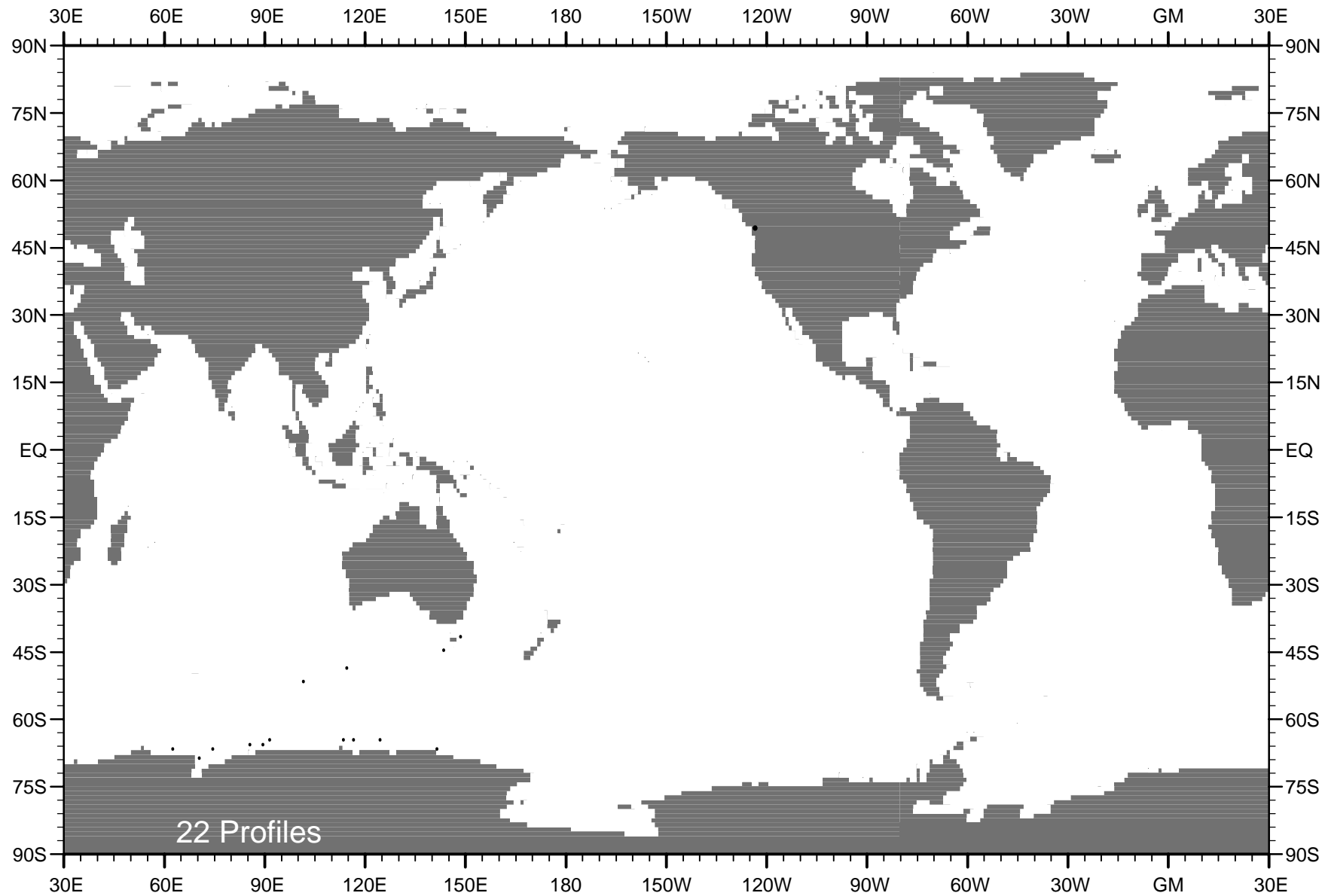


Fig. B6 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1931 .

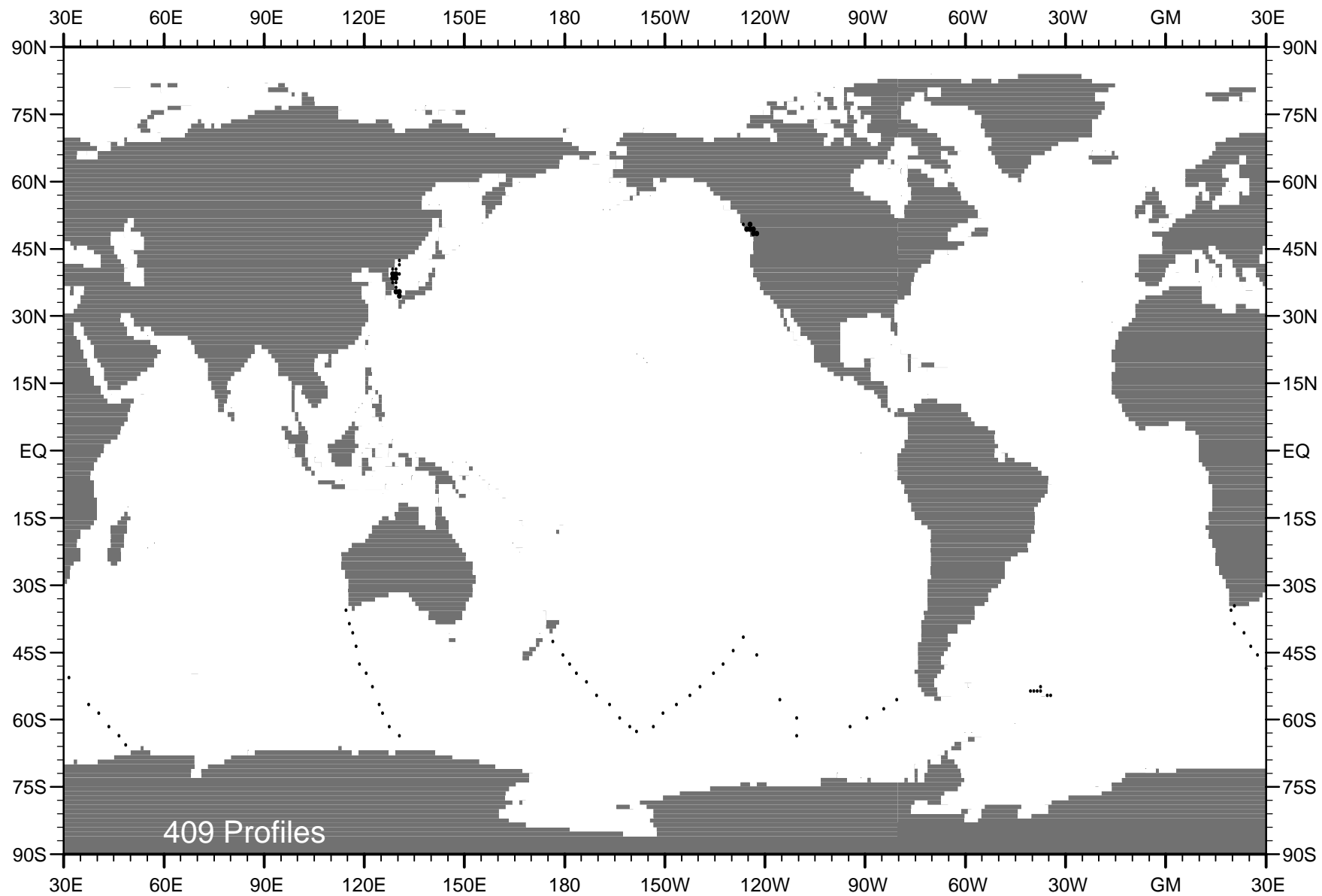


Fig. B7 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1932 .

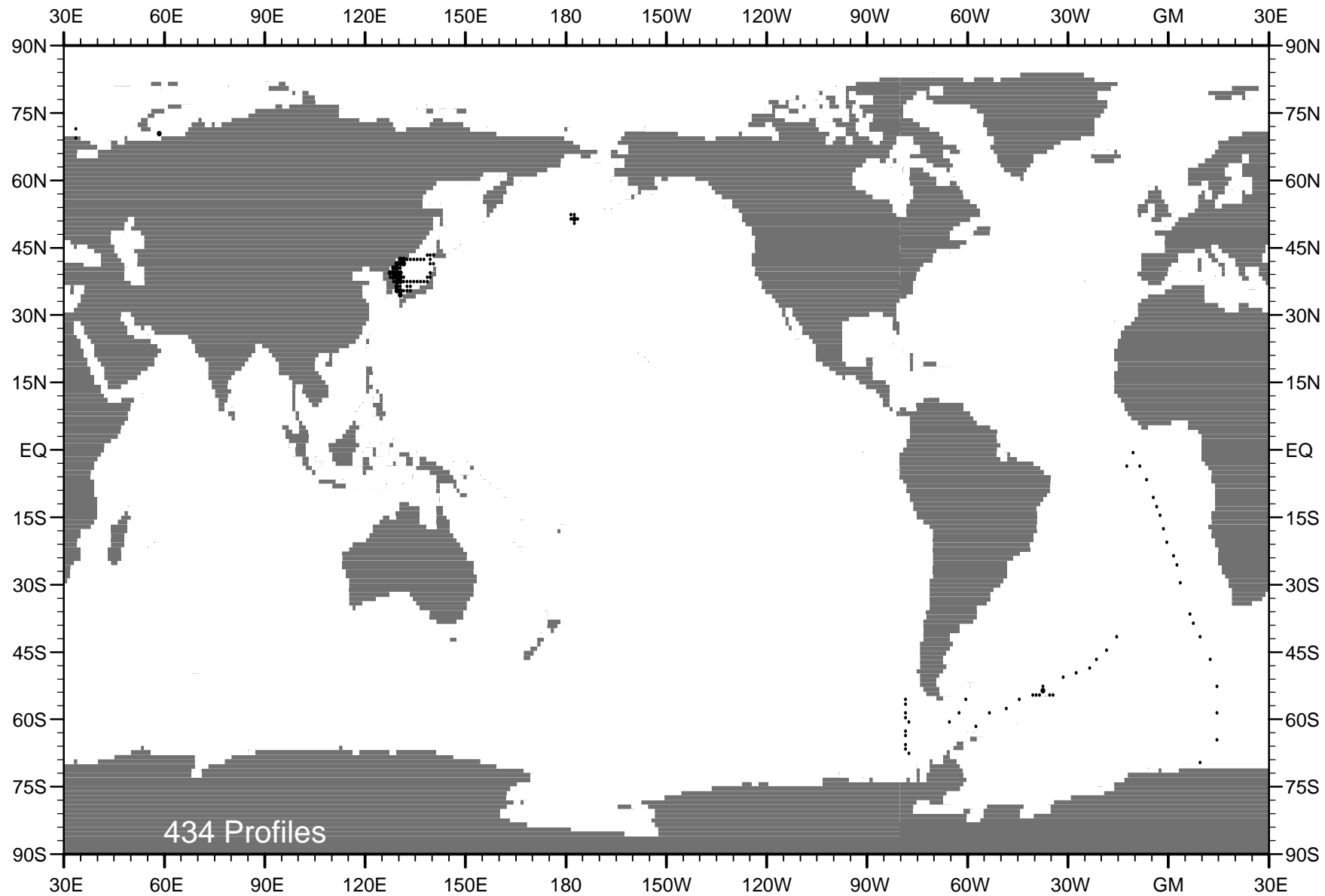


Fig. B8 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1933 .

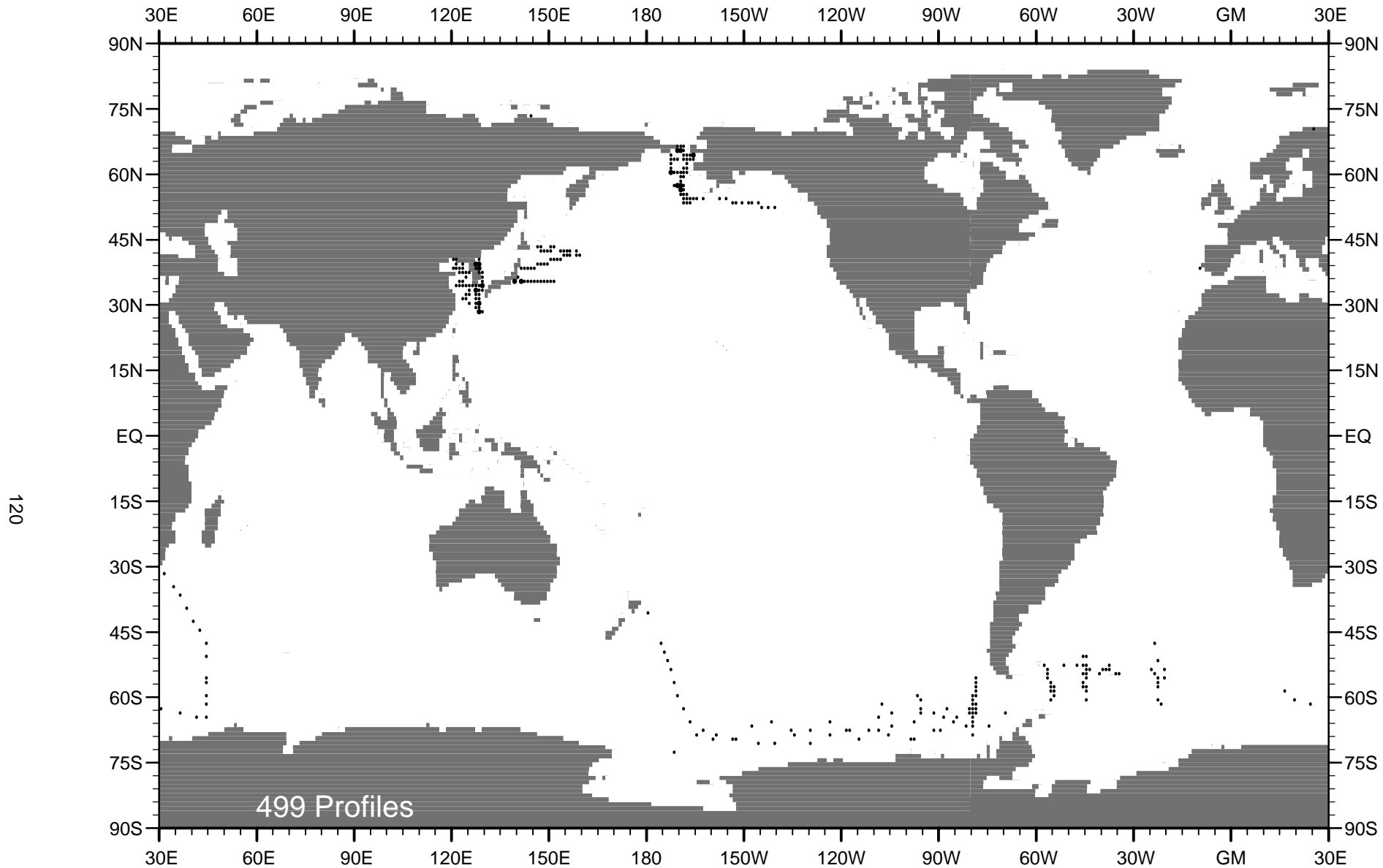


Fig. B9 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1934 .

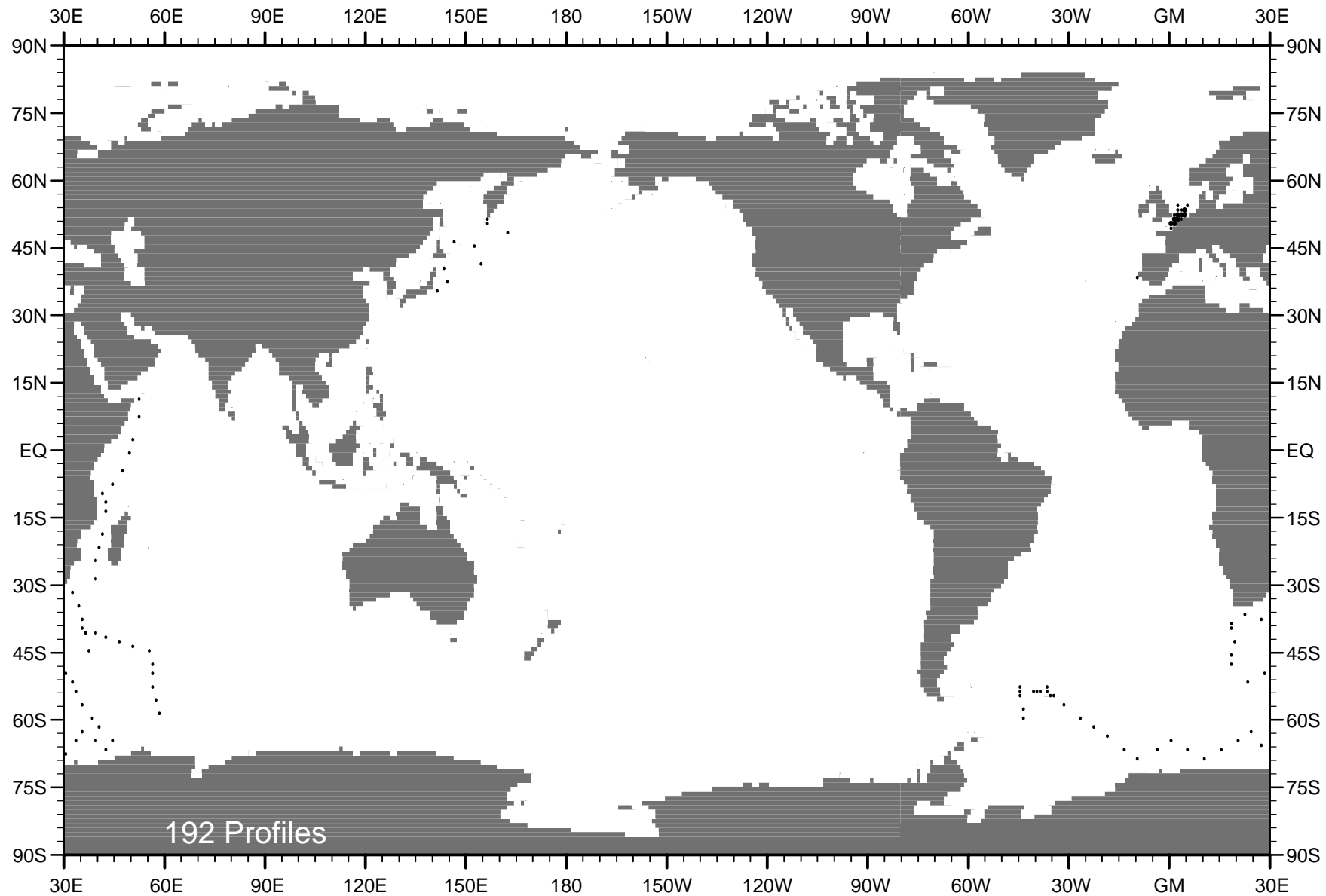


Fig. B10 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1935 .

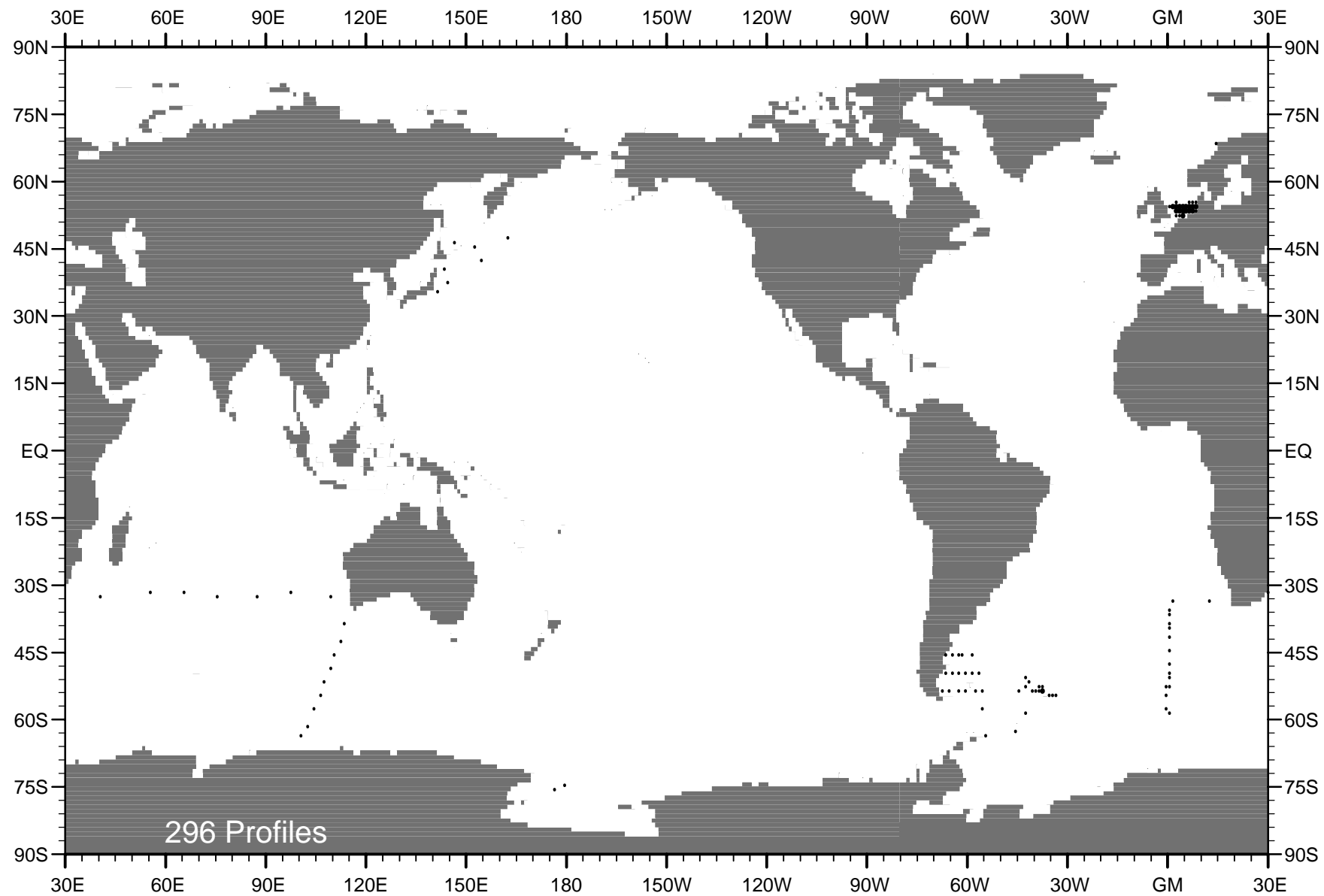


Fig. B11 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1936 .

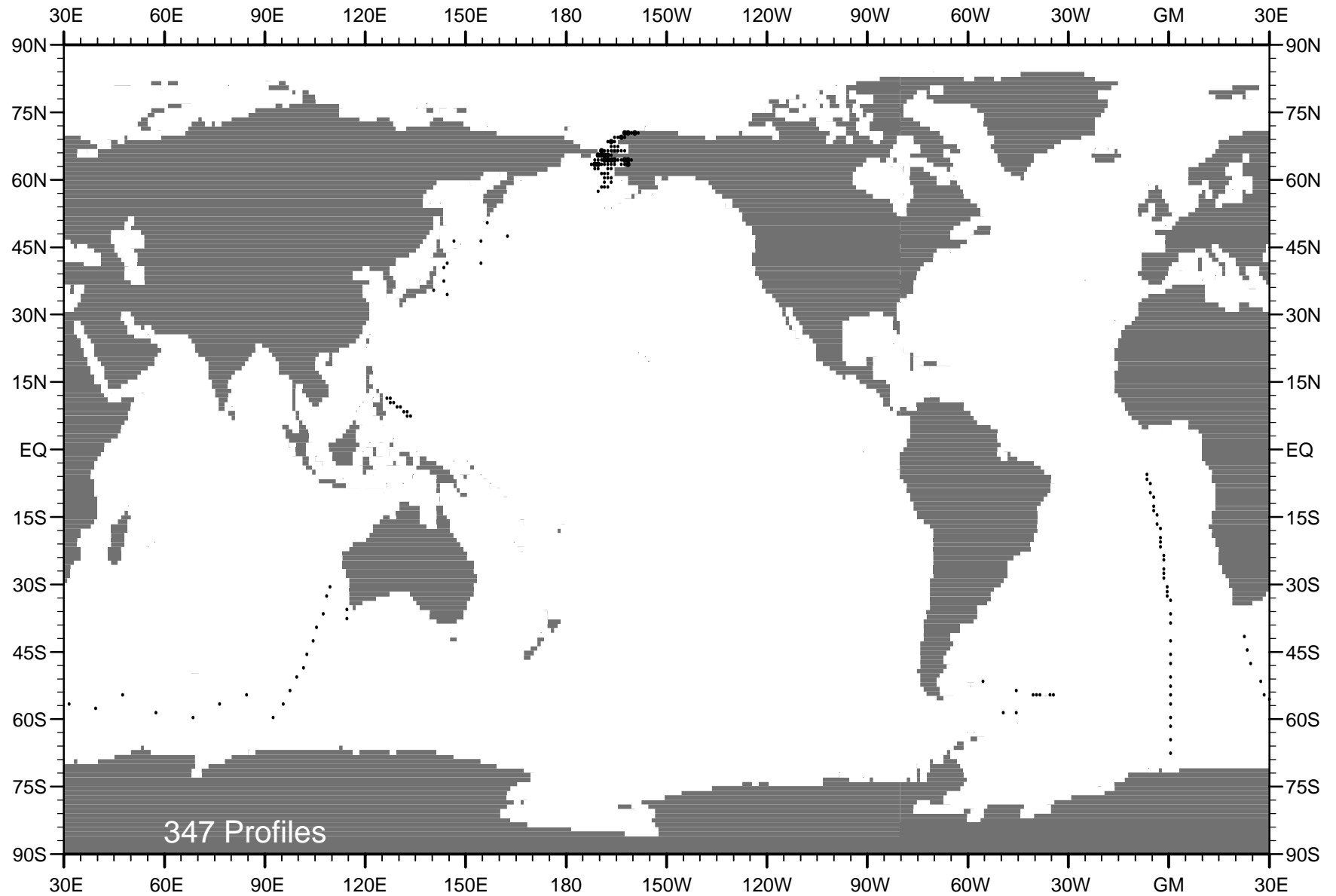


Fig. B12 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1937 .



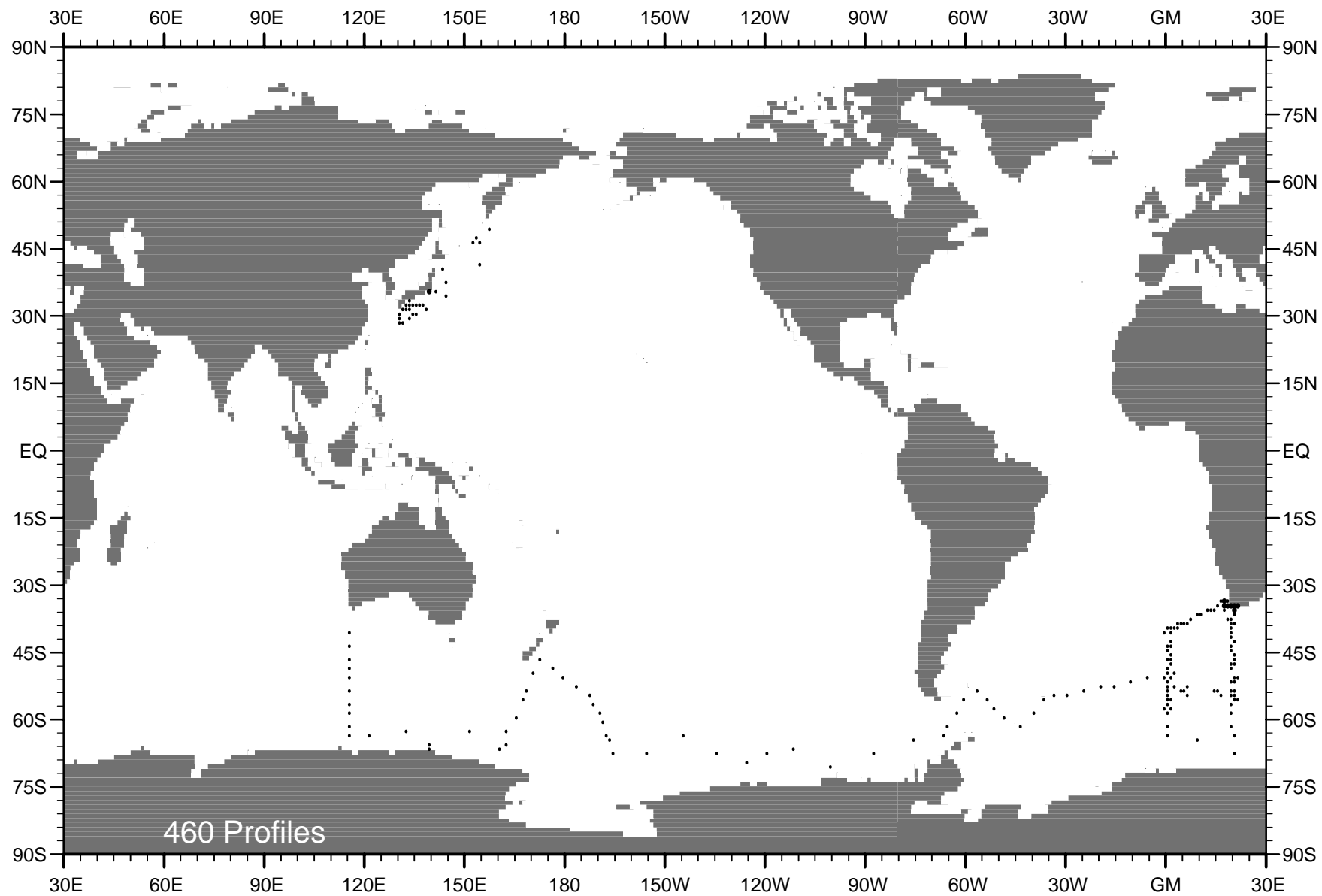


Fig. B13 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1938 .

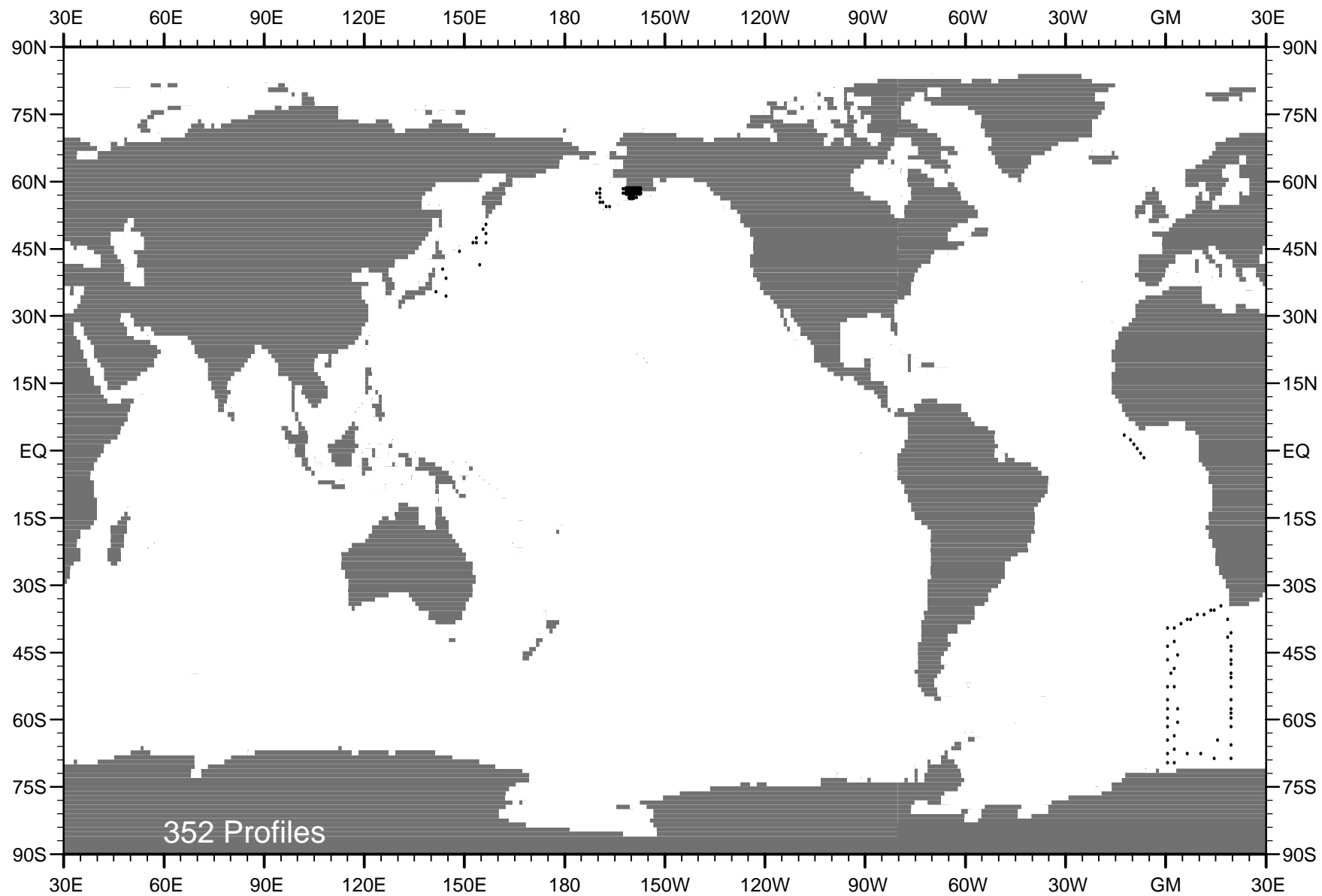


Fig. B14 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1939 .

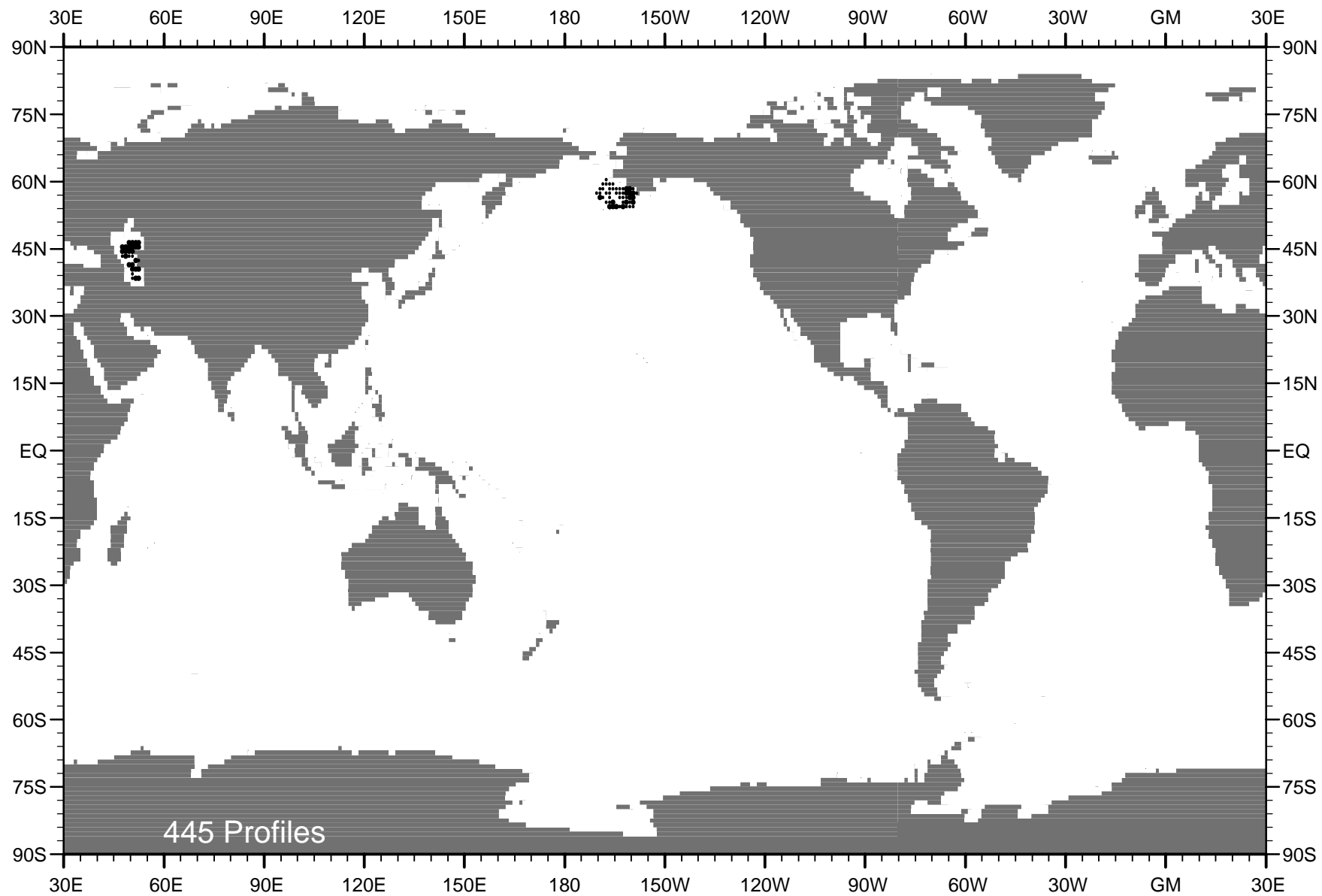


Fig. B15 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1940 .

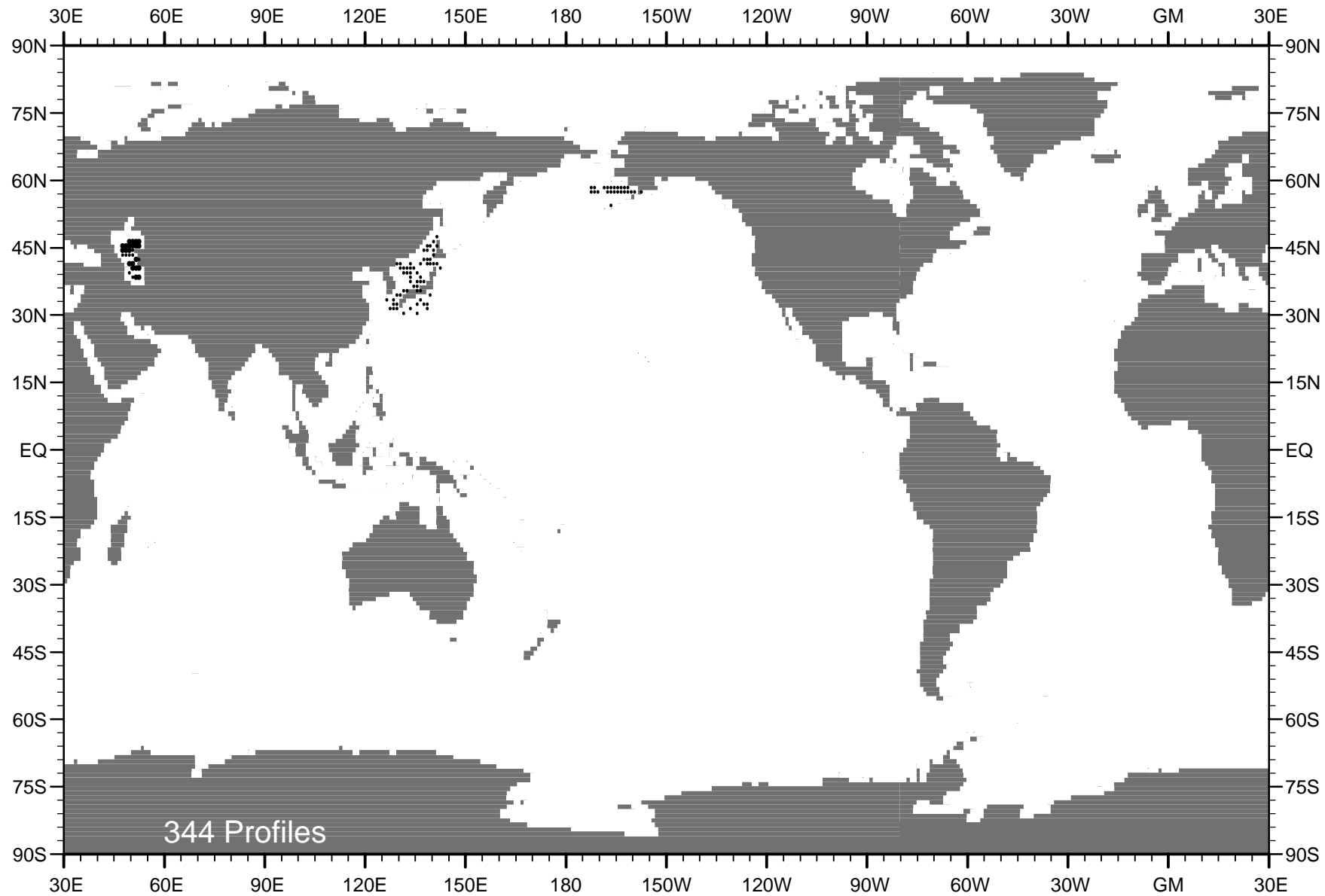


Fig. B16 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1941 .

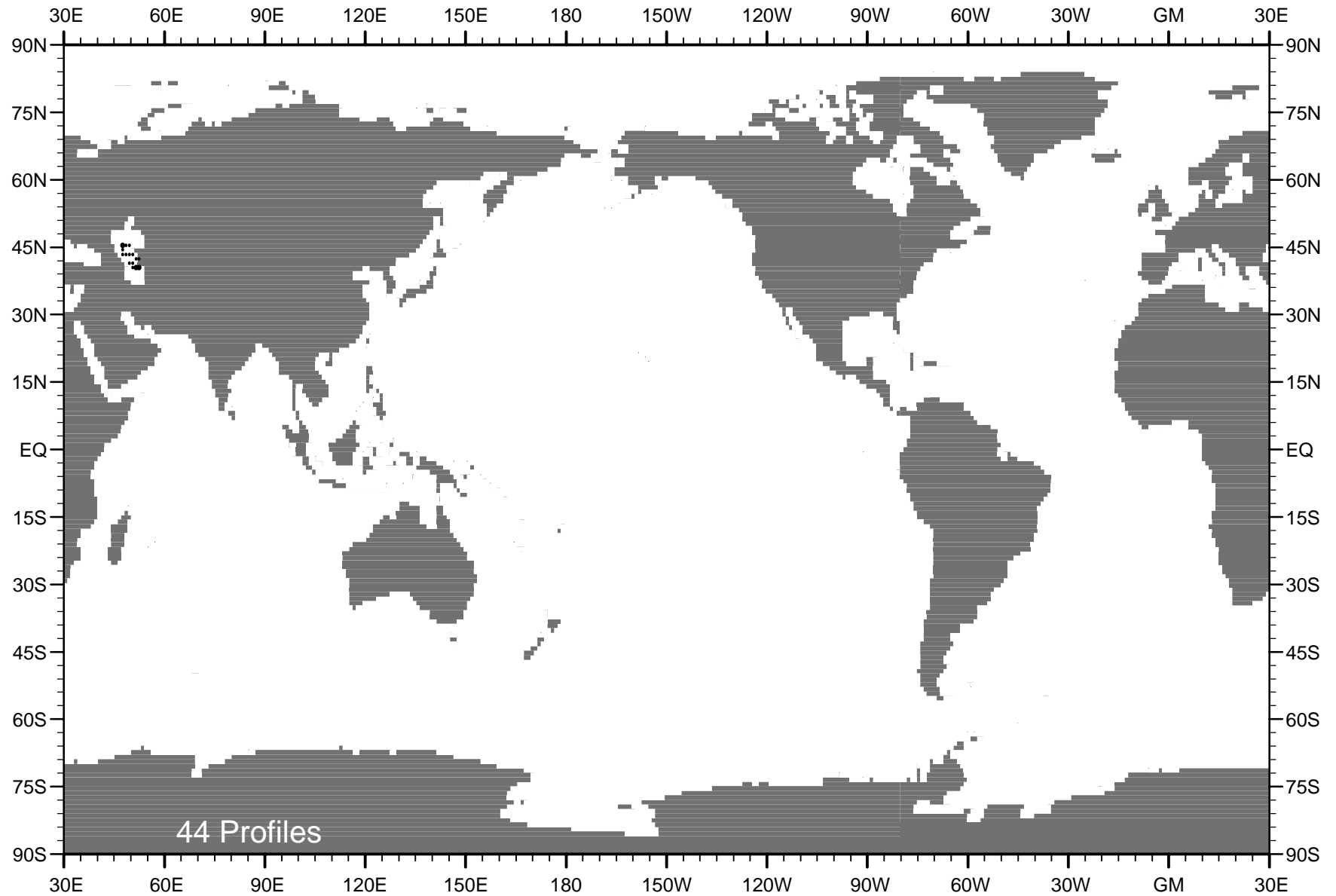


Fig. B17 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1943 .

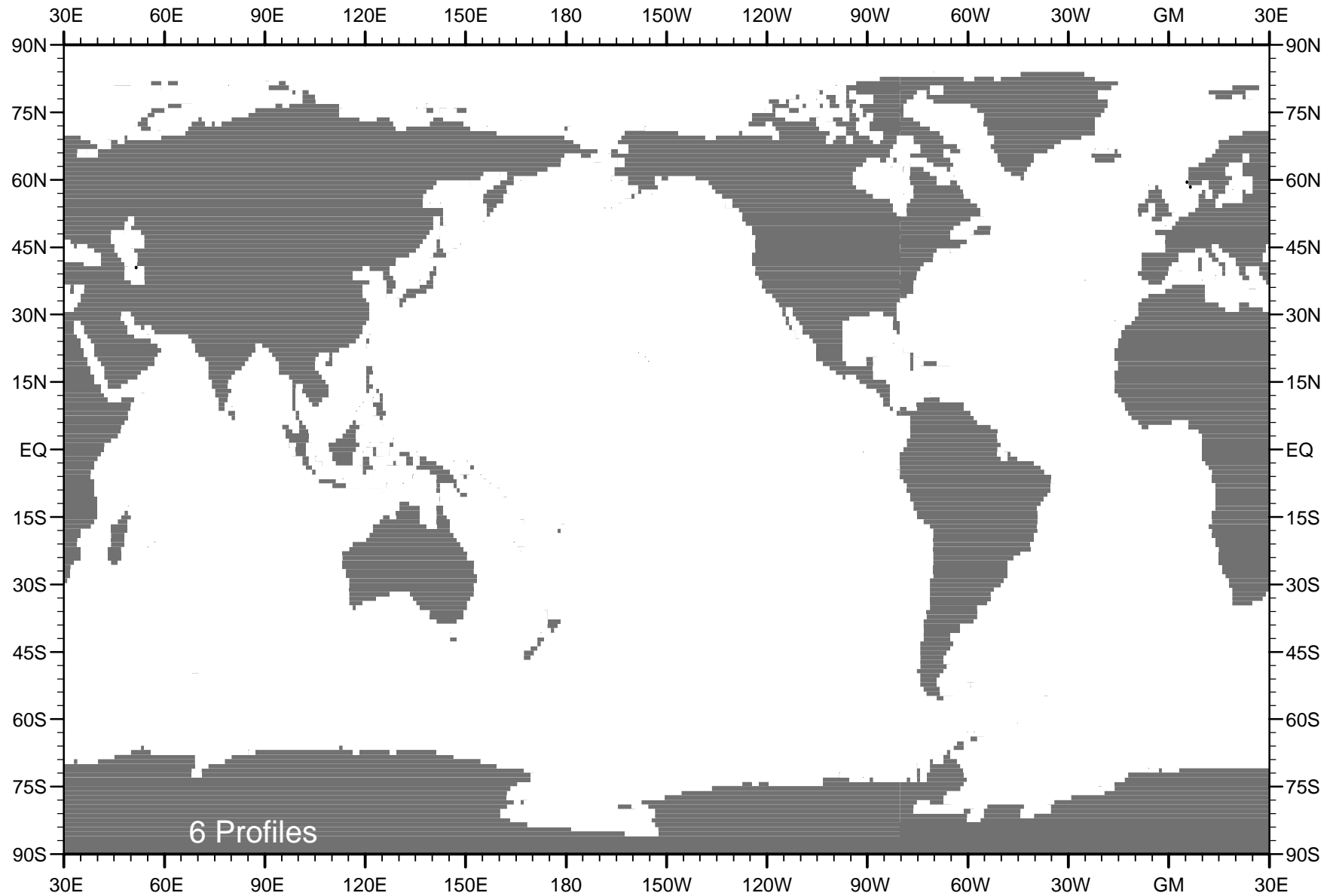


Fig. B18 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1945 .

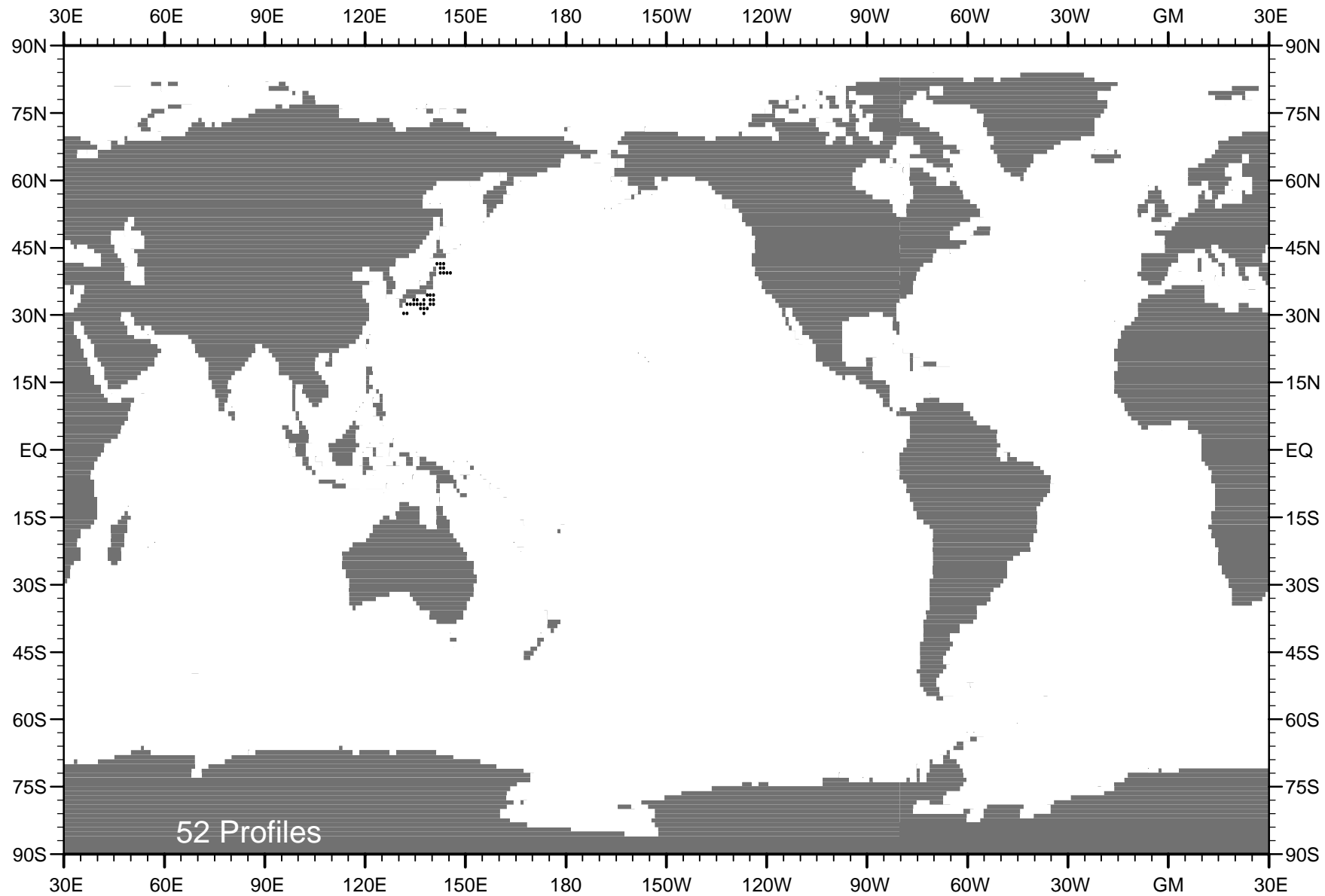


Fig. B19 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1946 .

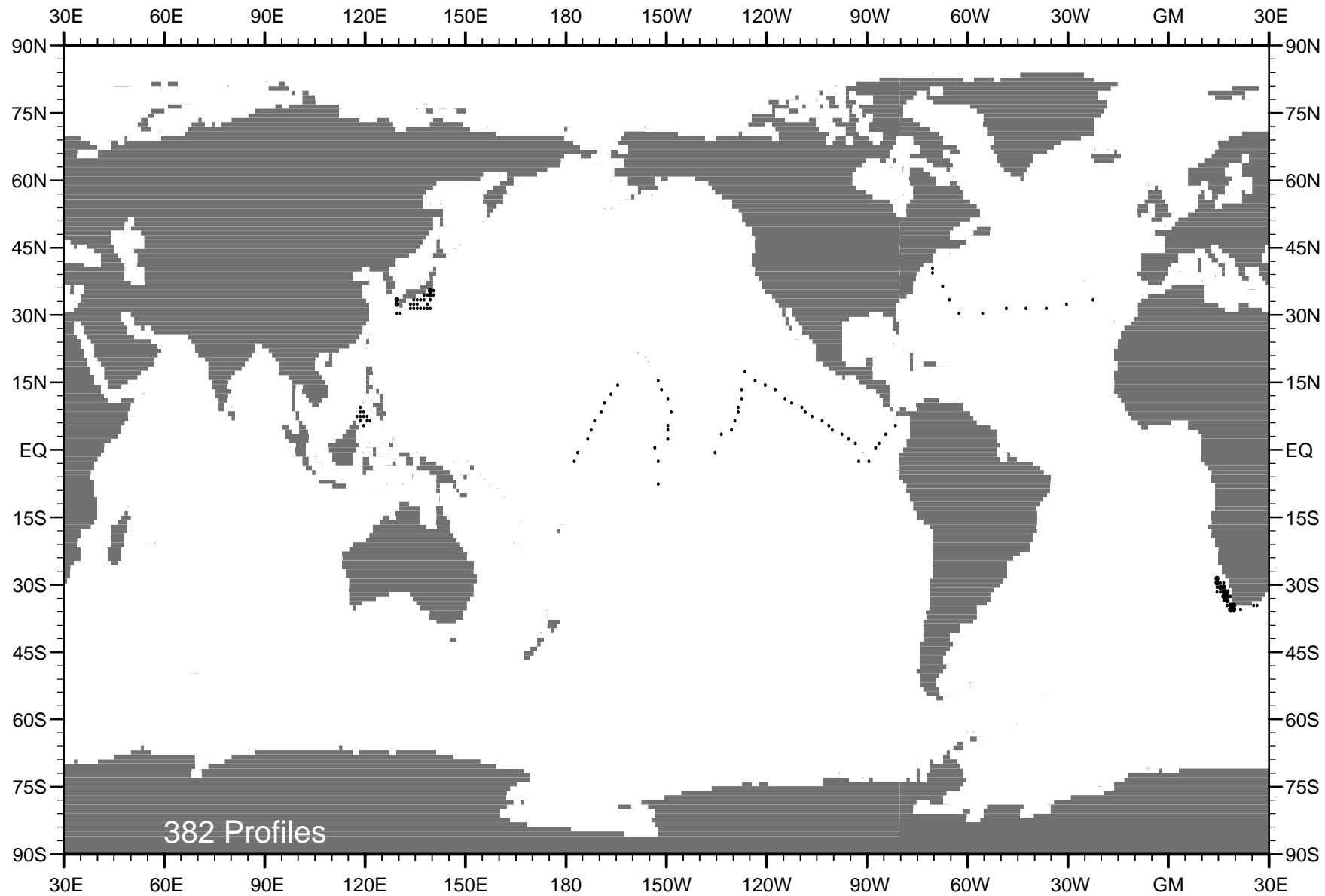


Fig. B20 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1947 .



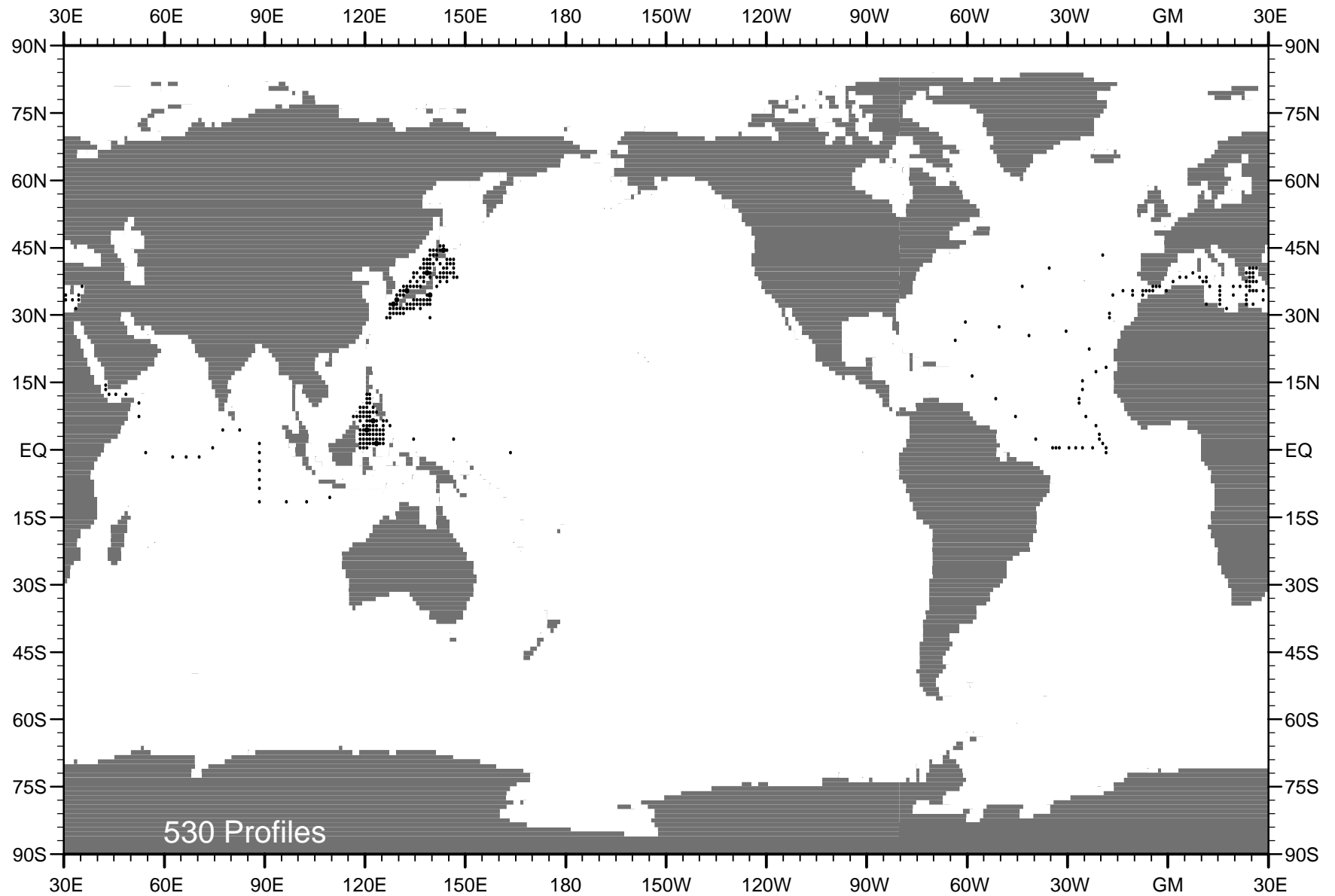


Fig. B21 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1948 .

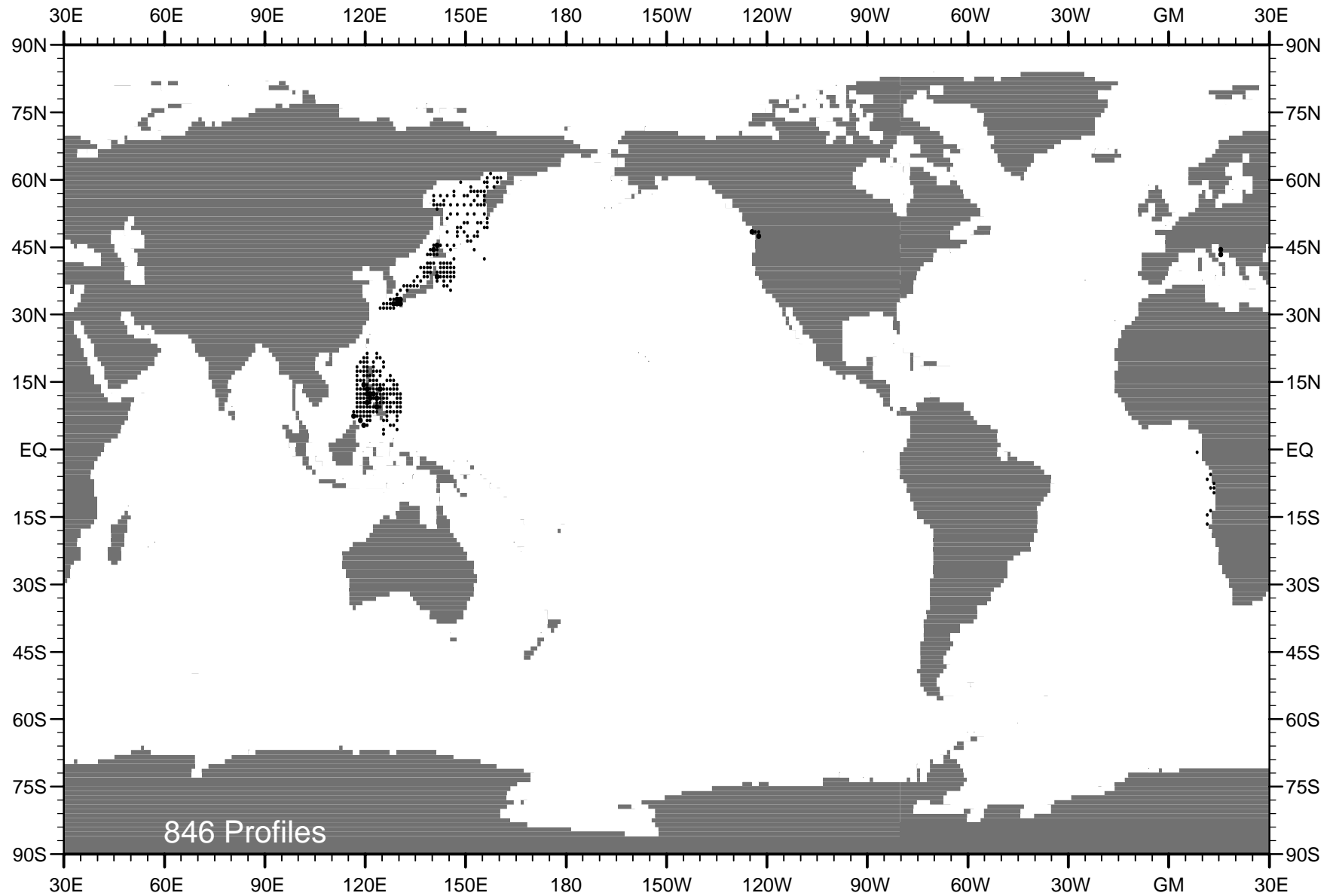


Fig. B22 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1949 .

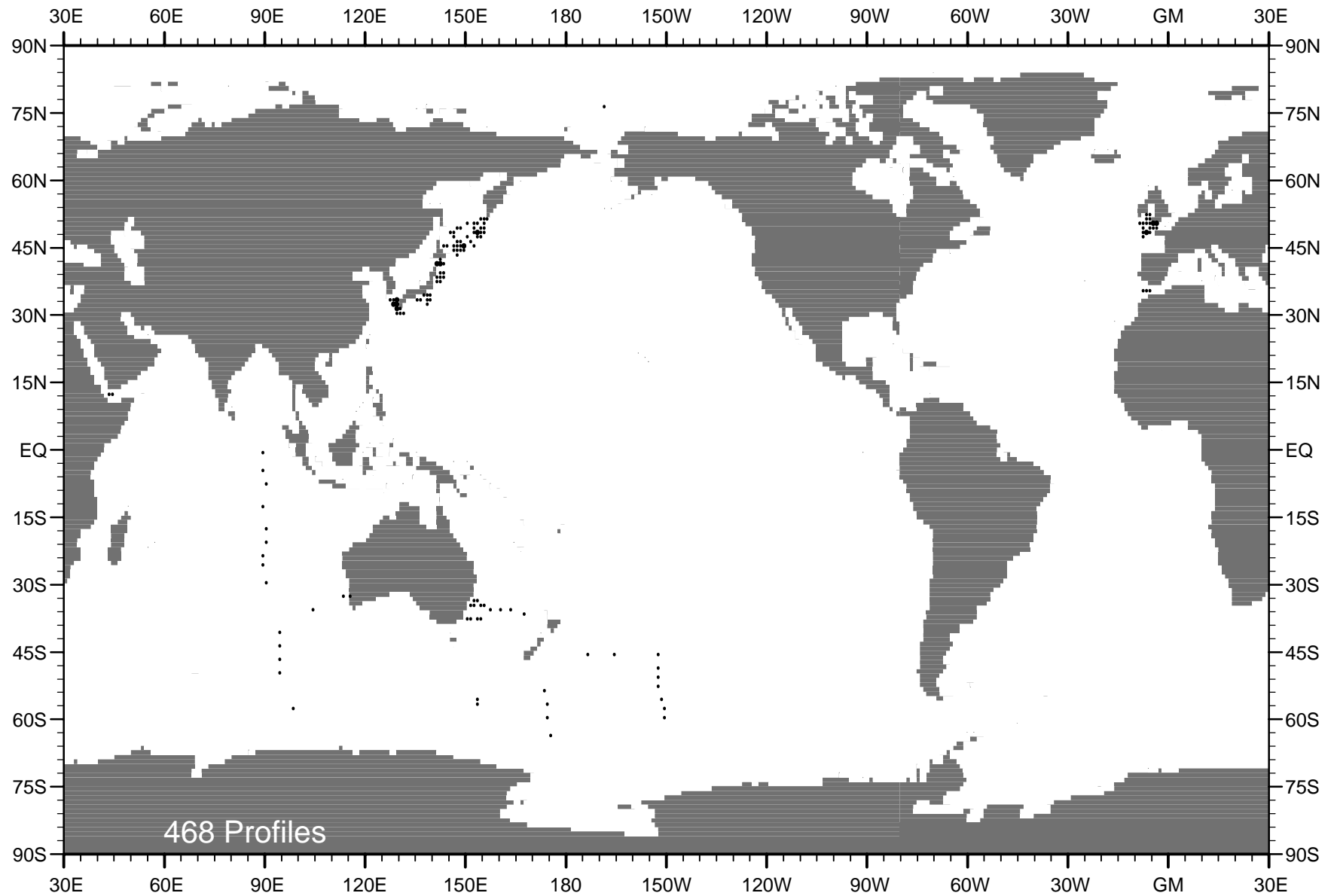


Fig. B23 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1950 .

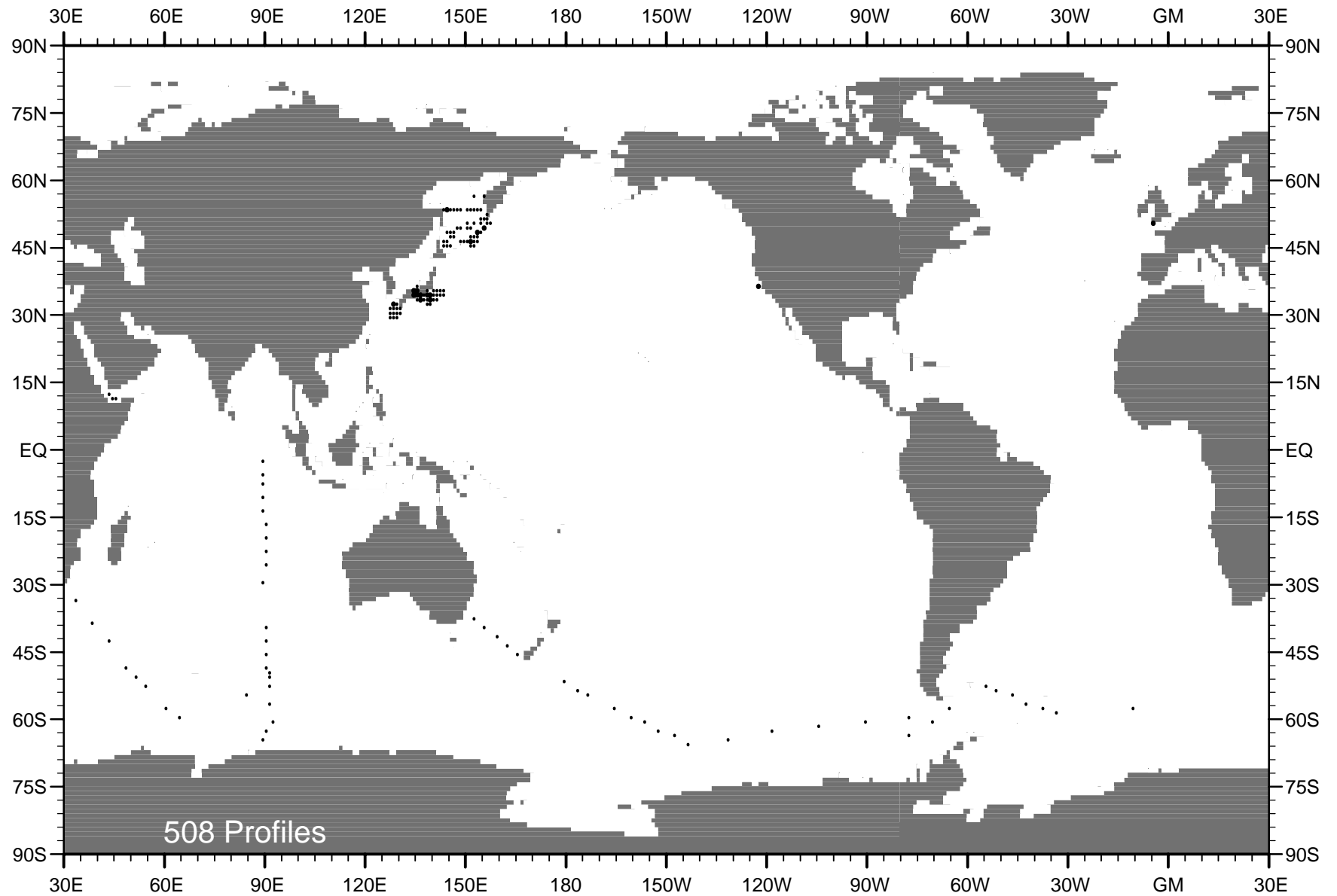


Fig. B24 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1951 .

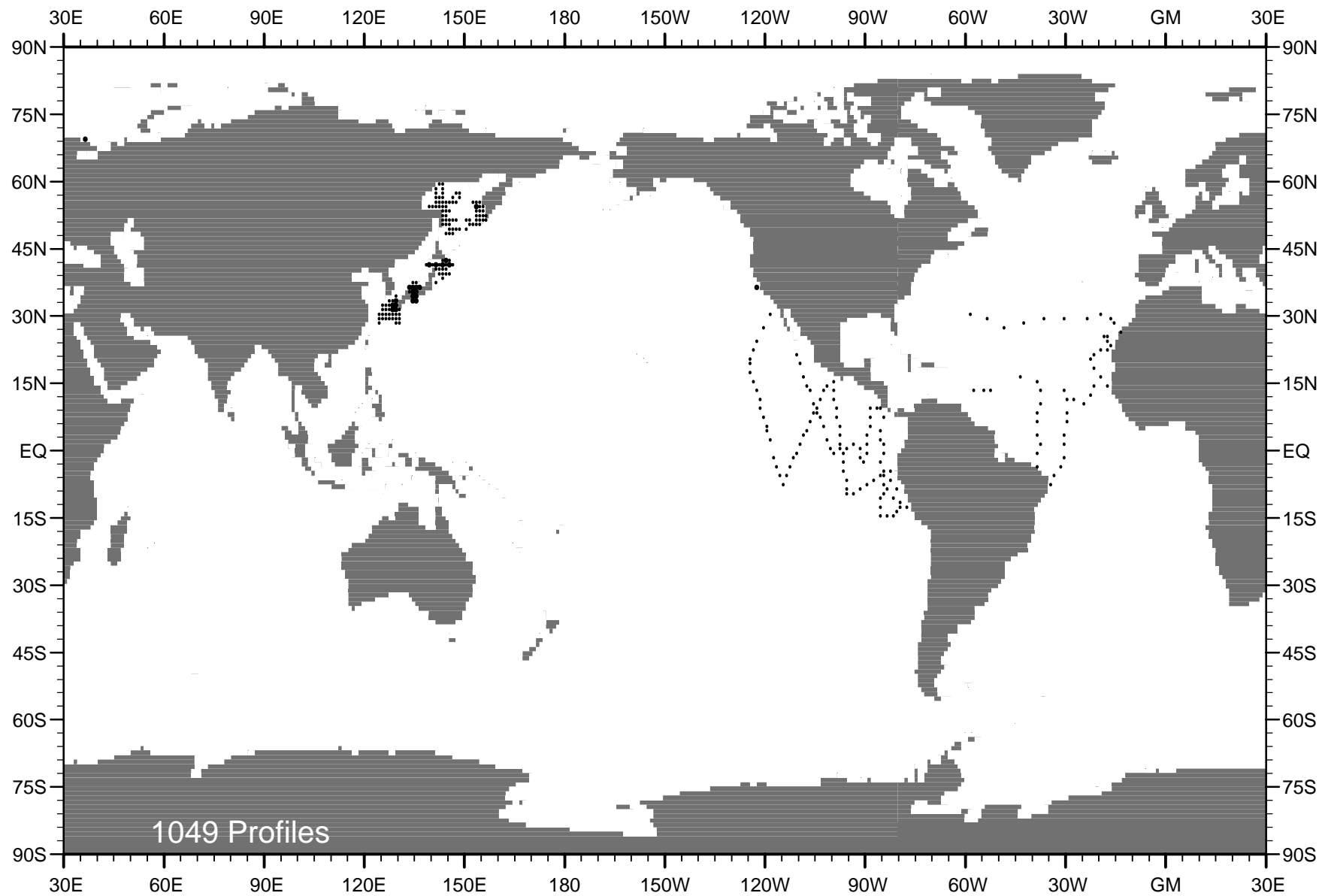


Fig. B25 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1952 .

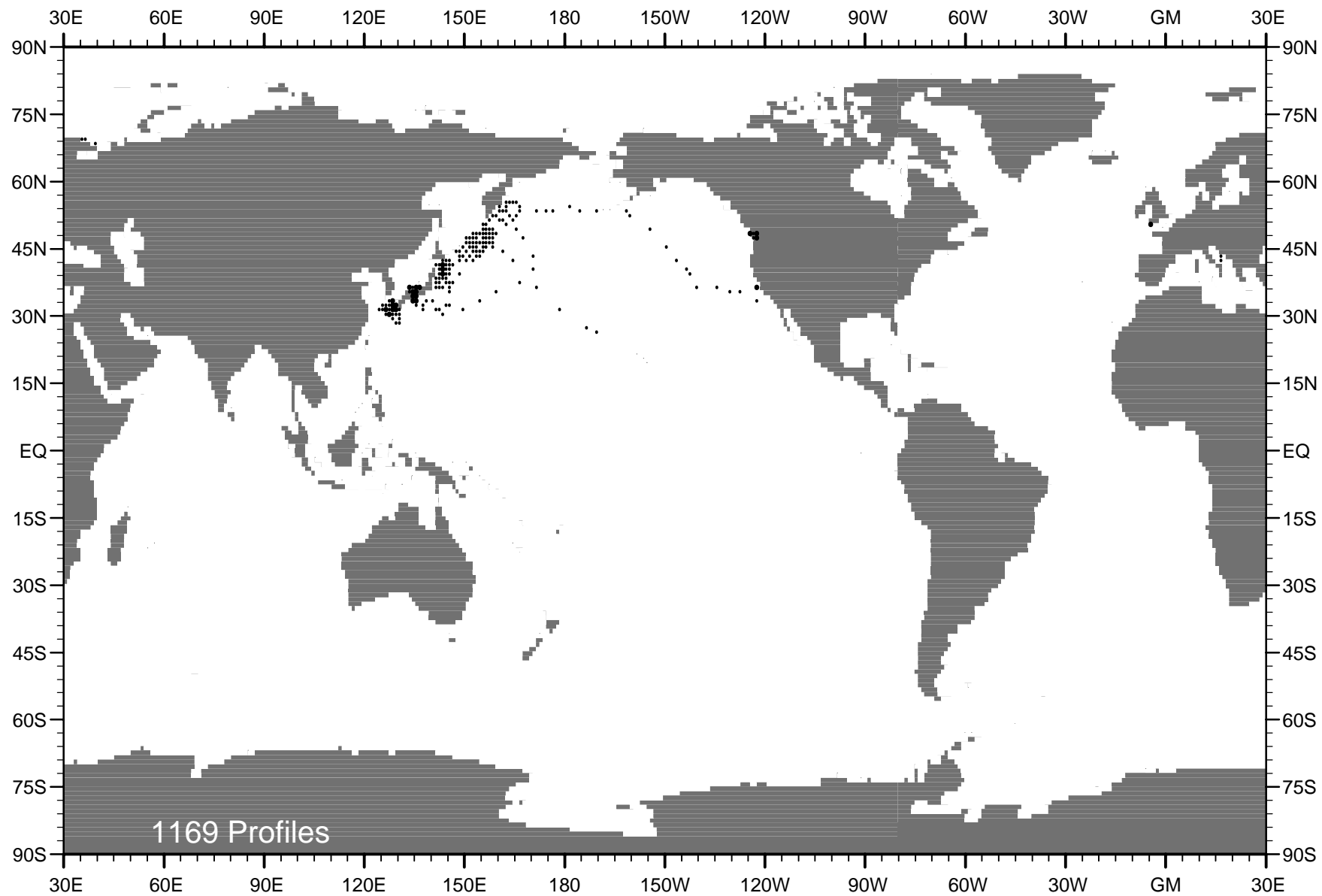


Fig. B26 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1953 .

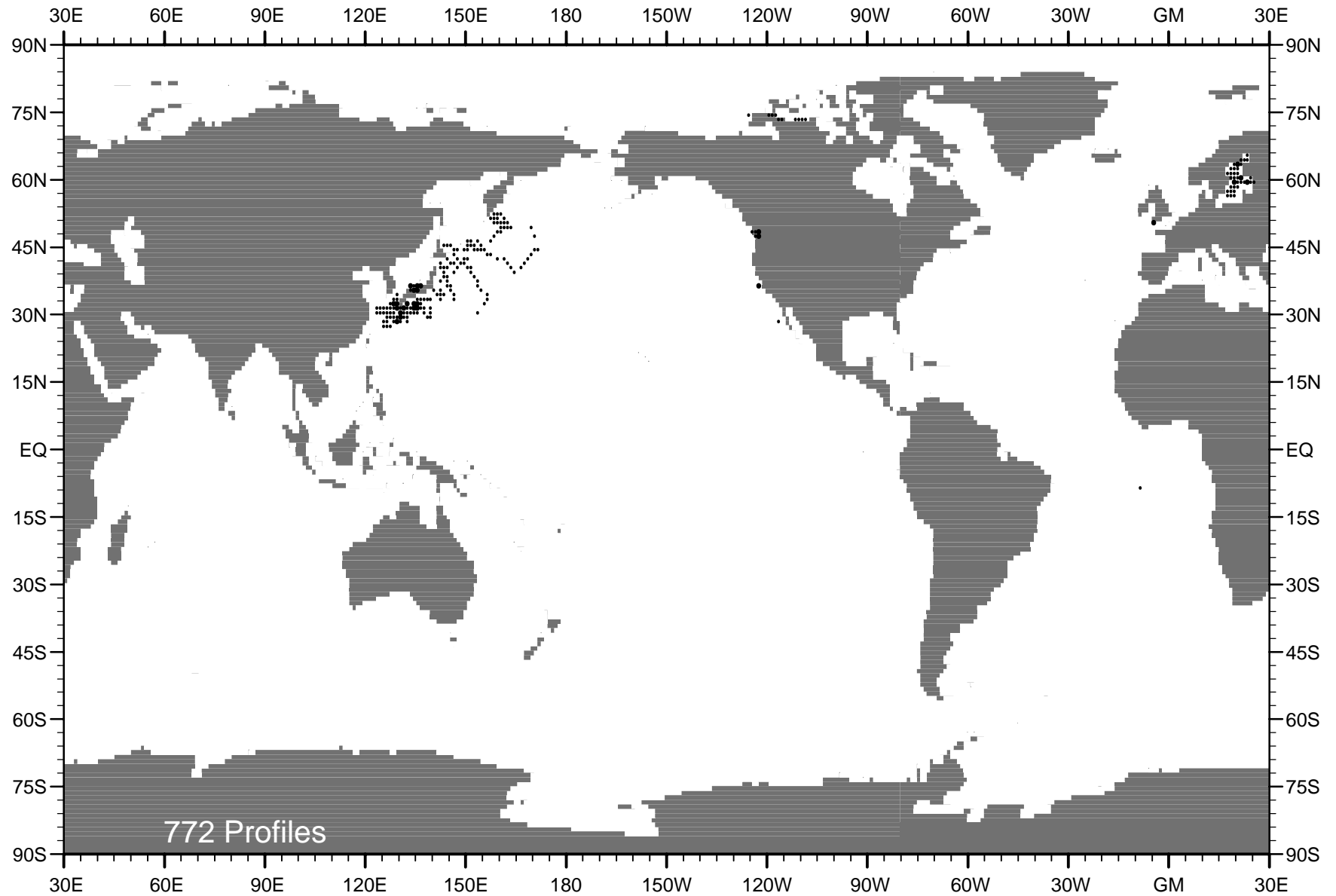


Fig. B27 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1954 .

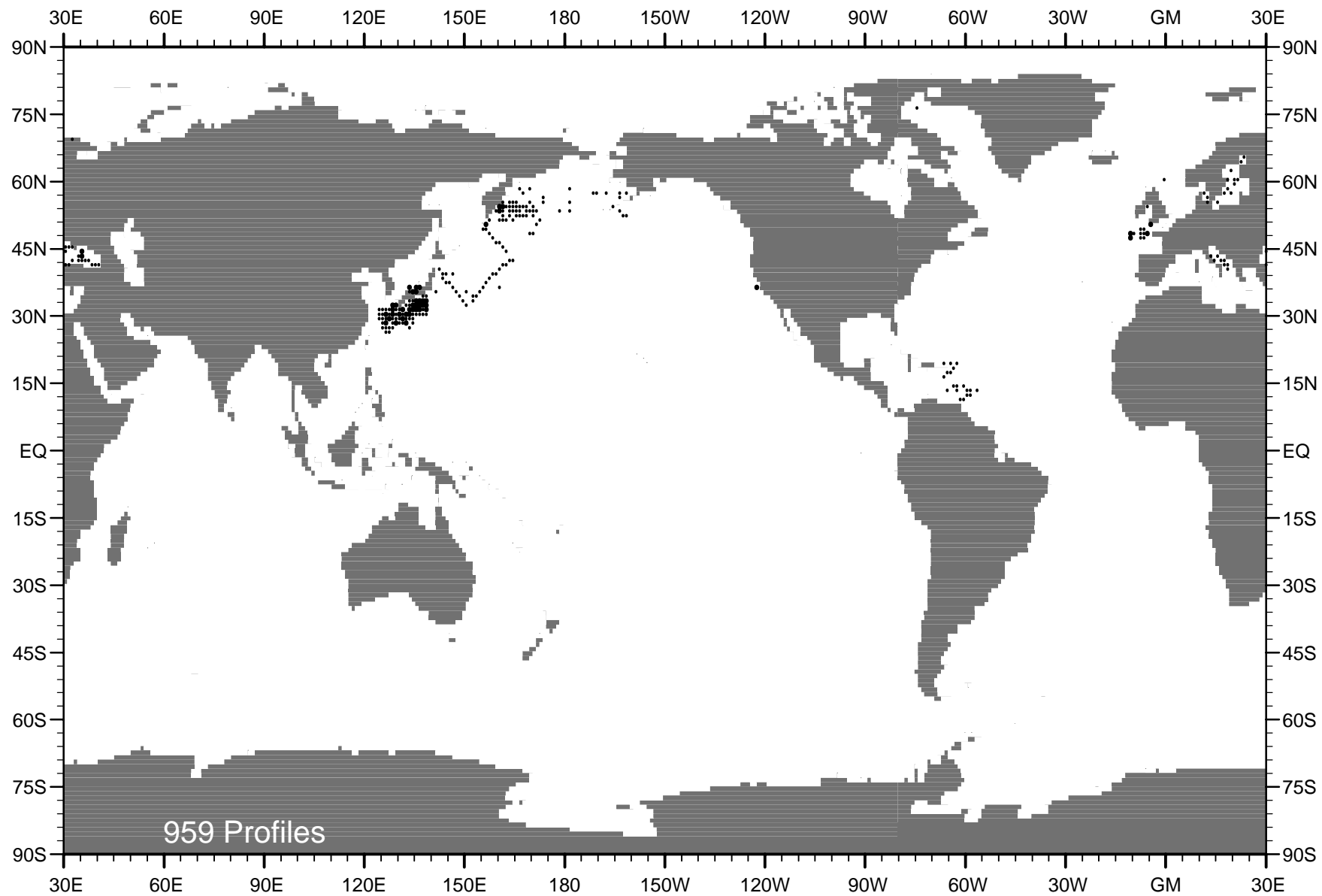


Fig. B28 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1955 .



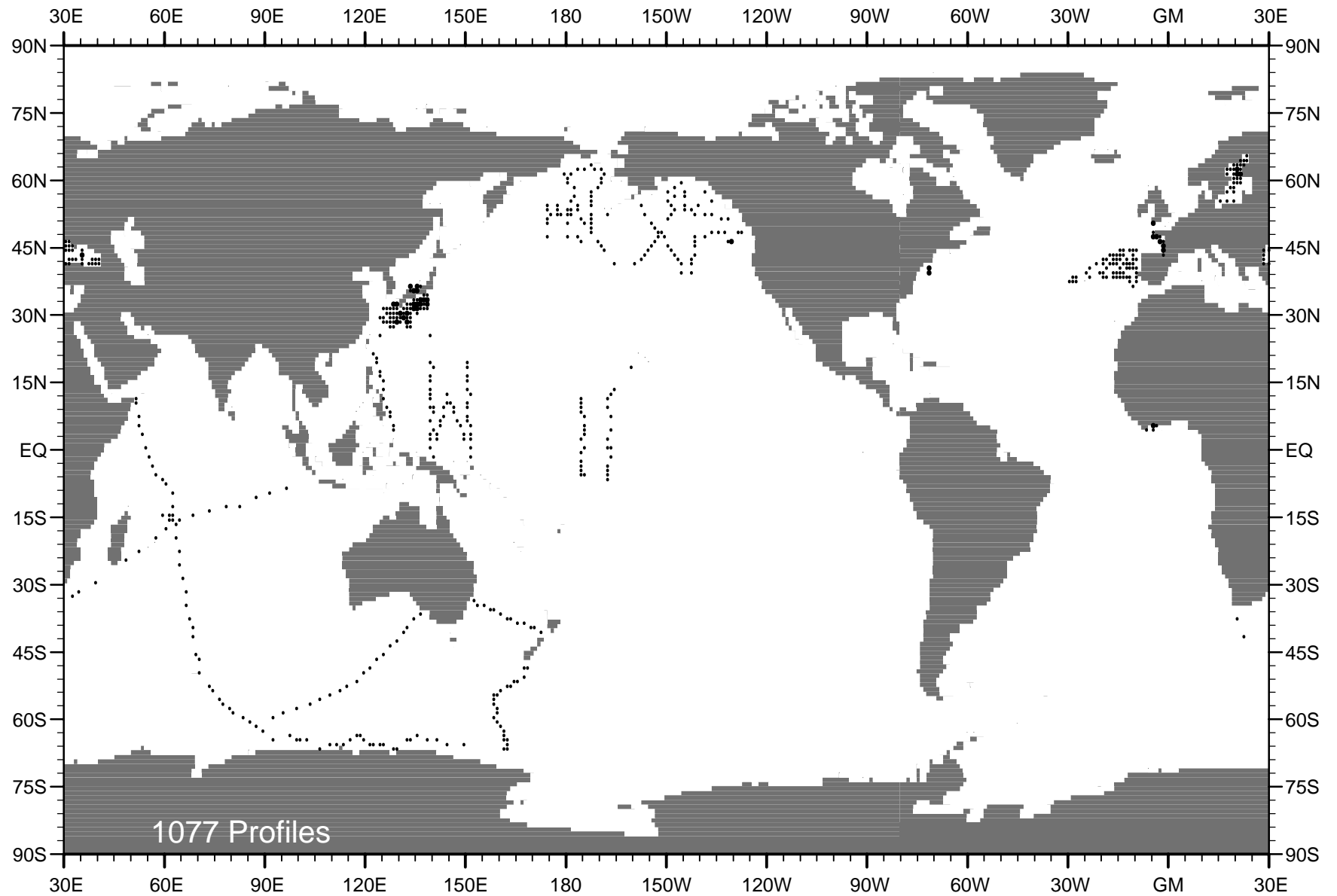


Fig. B29 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1956 .

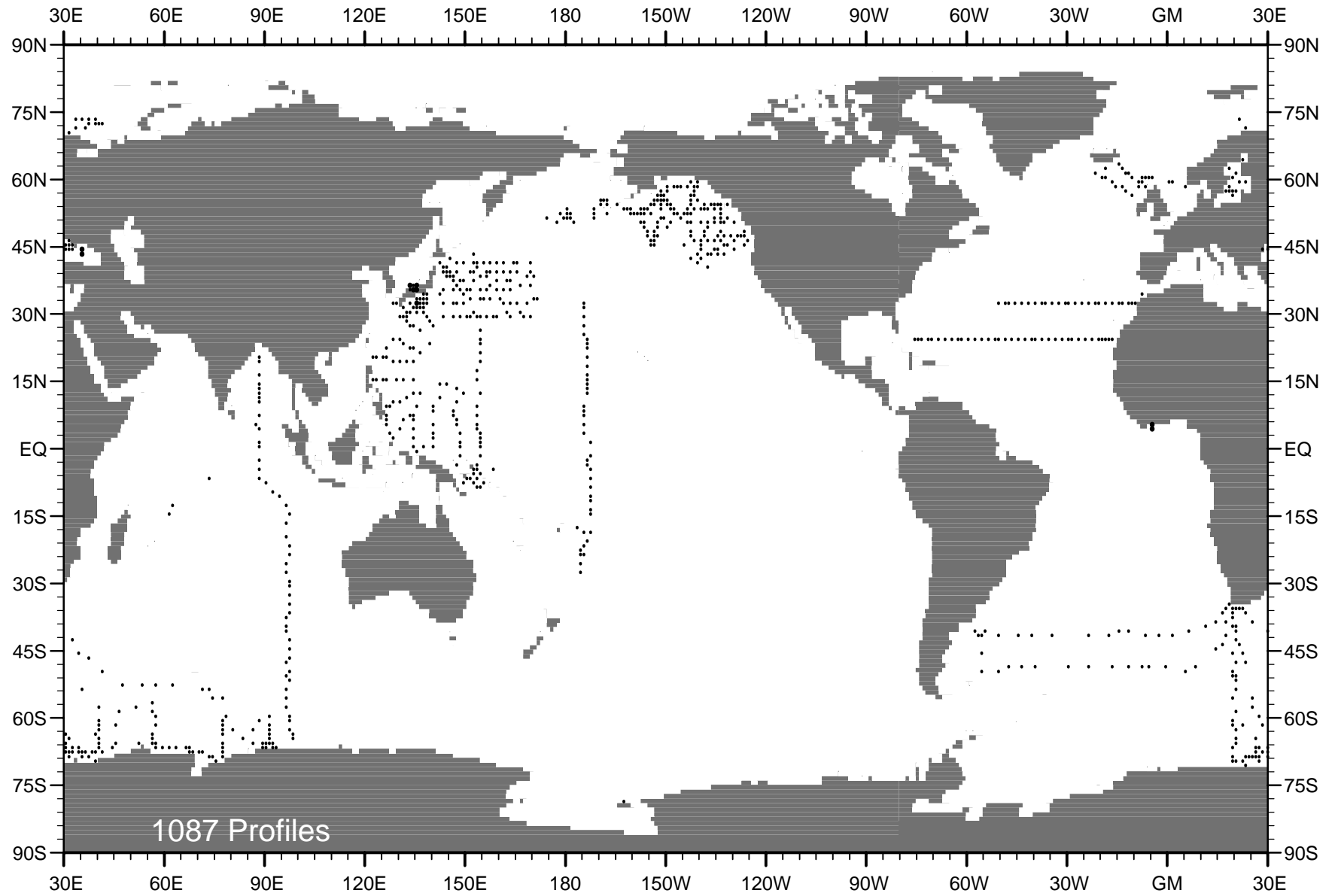


Fig. B30 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1957 .

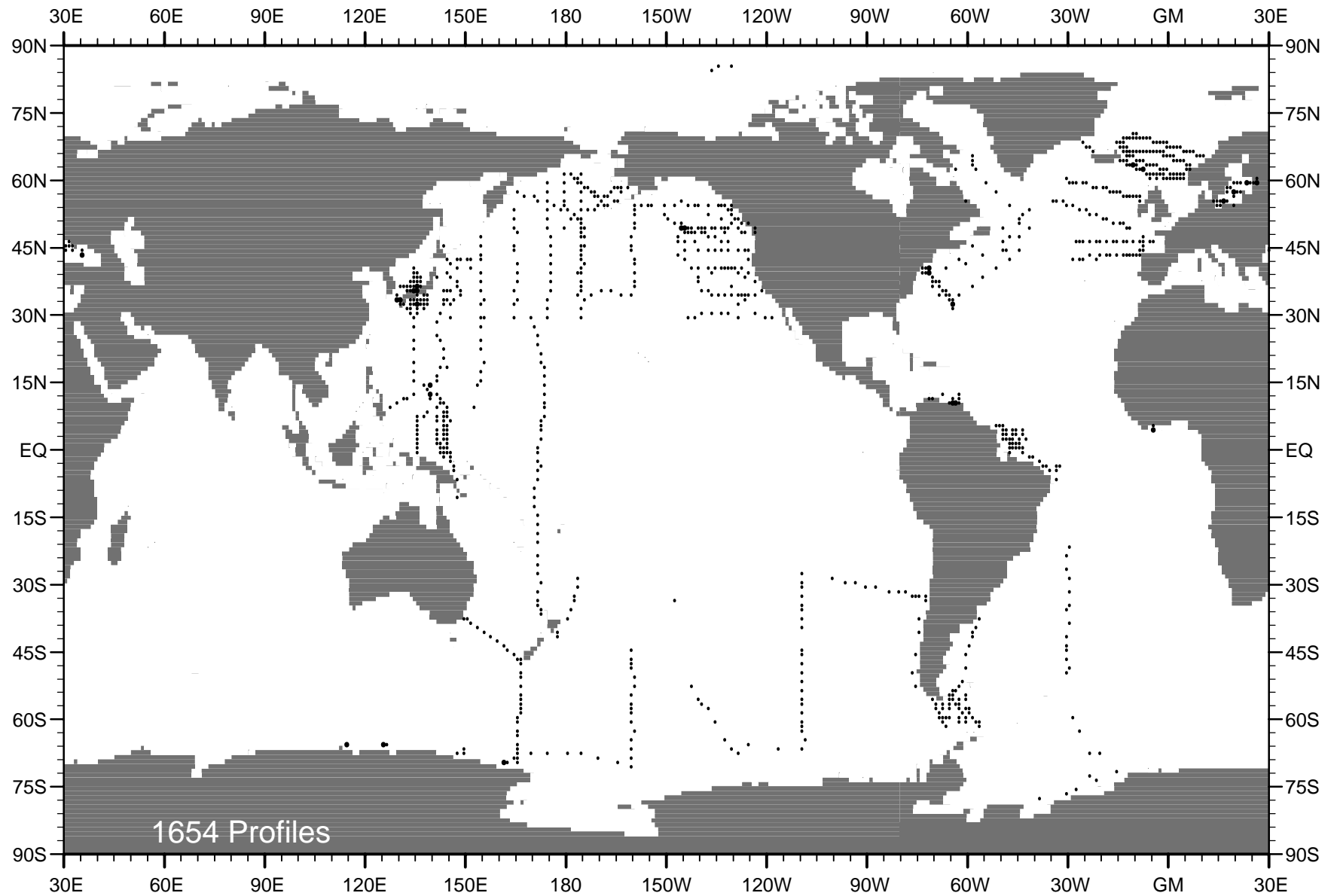


Fig. B31 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1958 .

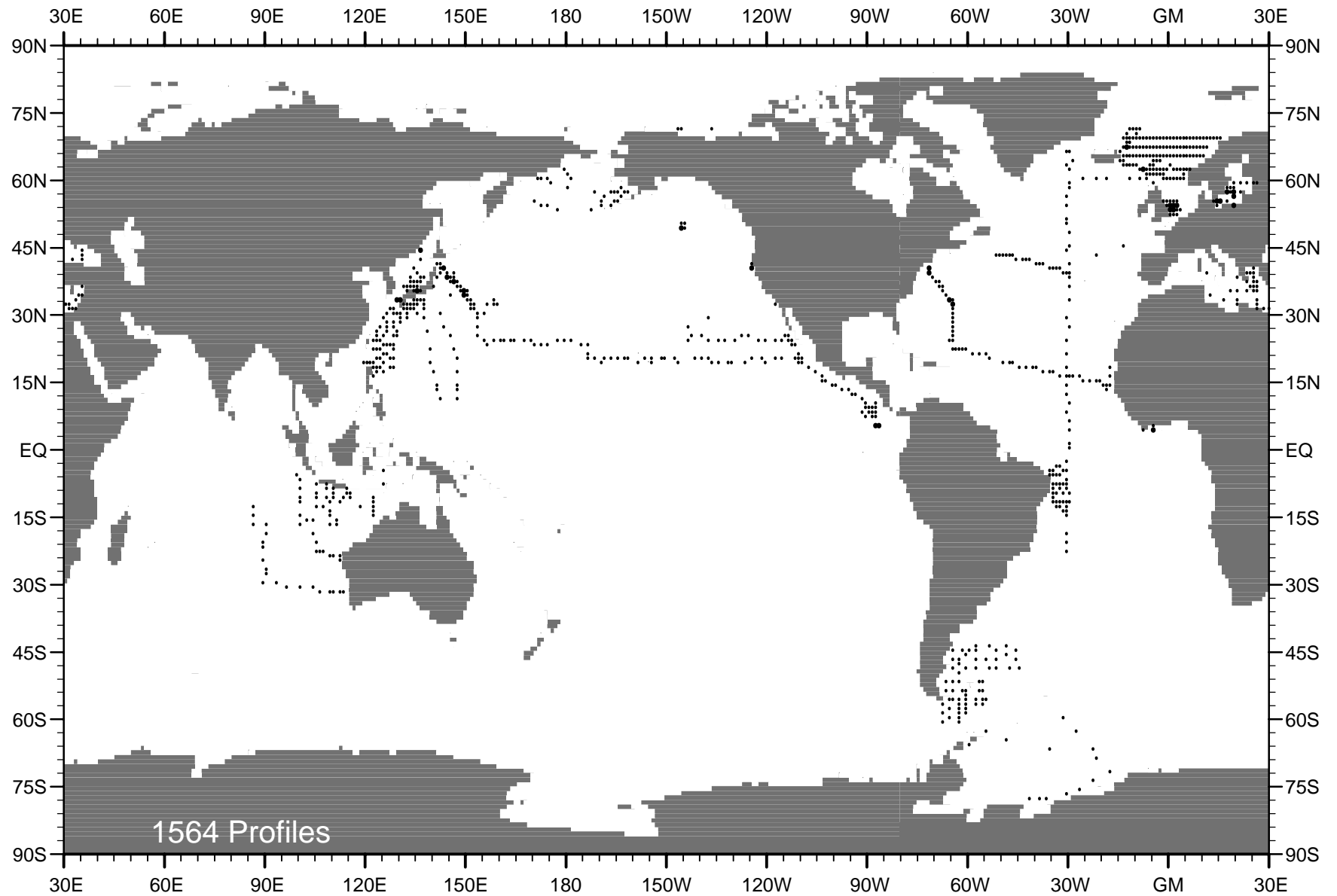


Fig. B32 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1959 .

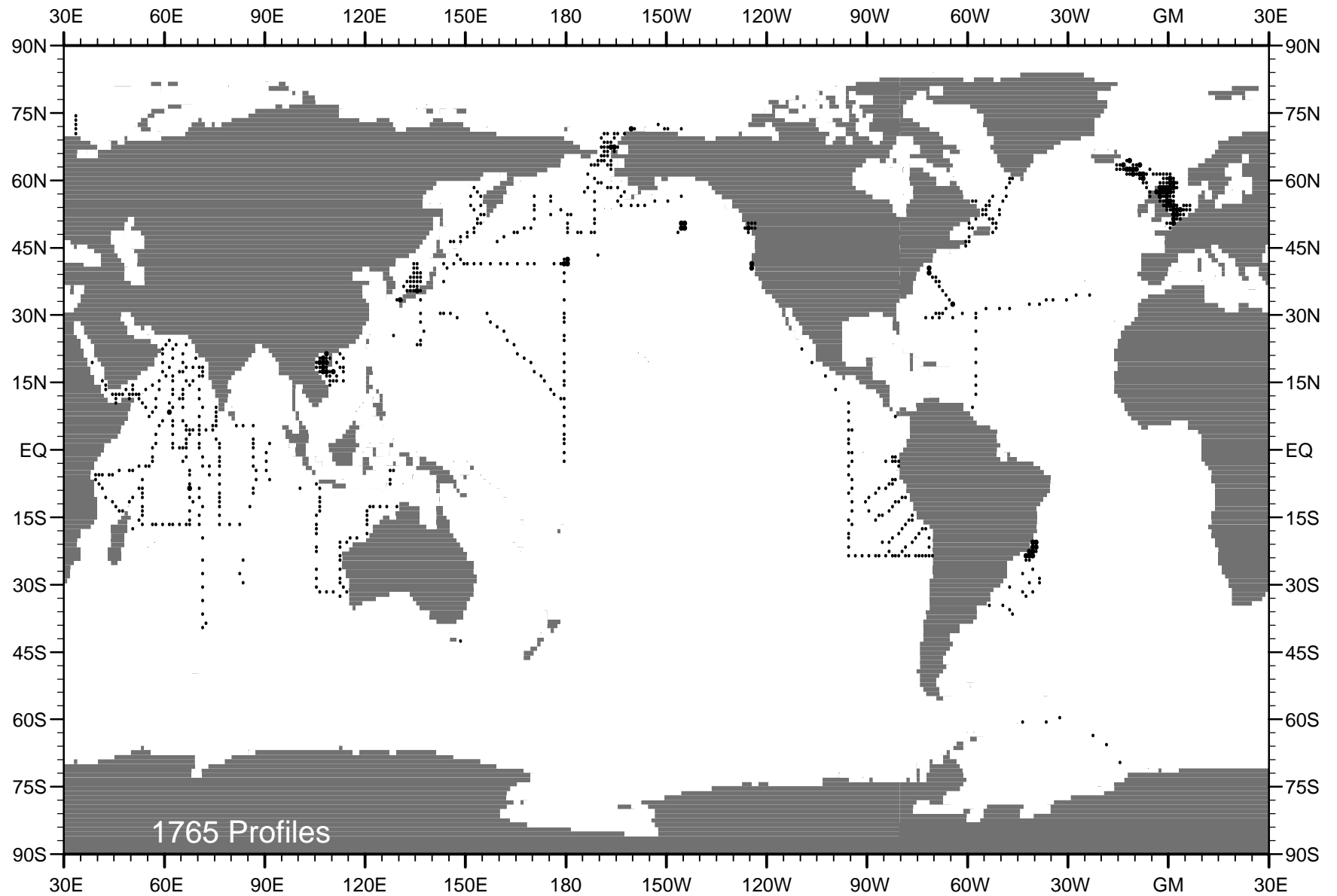


Fig. B33 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1960 .

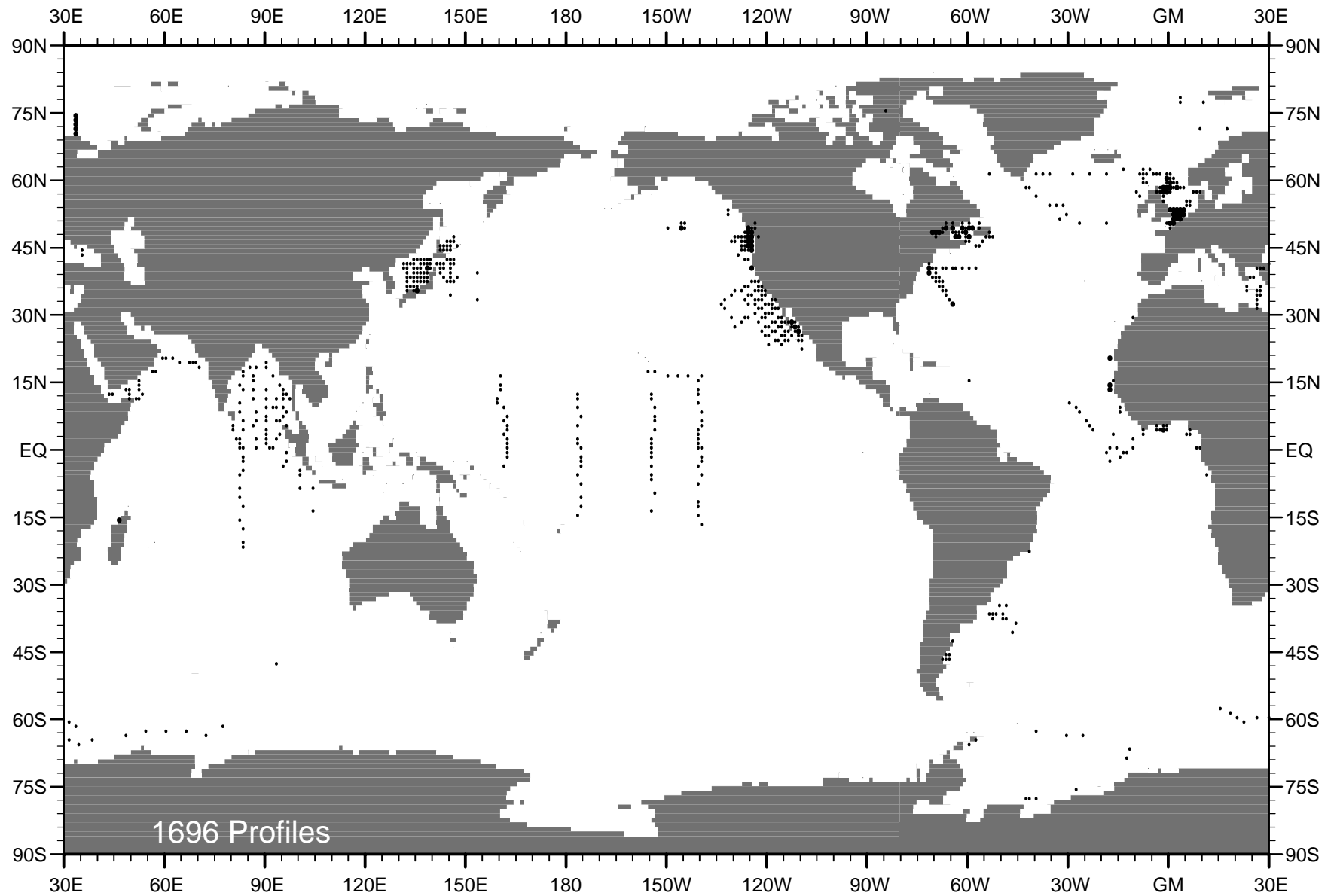


Fig. B34 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1961 .

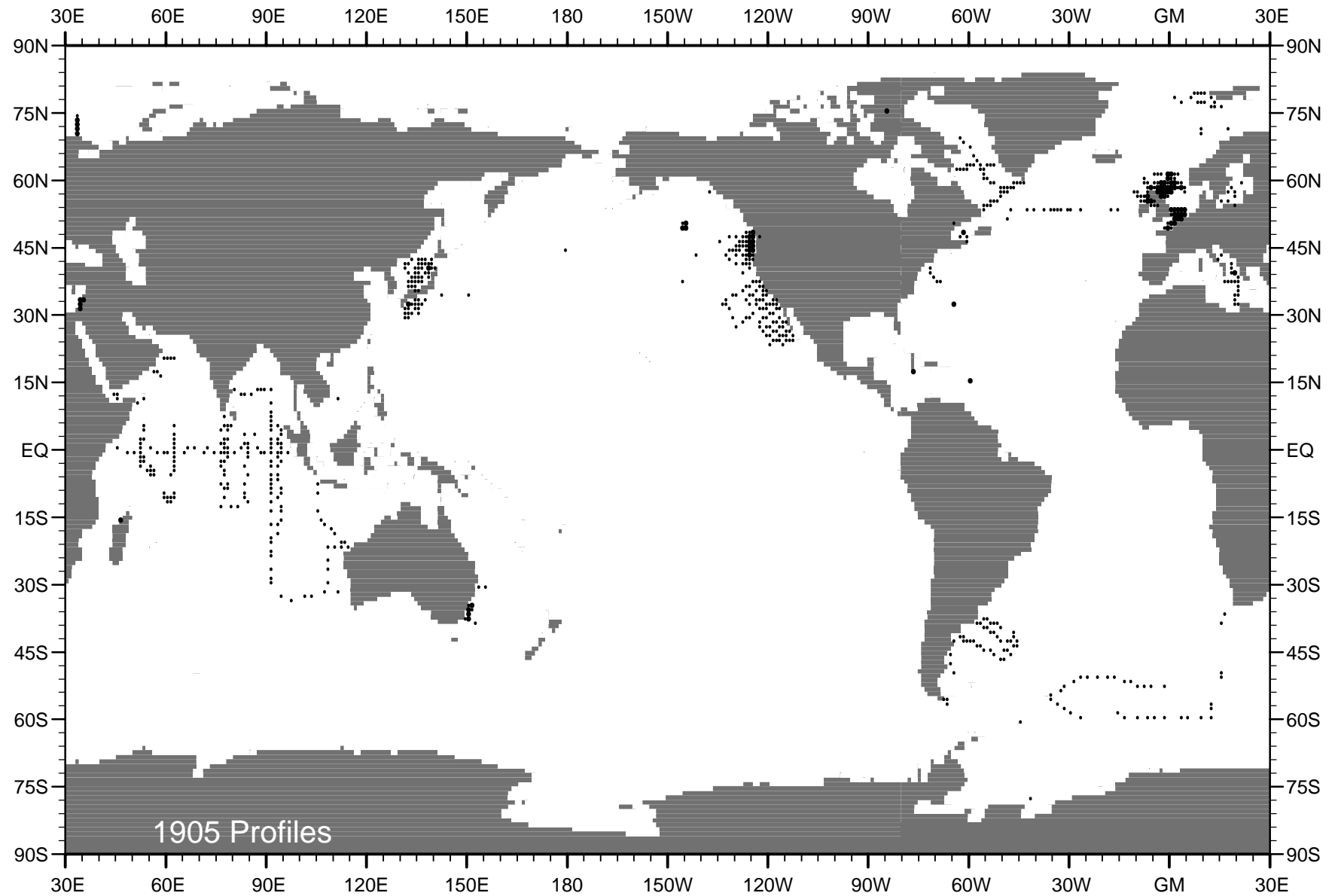


Fig. B35 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1962 .

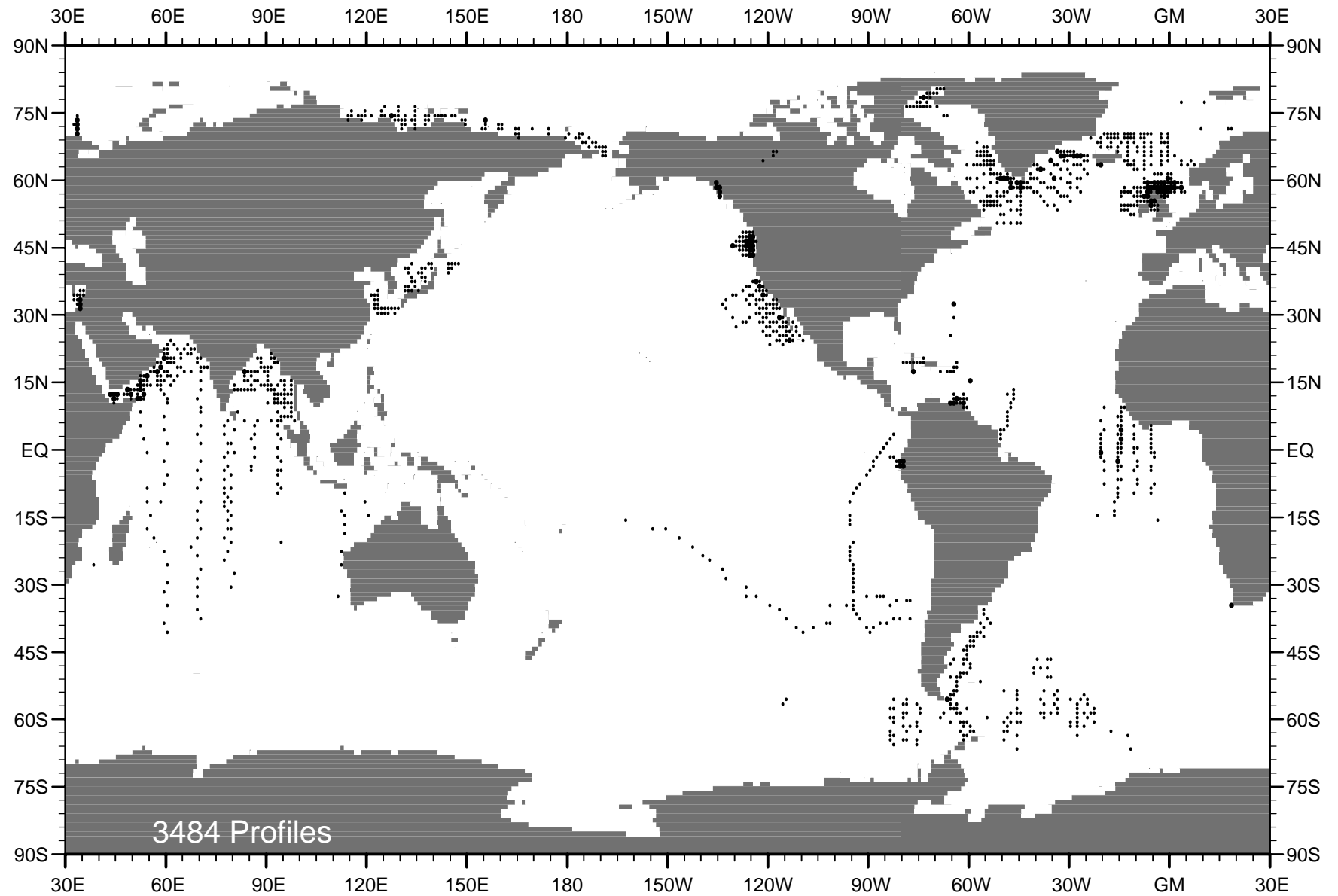


Fig. B36 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1963 .



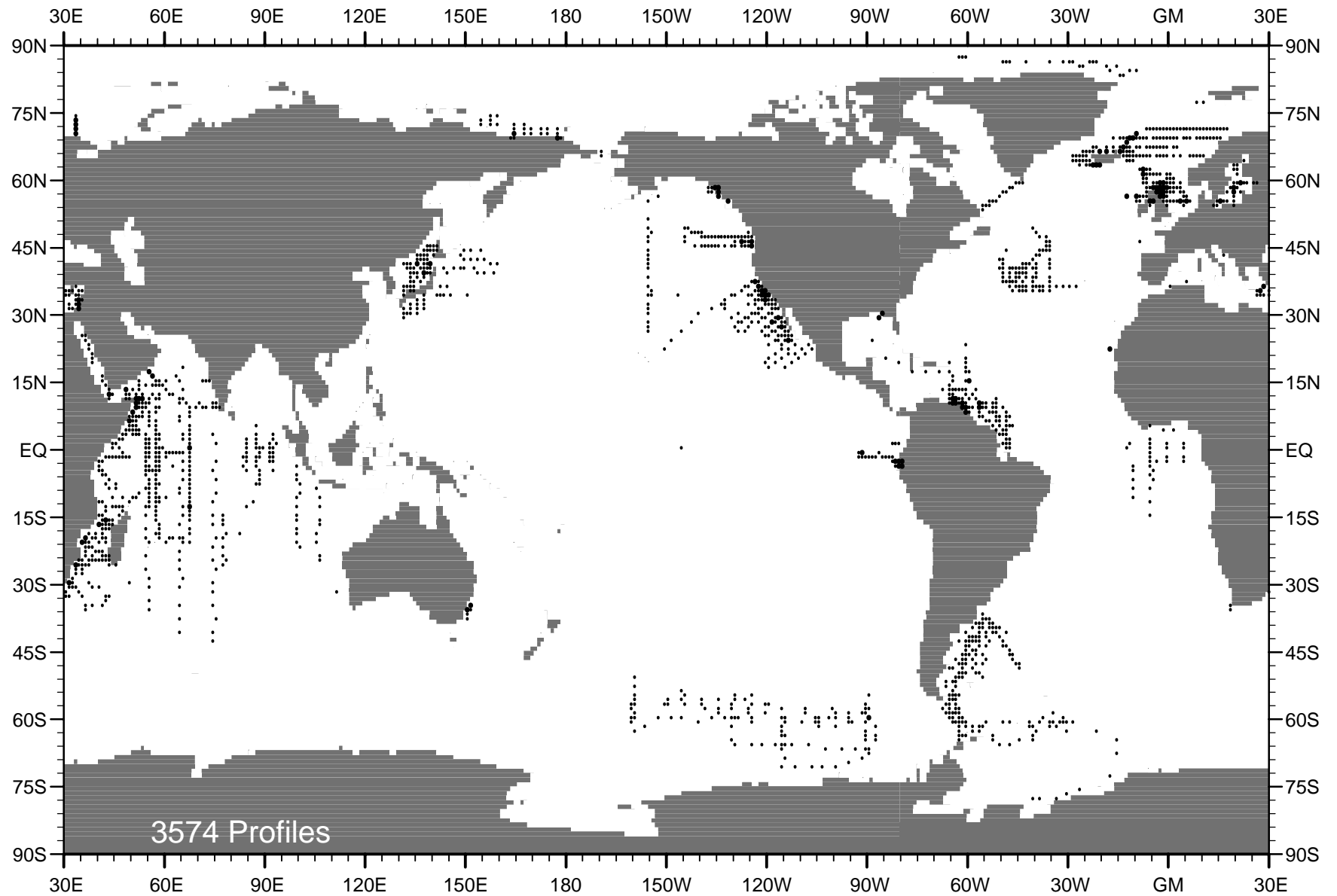


Fig. B37 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1964 .

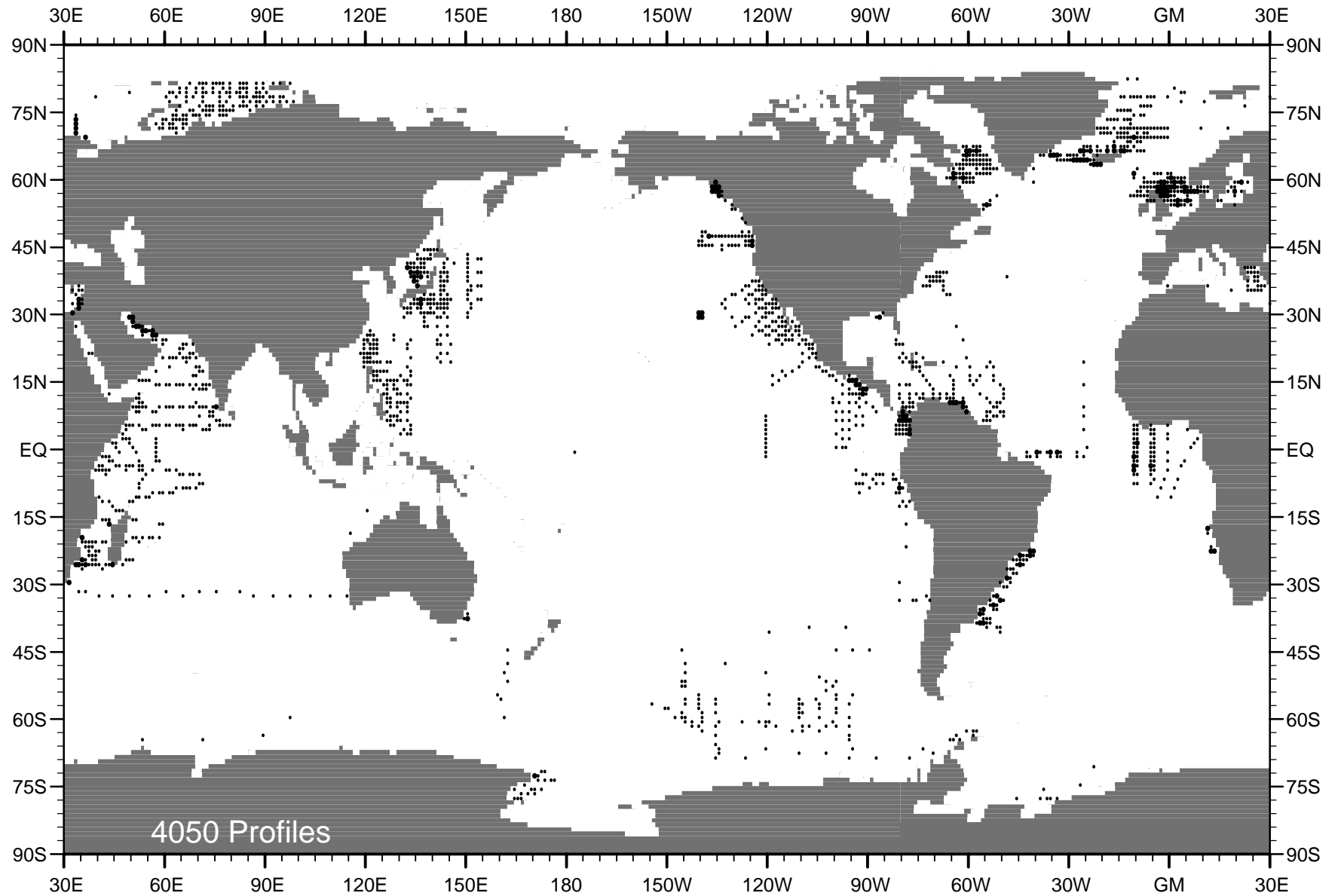


Fig. B38 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1965 .

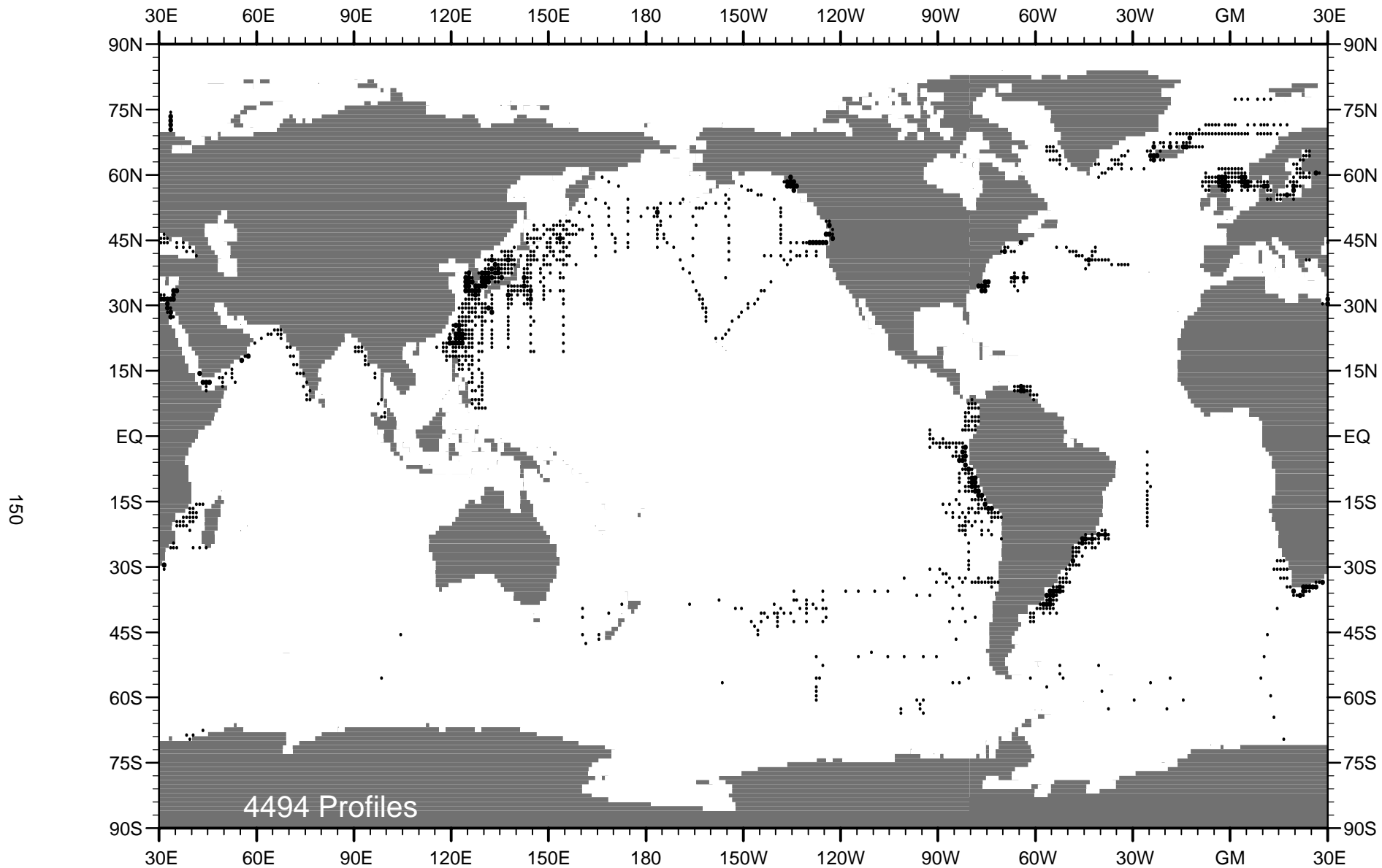


Fig. B39 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1966 .

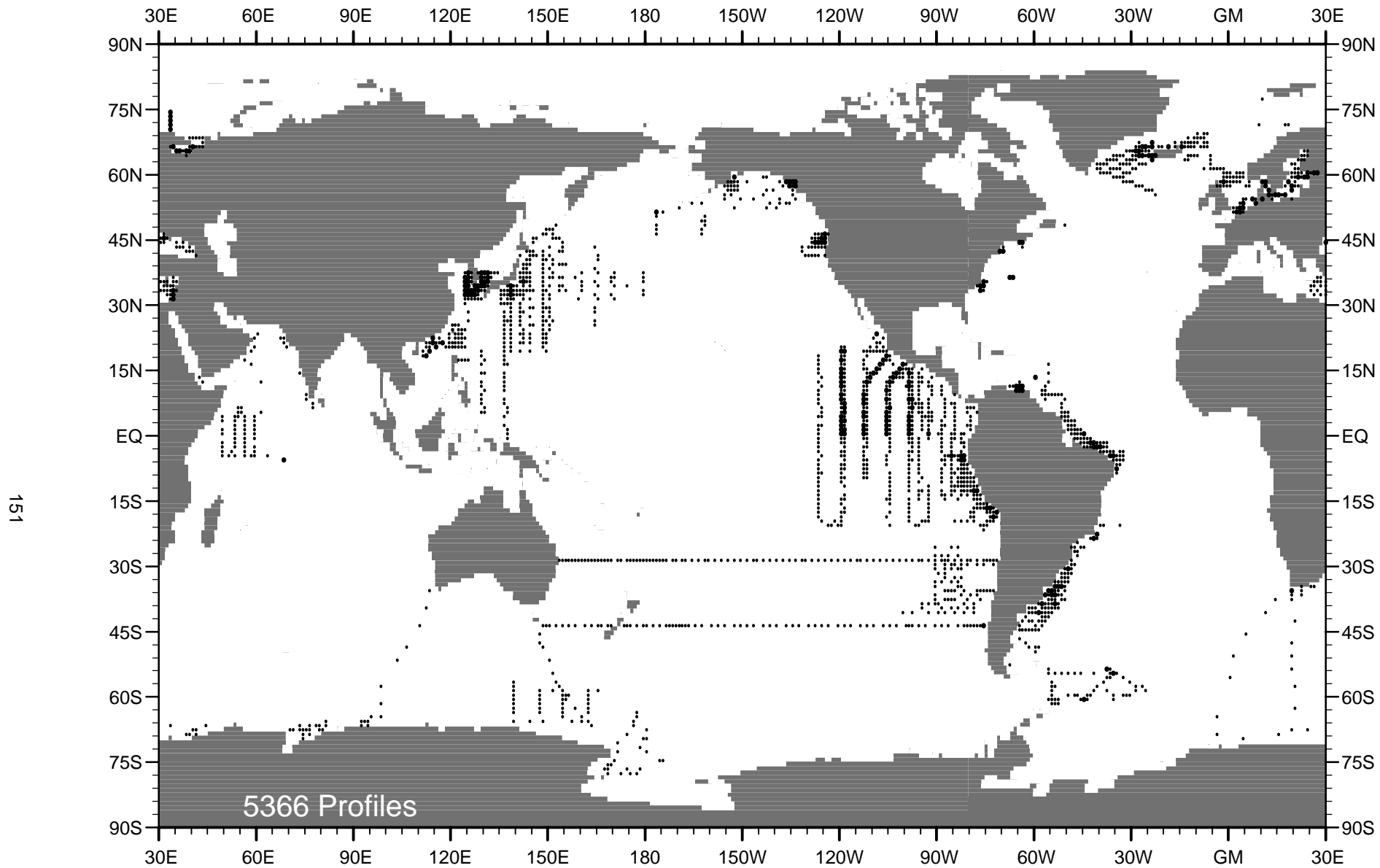


Fig. B40 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1967 .

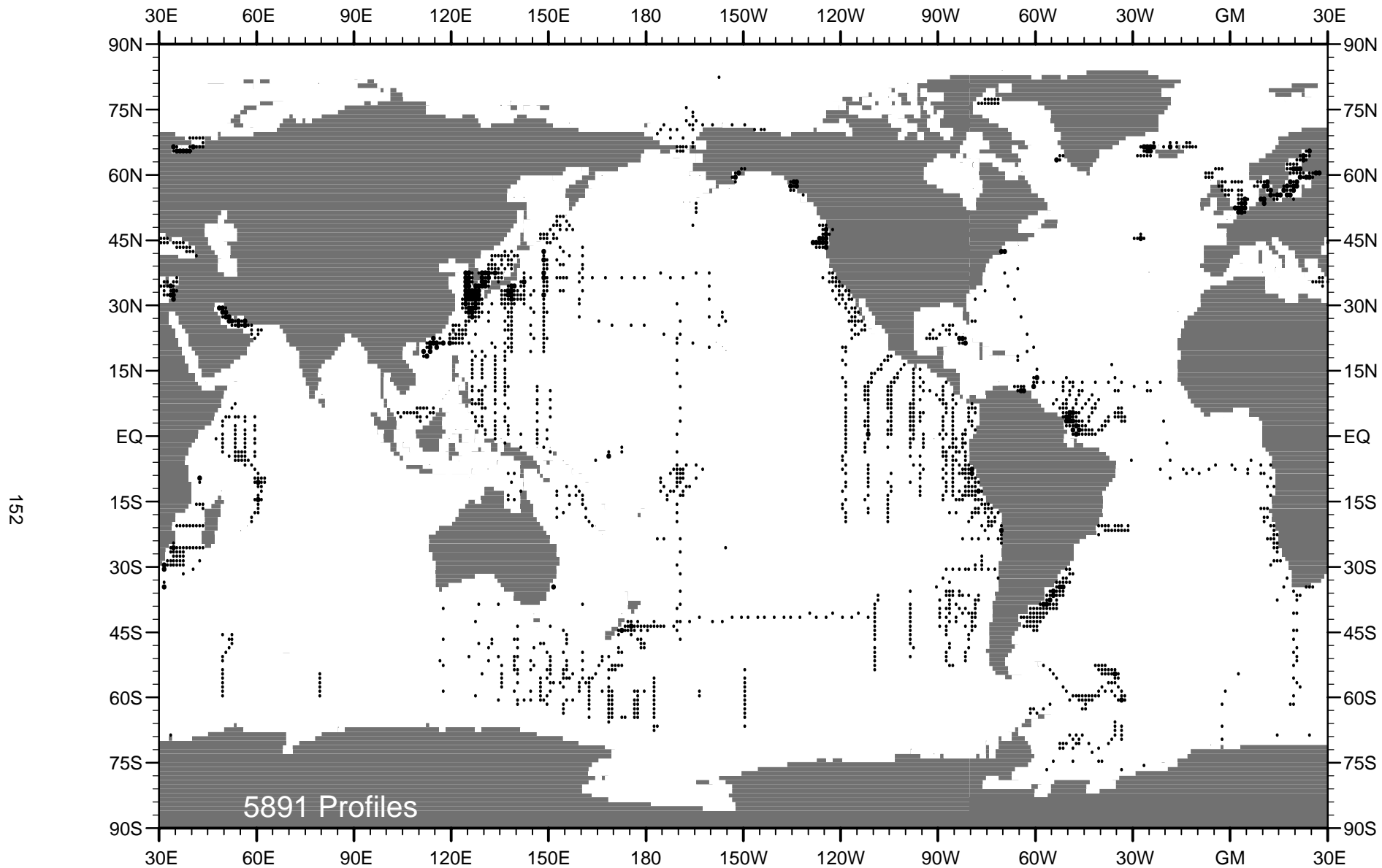


Fig. B41 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1968 .

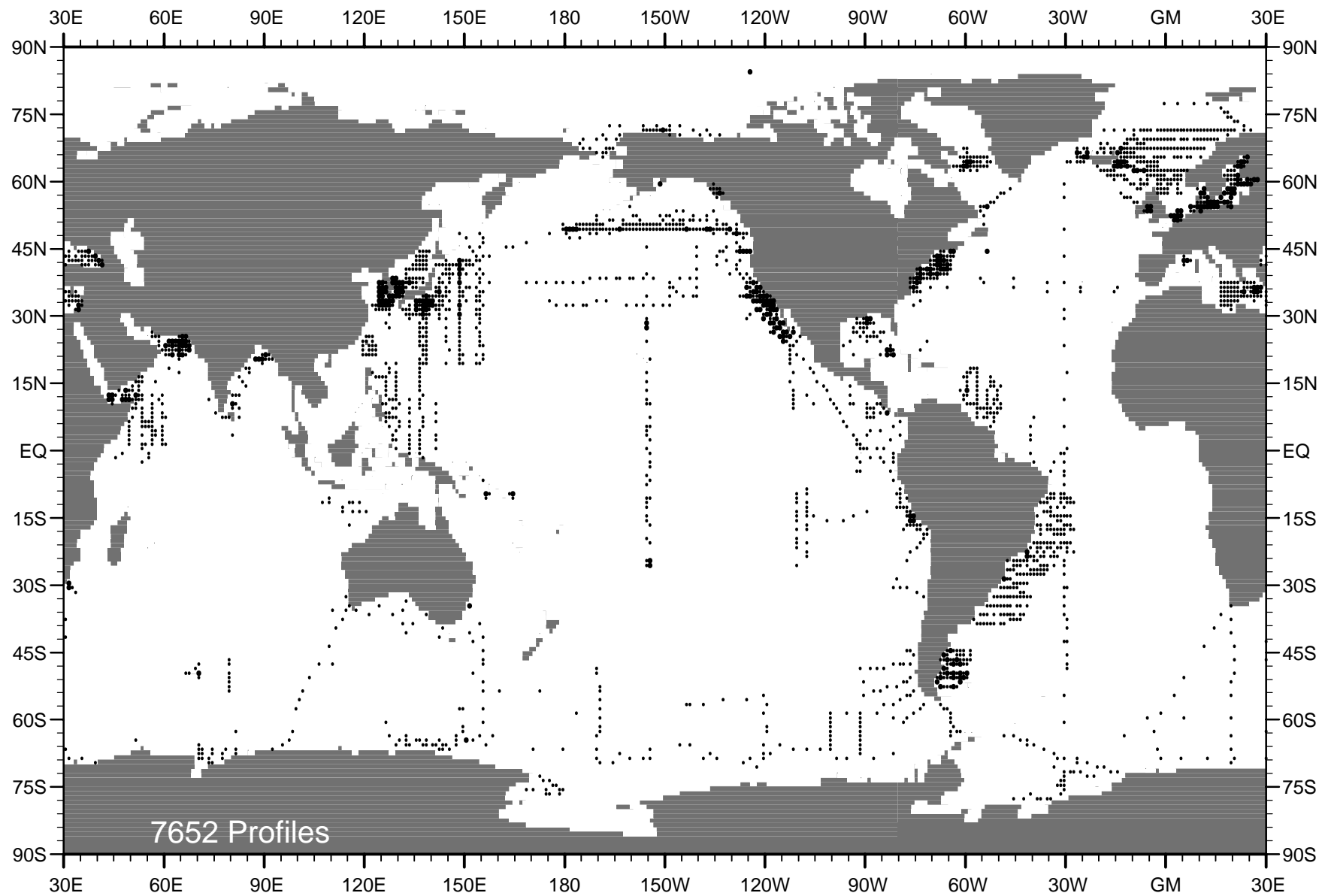


Fig. B42 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1969 .

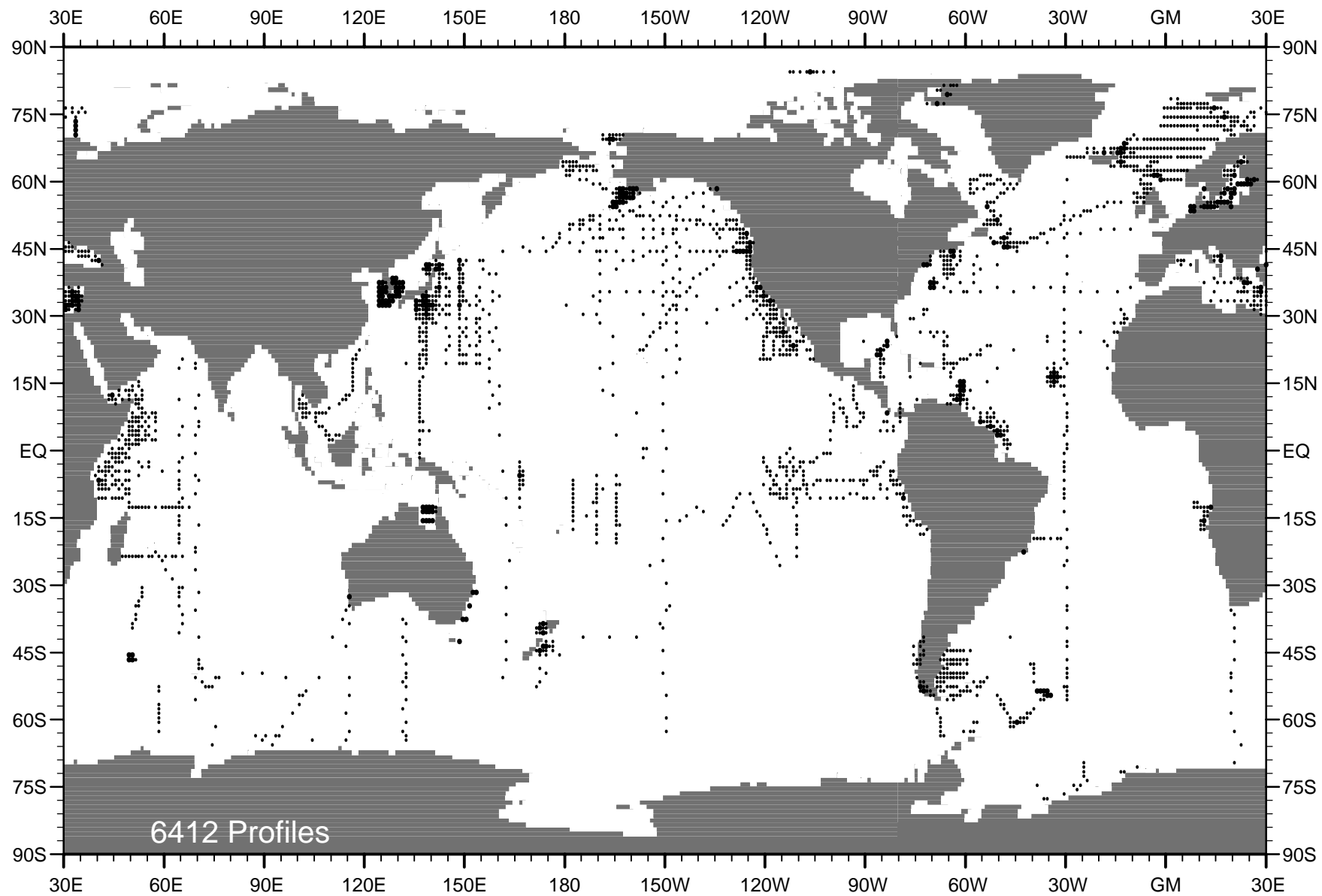


Fig. B43 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1970 .

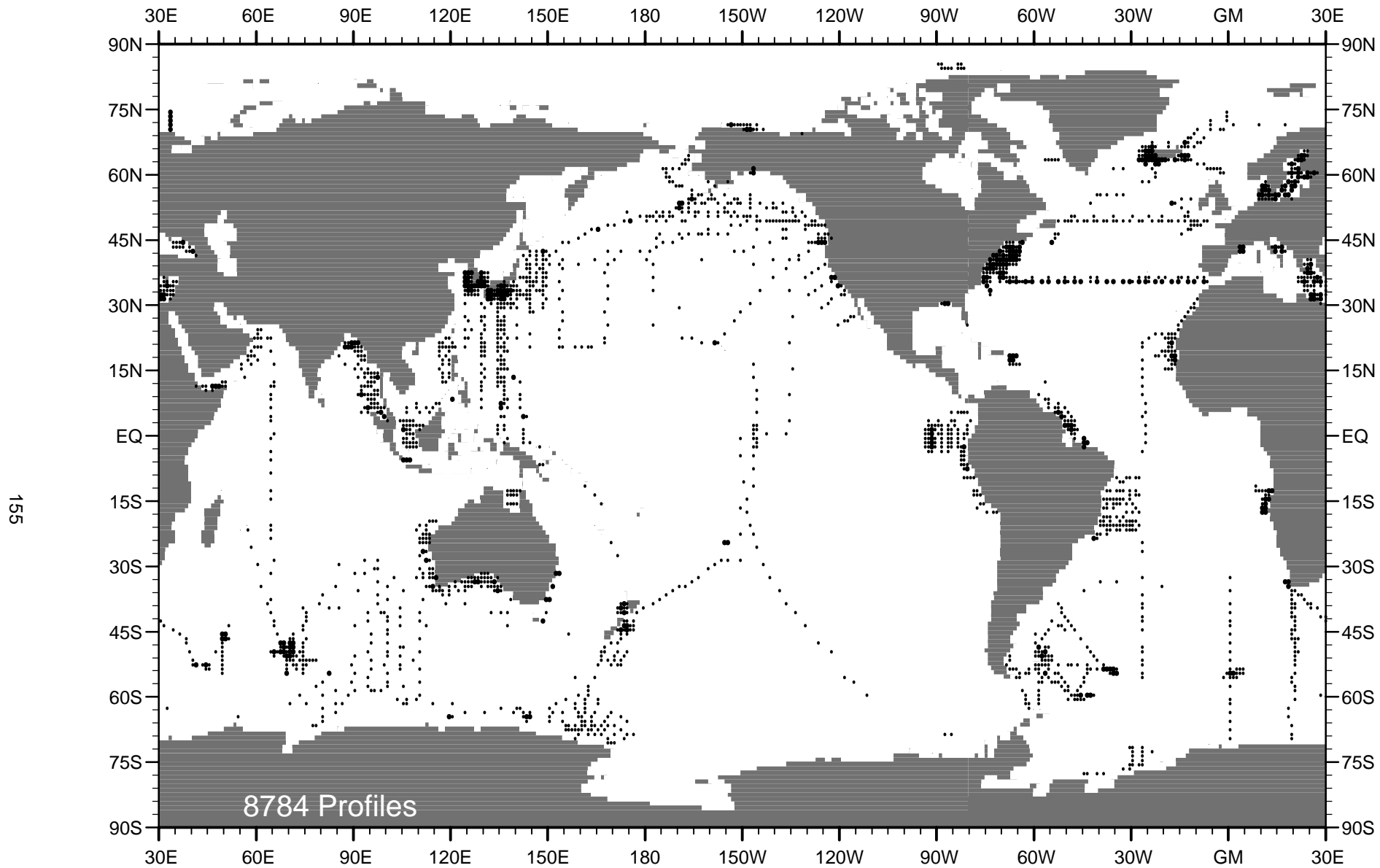


Fig. B44 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1971 .



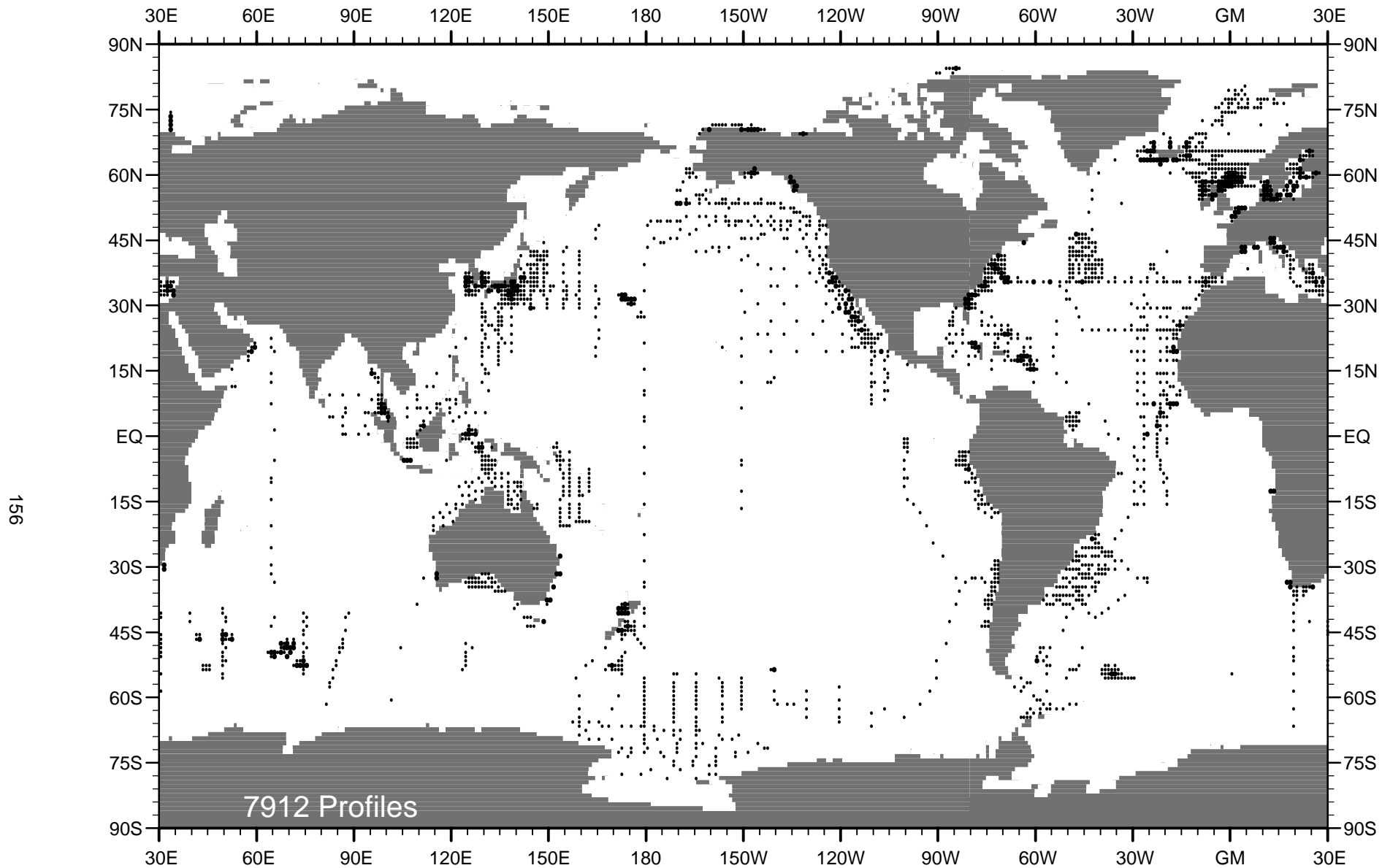


Fig. B45 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1972 .

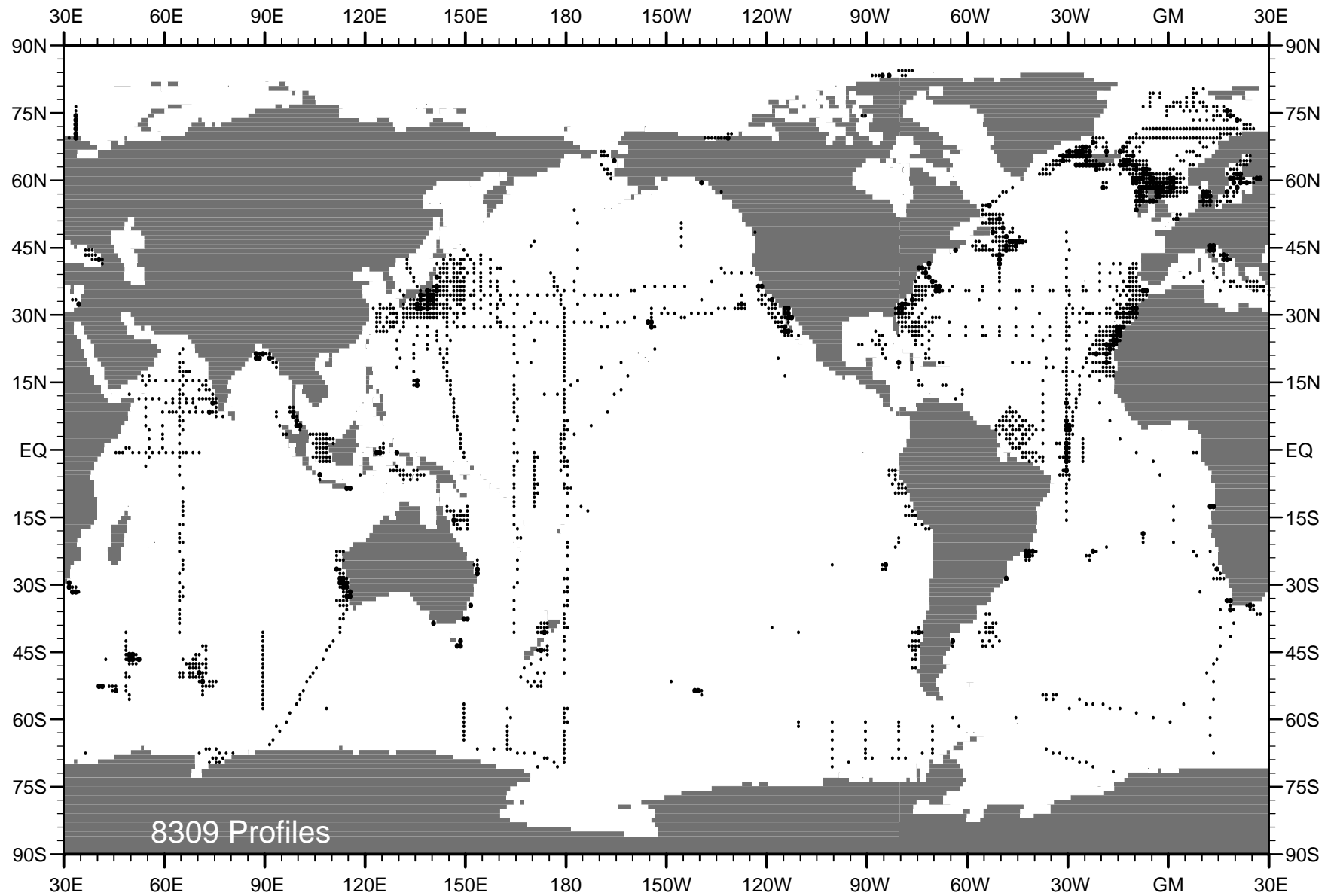


Fig. B46 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1973 .

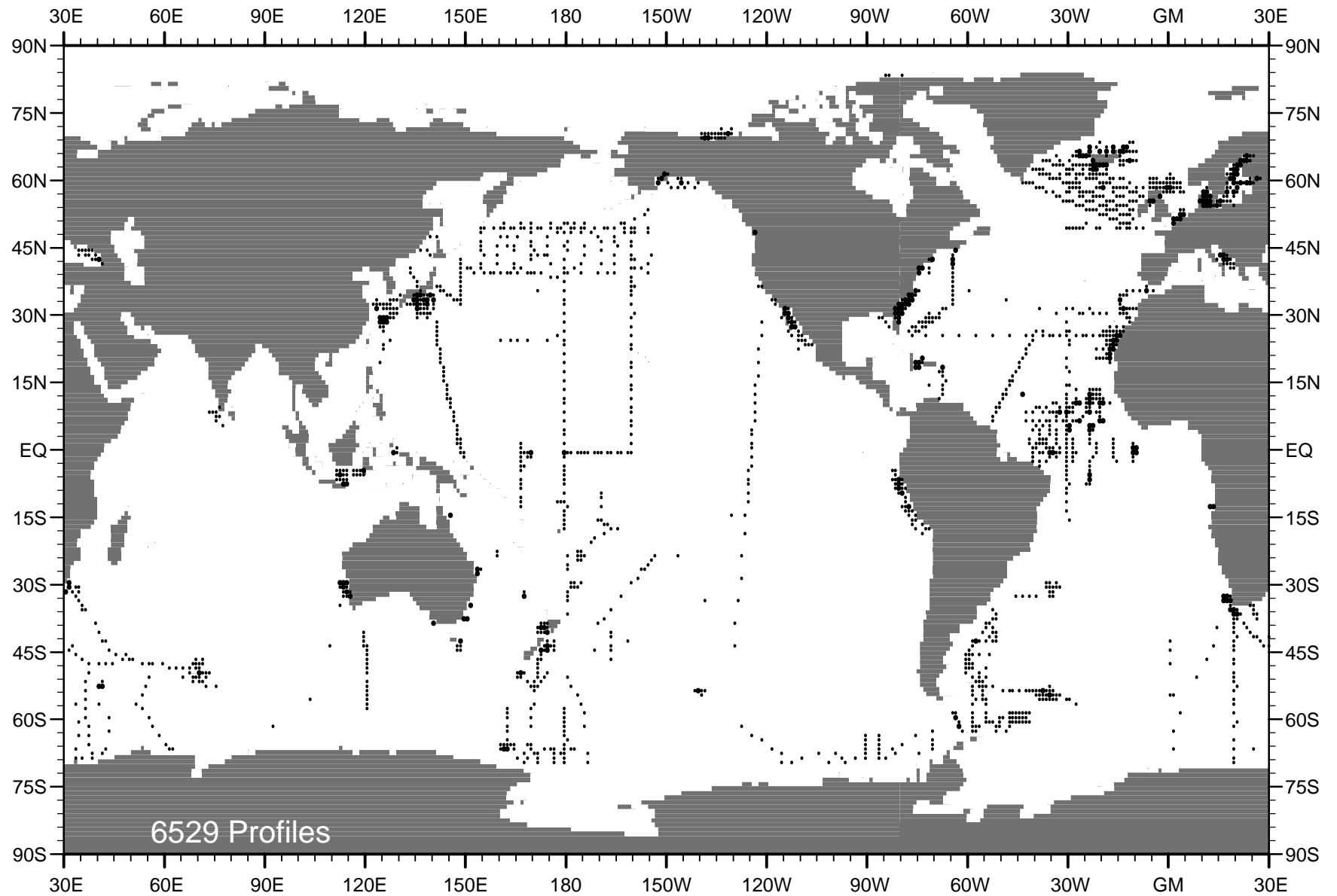


Fig. B47 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1974 .

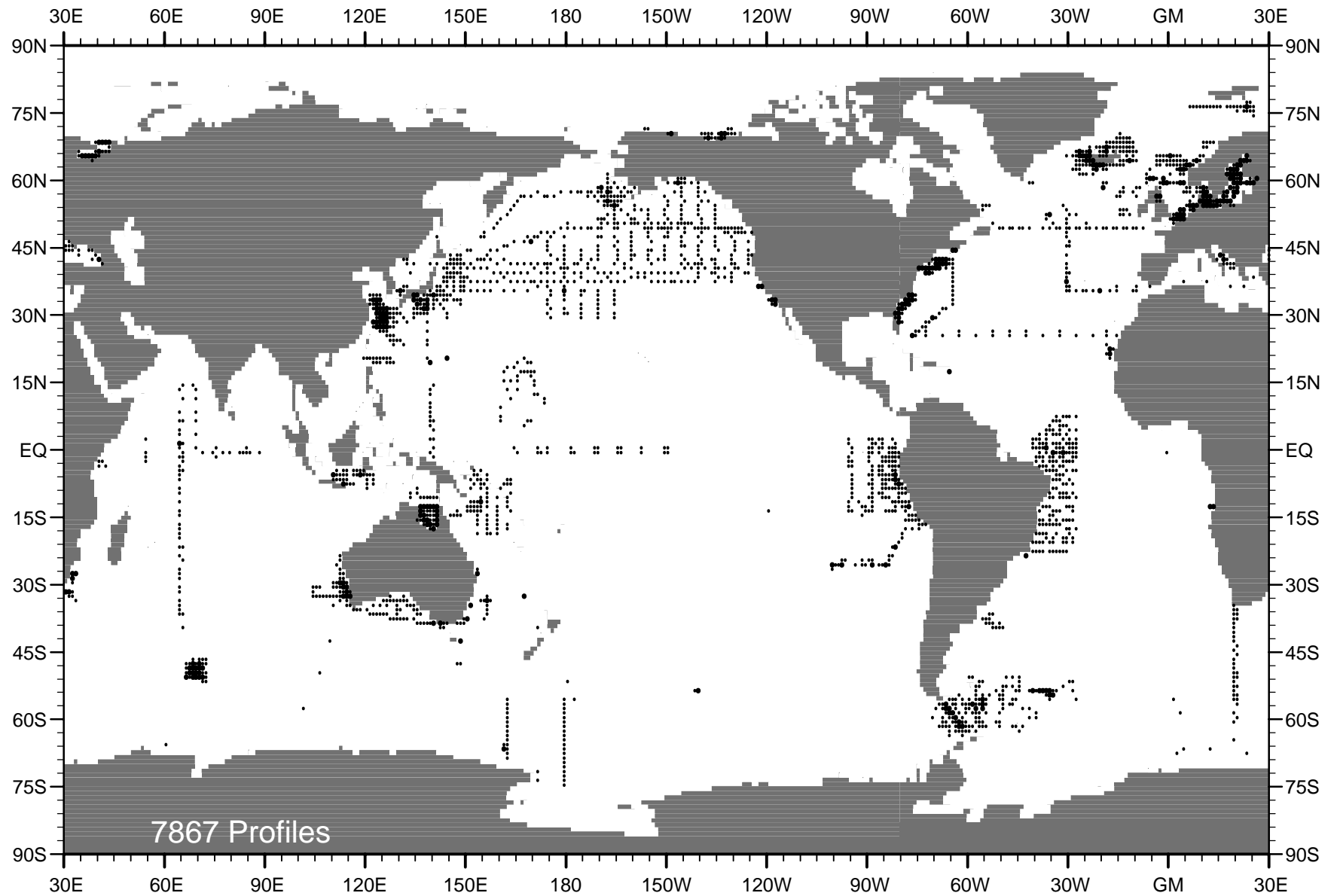


Fig. B48 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1975 .

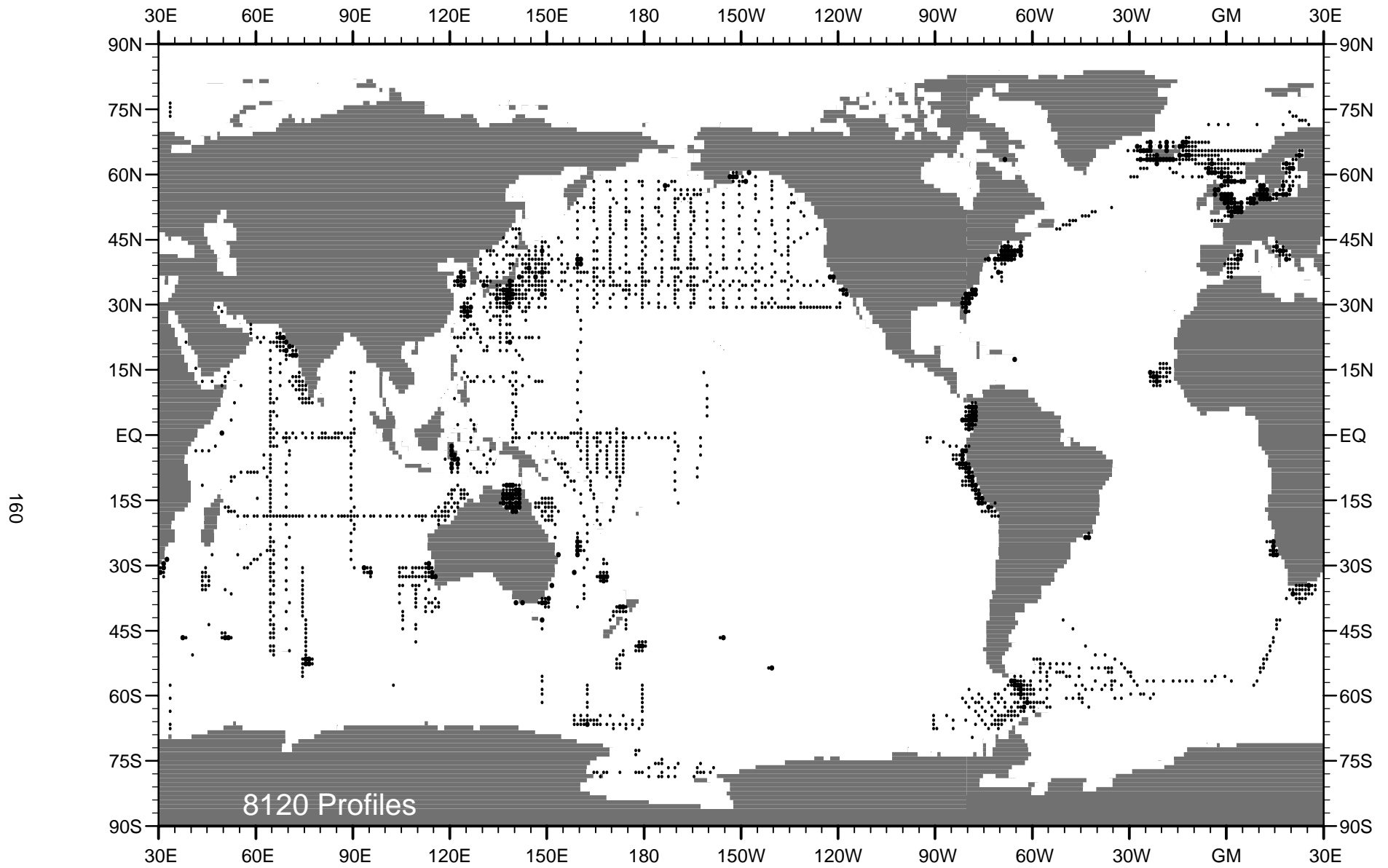


Fig. B49 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1976 .

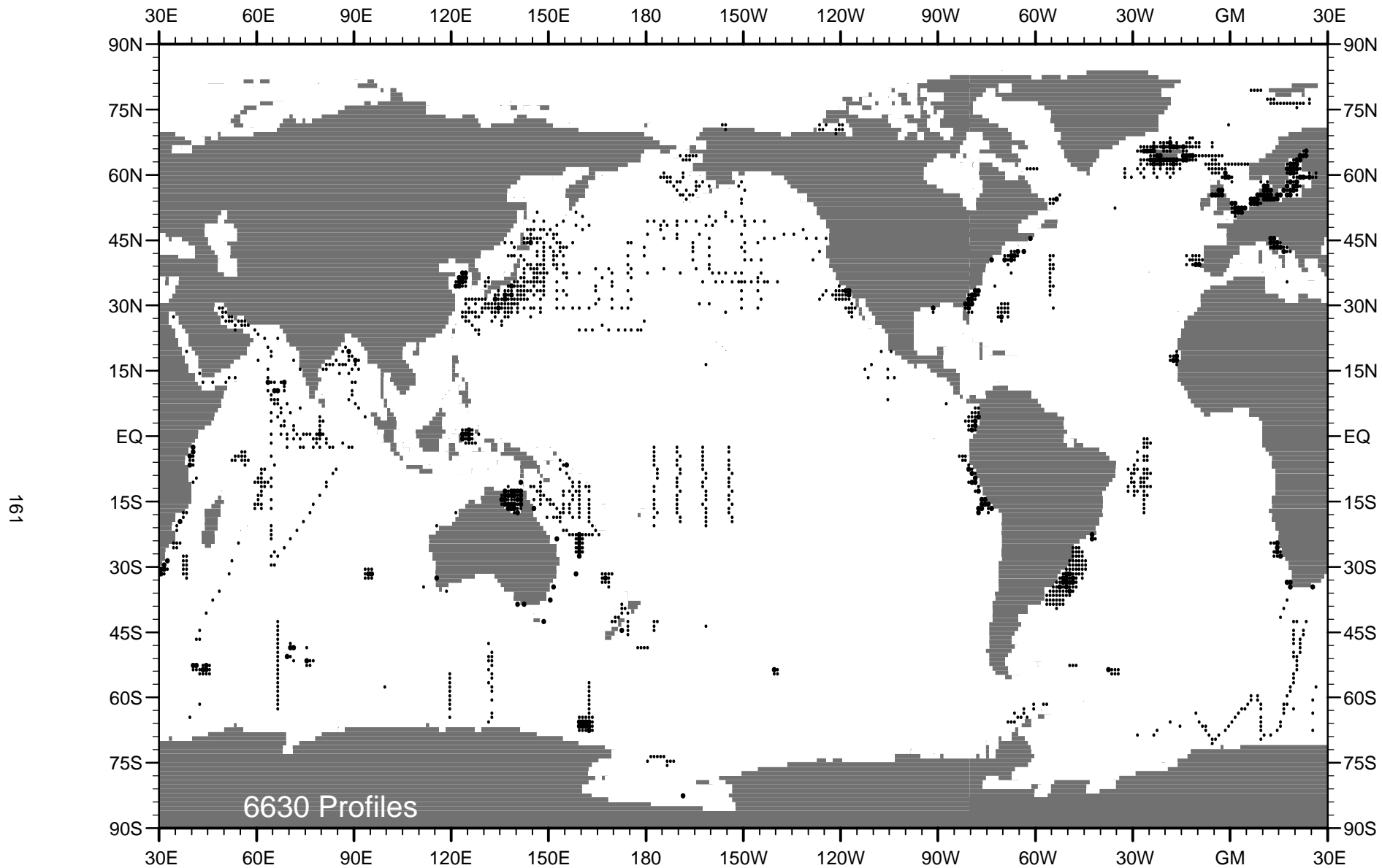


Fig. B50 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1977 .

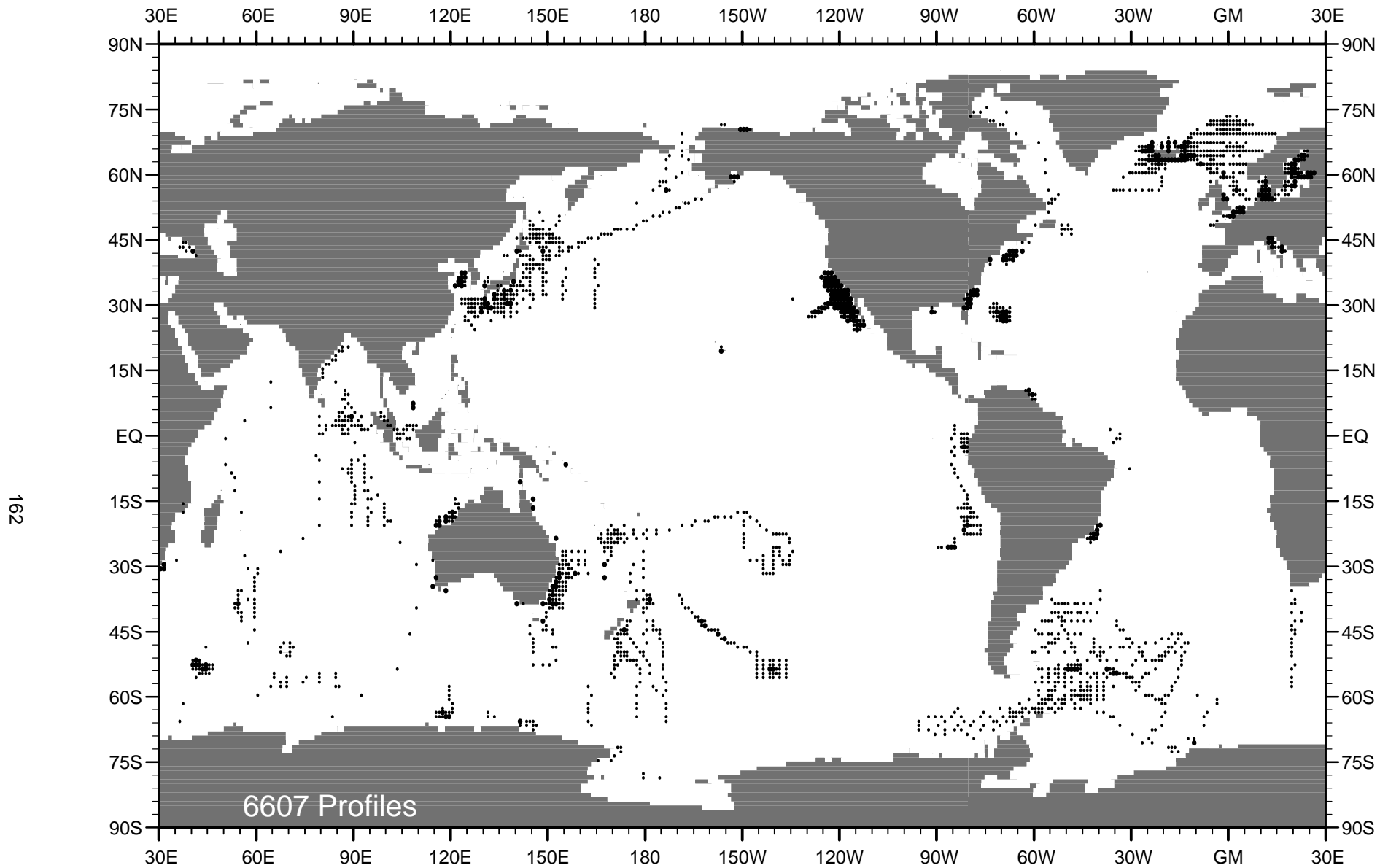


Fig. B51 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1978 .

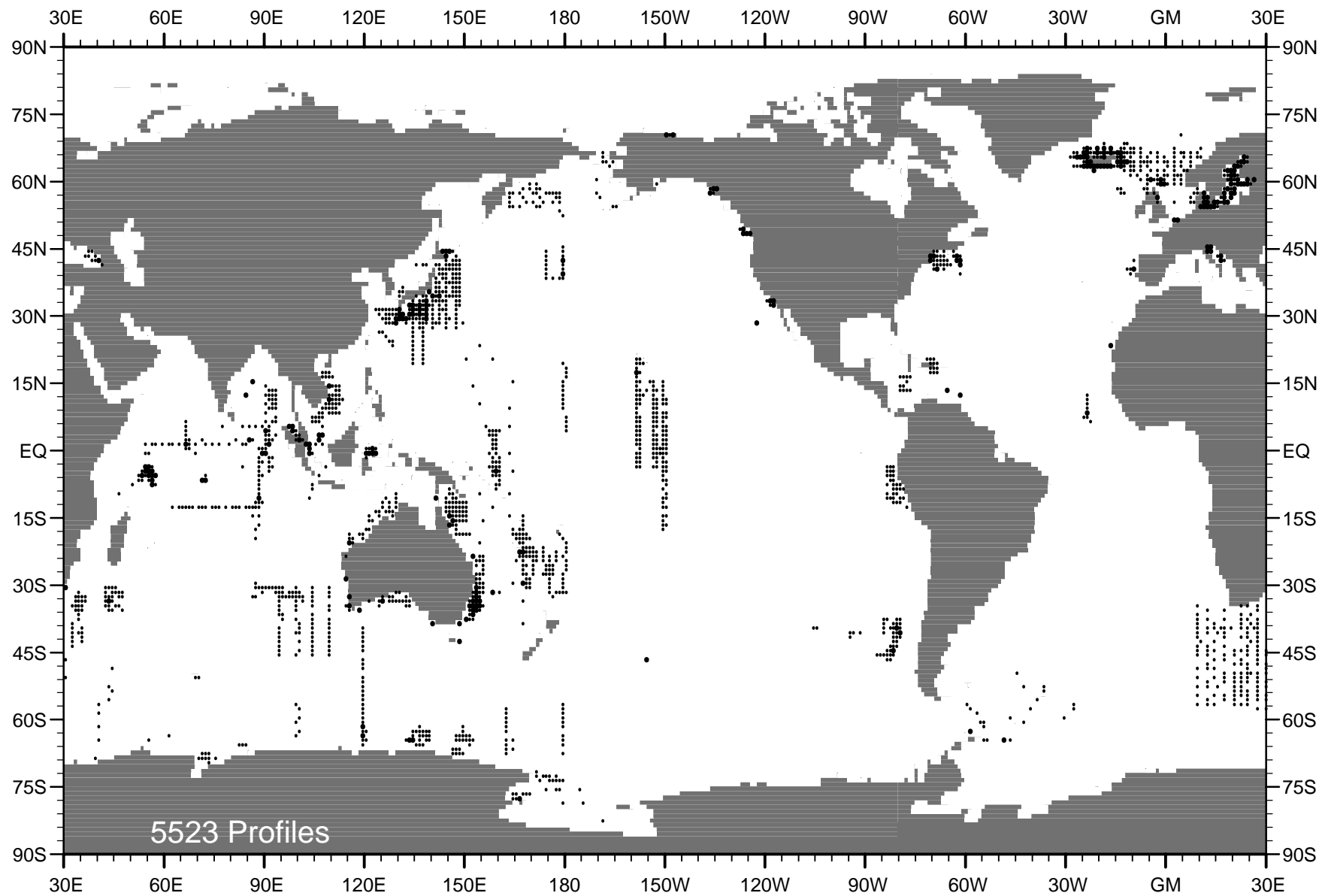


Fig. B52 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1979 .



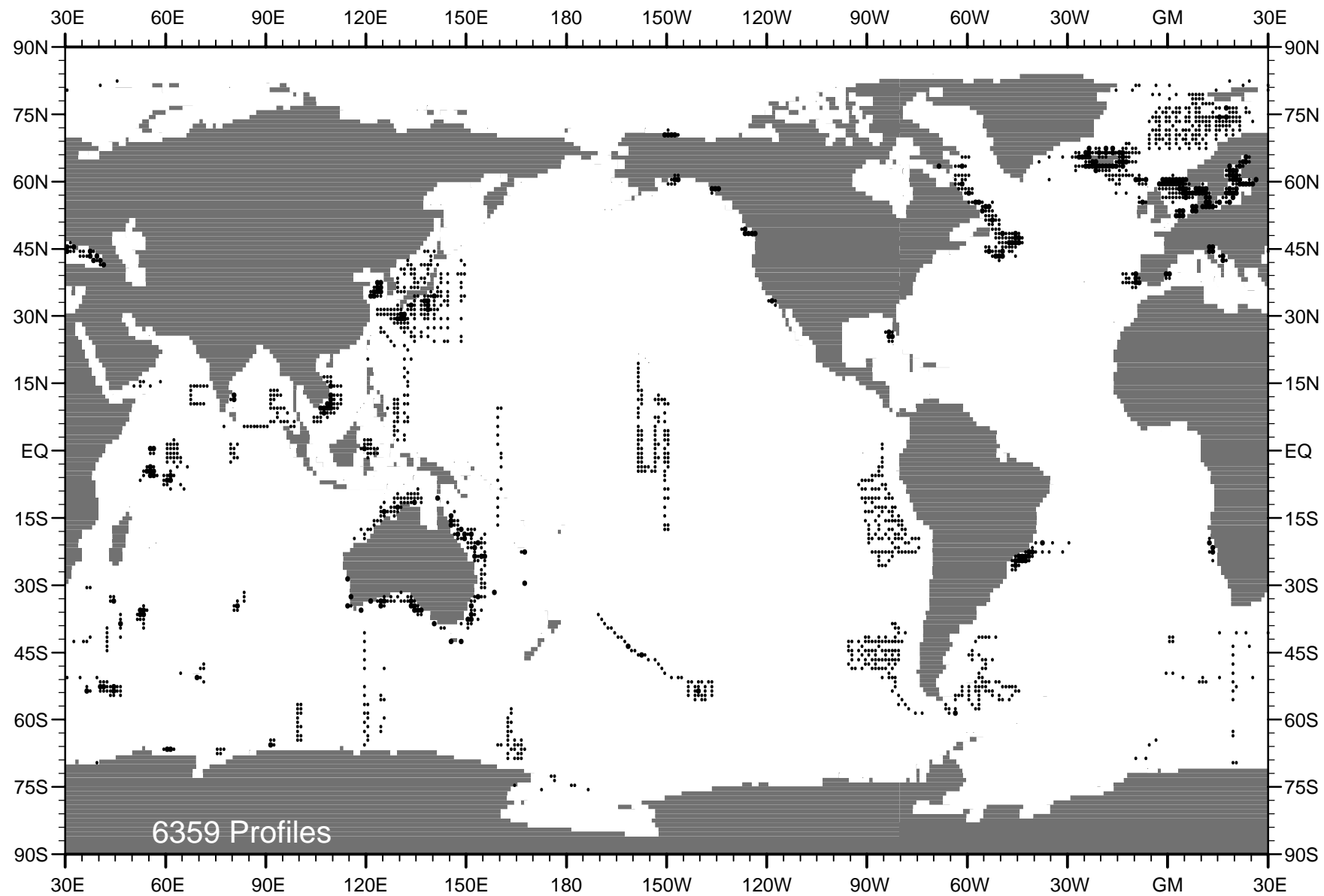


Fig. B53 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1980 .

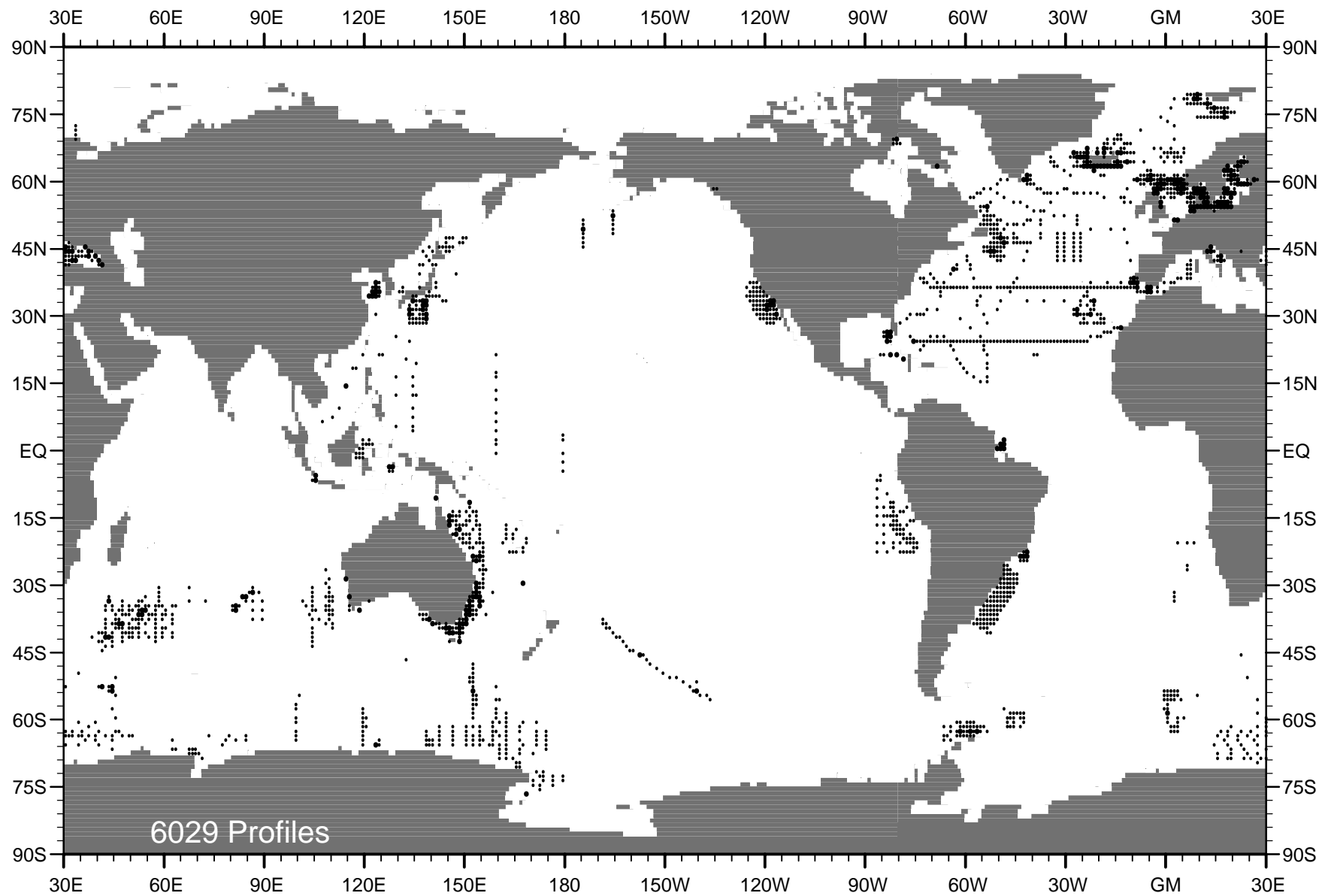


Fig. B54 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1981 .

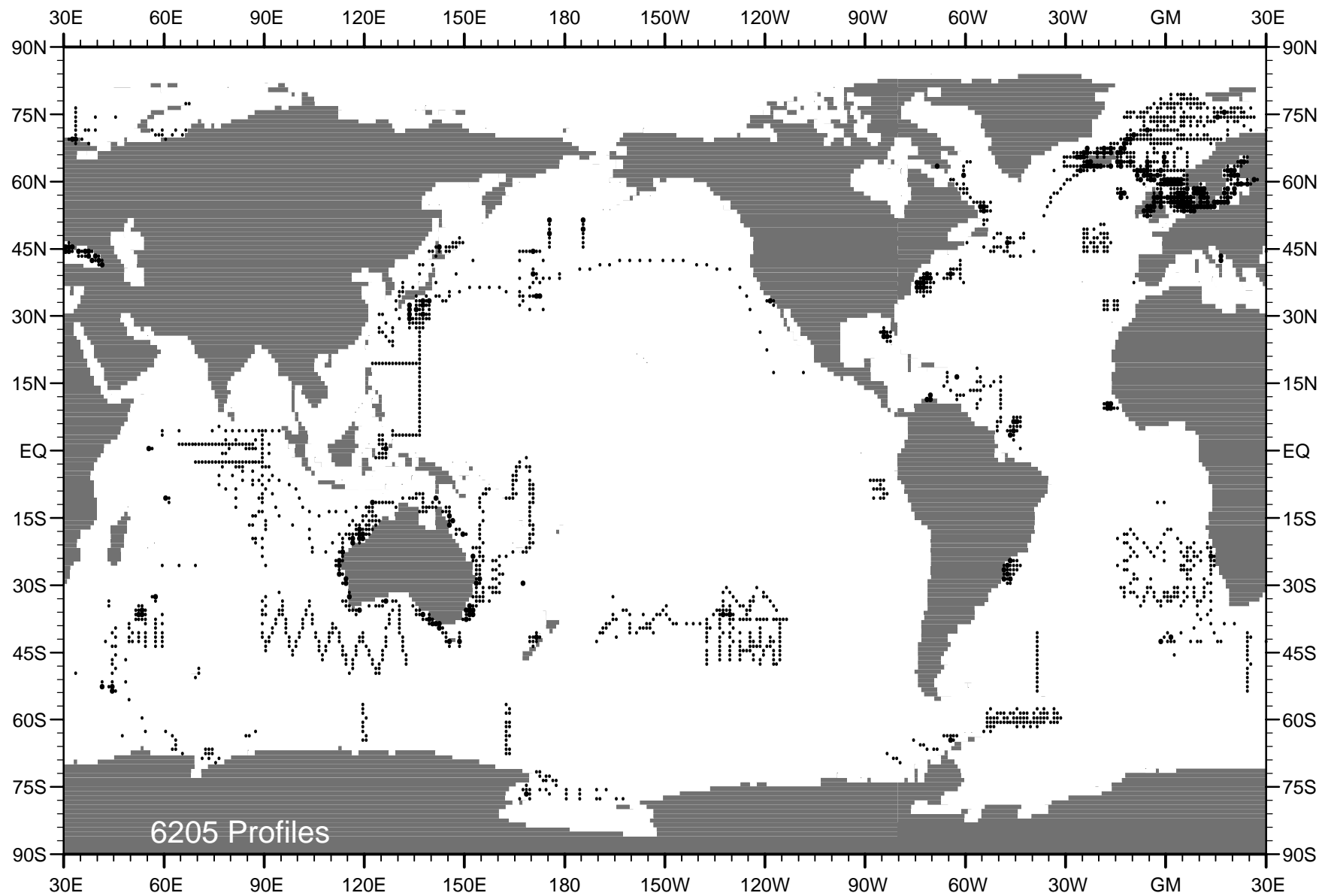


Fig. B55 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1982 .

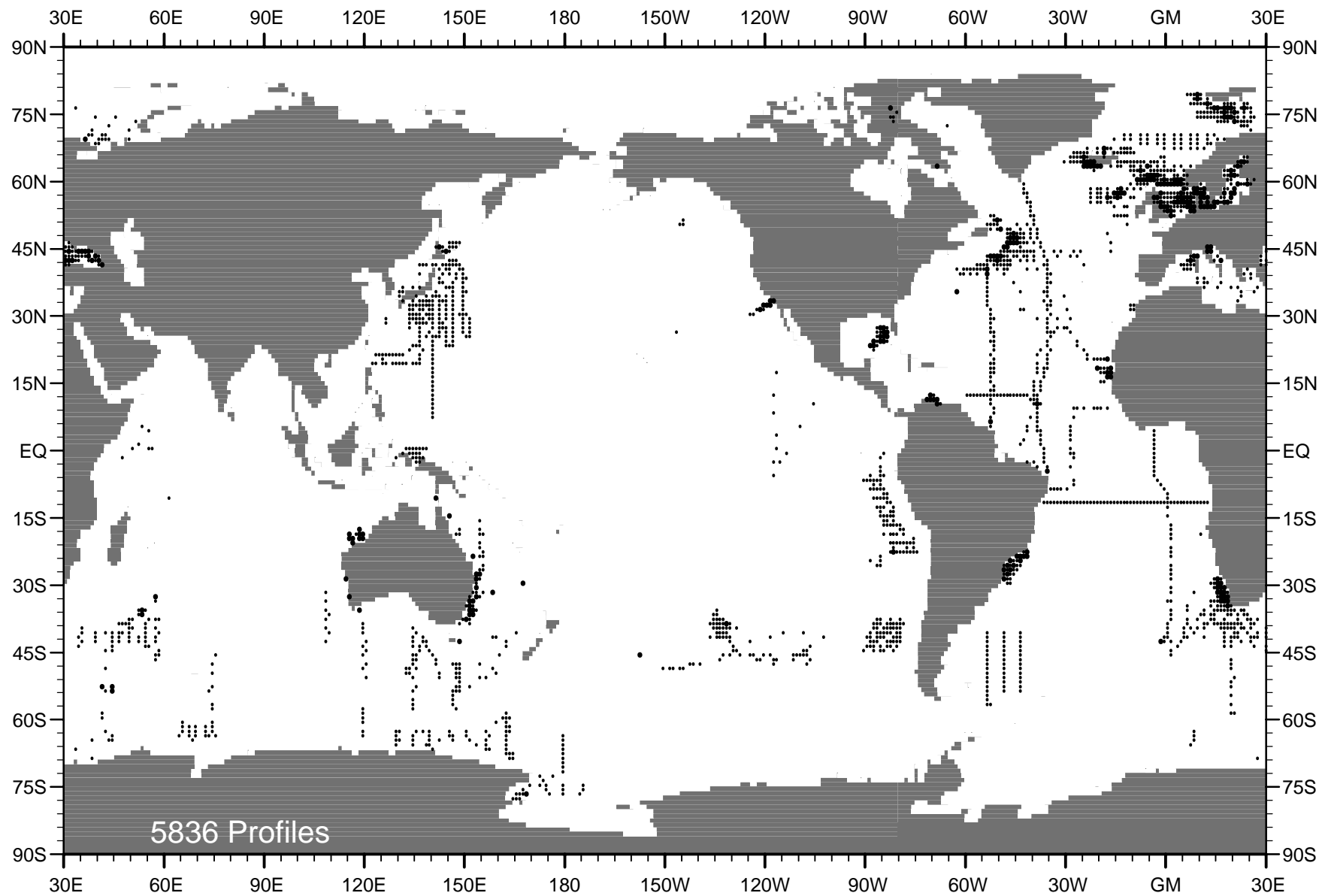


Fig. B56 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1983 .

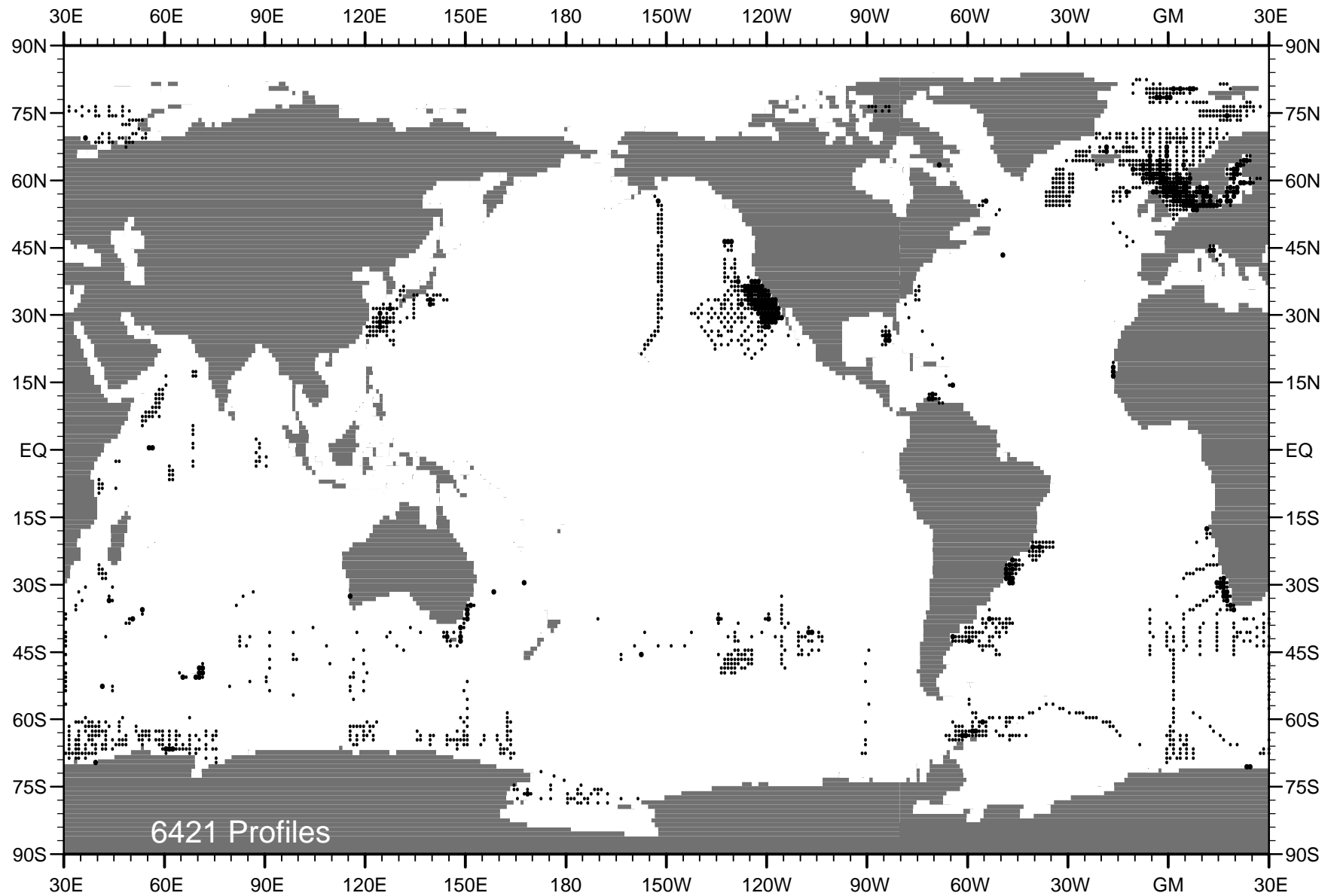


Fig. B57 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1984 .

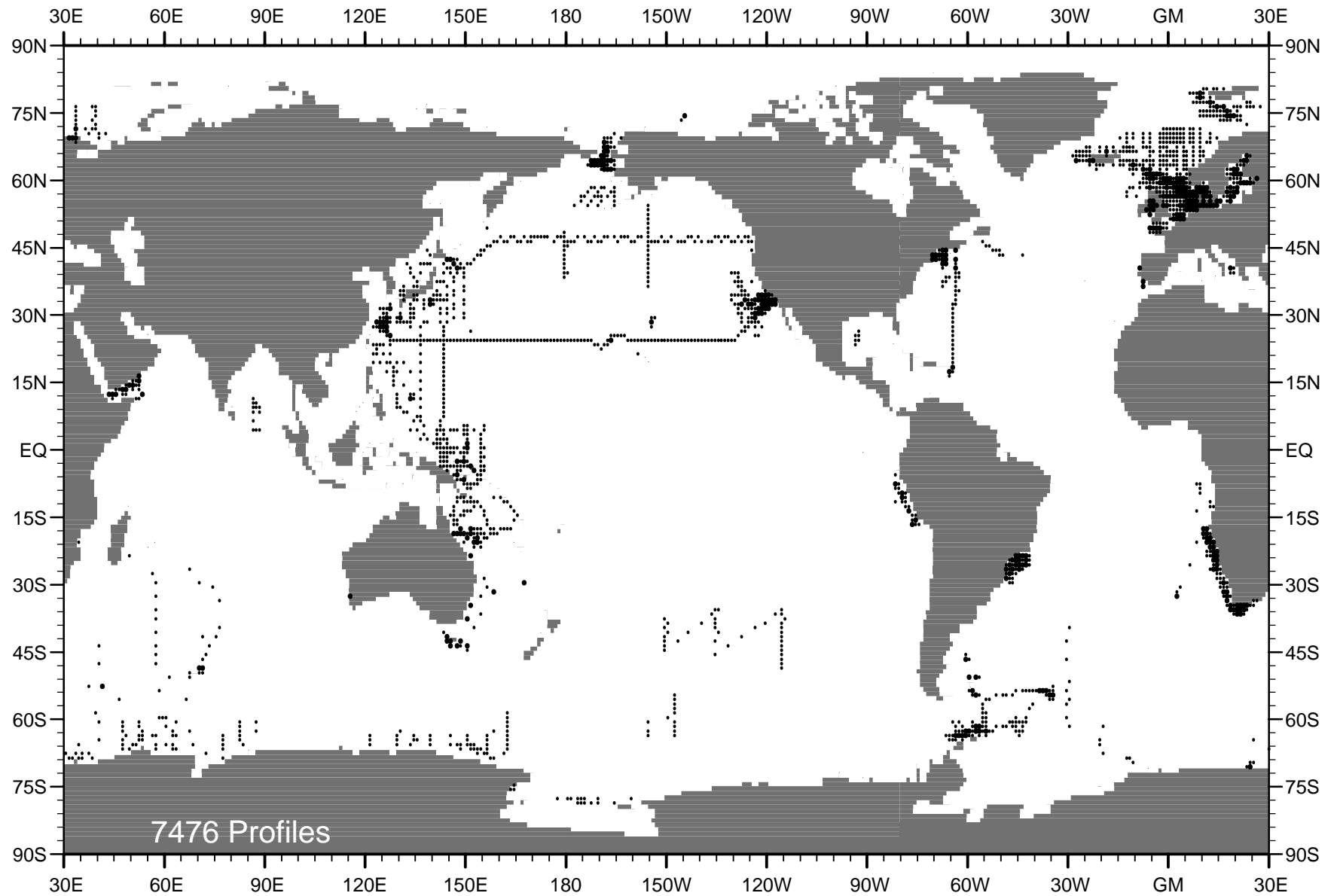


Fig. B58 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1985 .

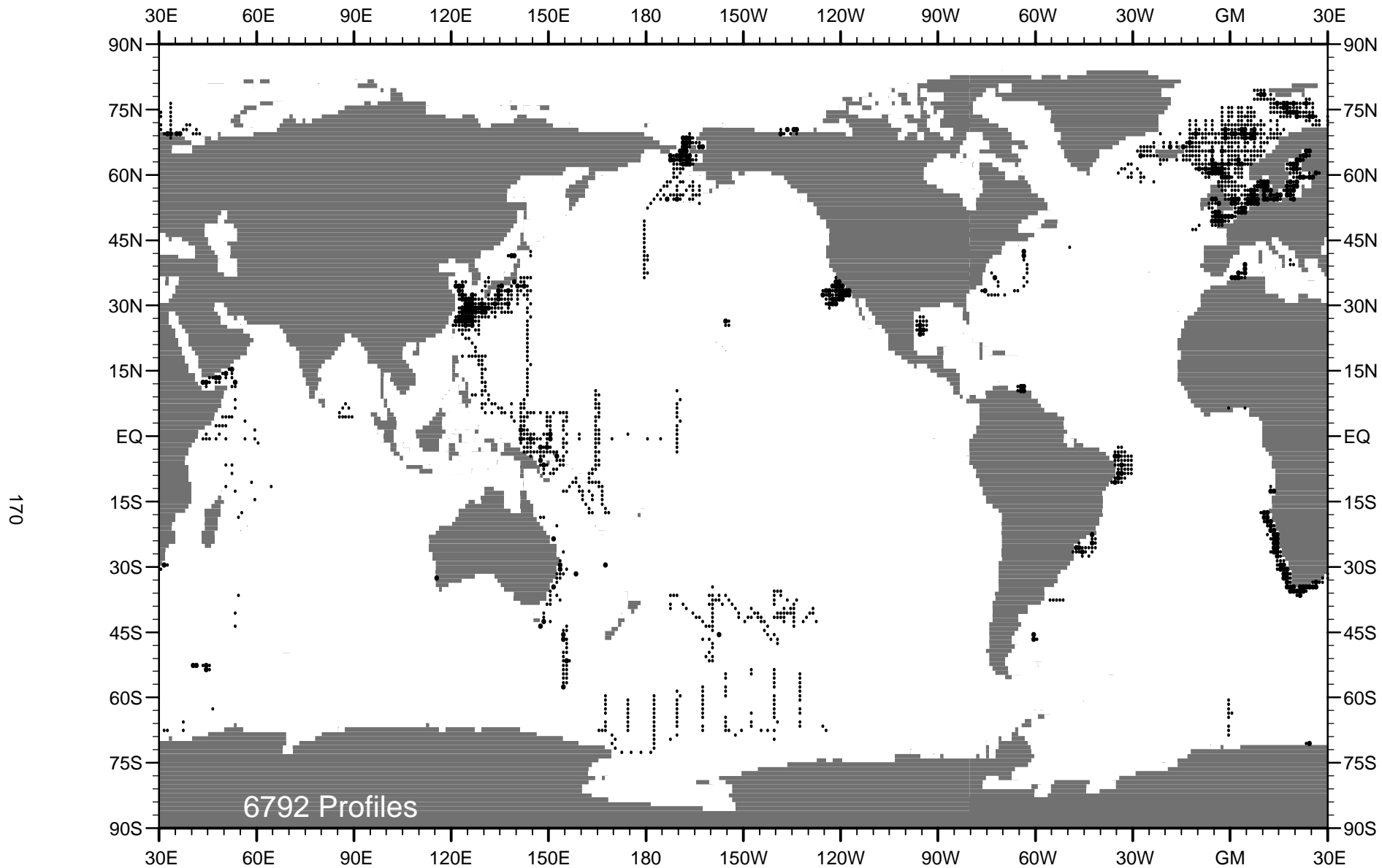


Fig. B59 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1986 .

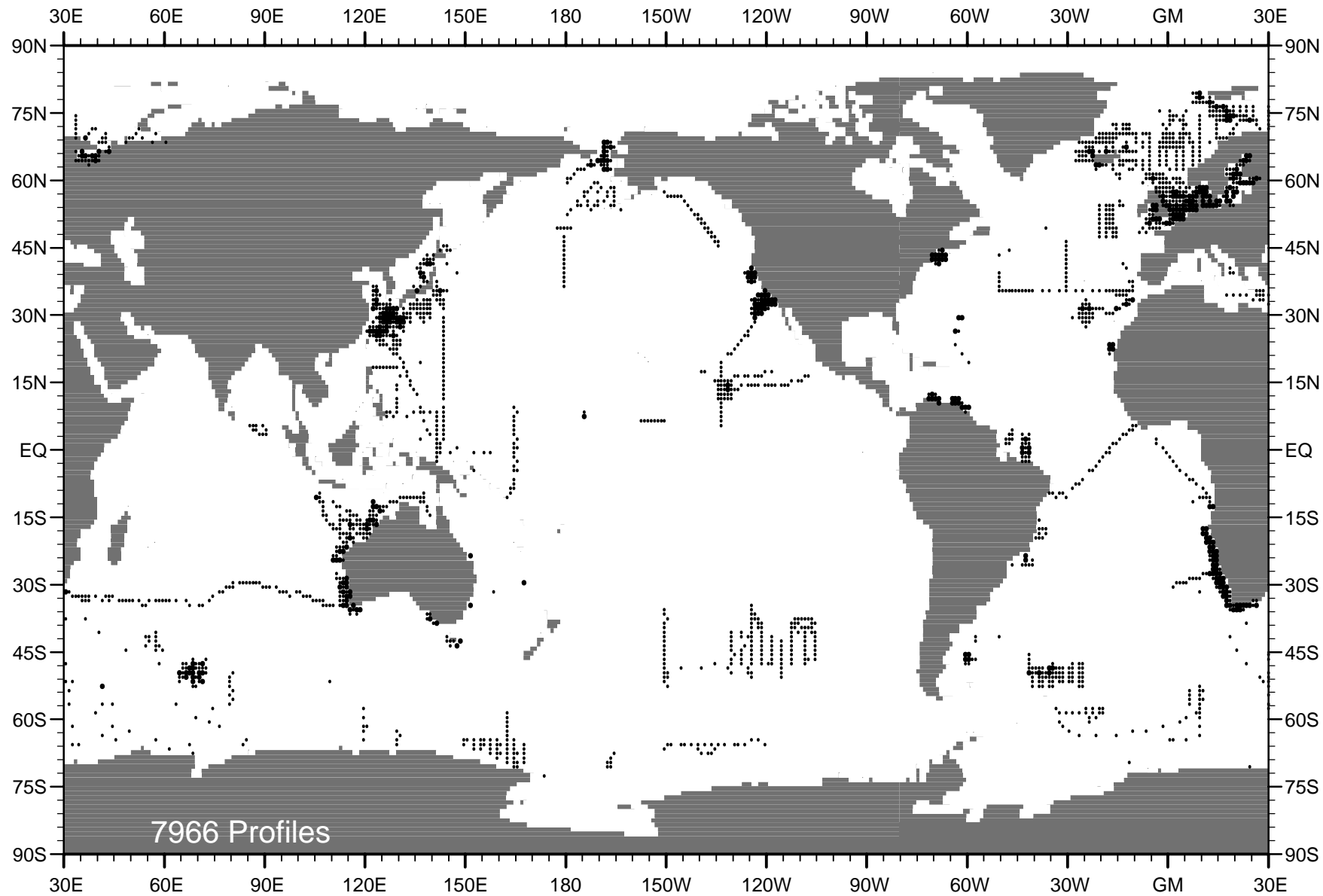


Fig. B60 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1987 .



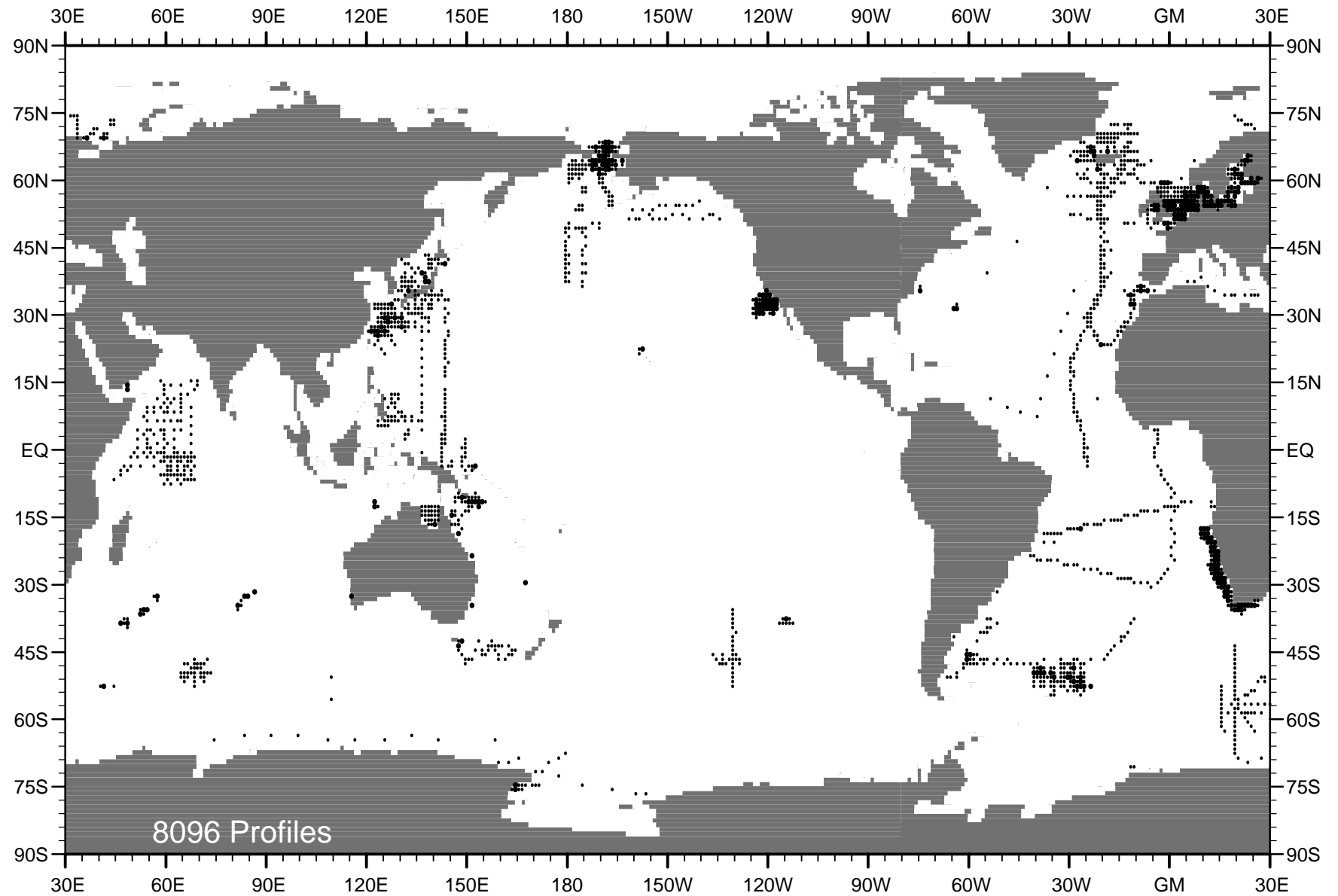


Fig. B61 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1988 .

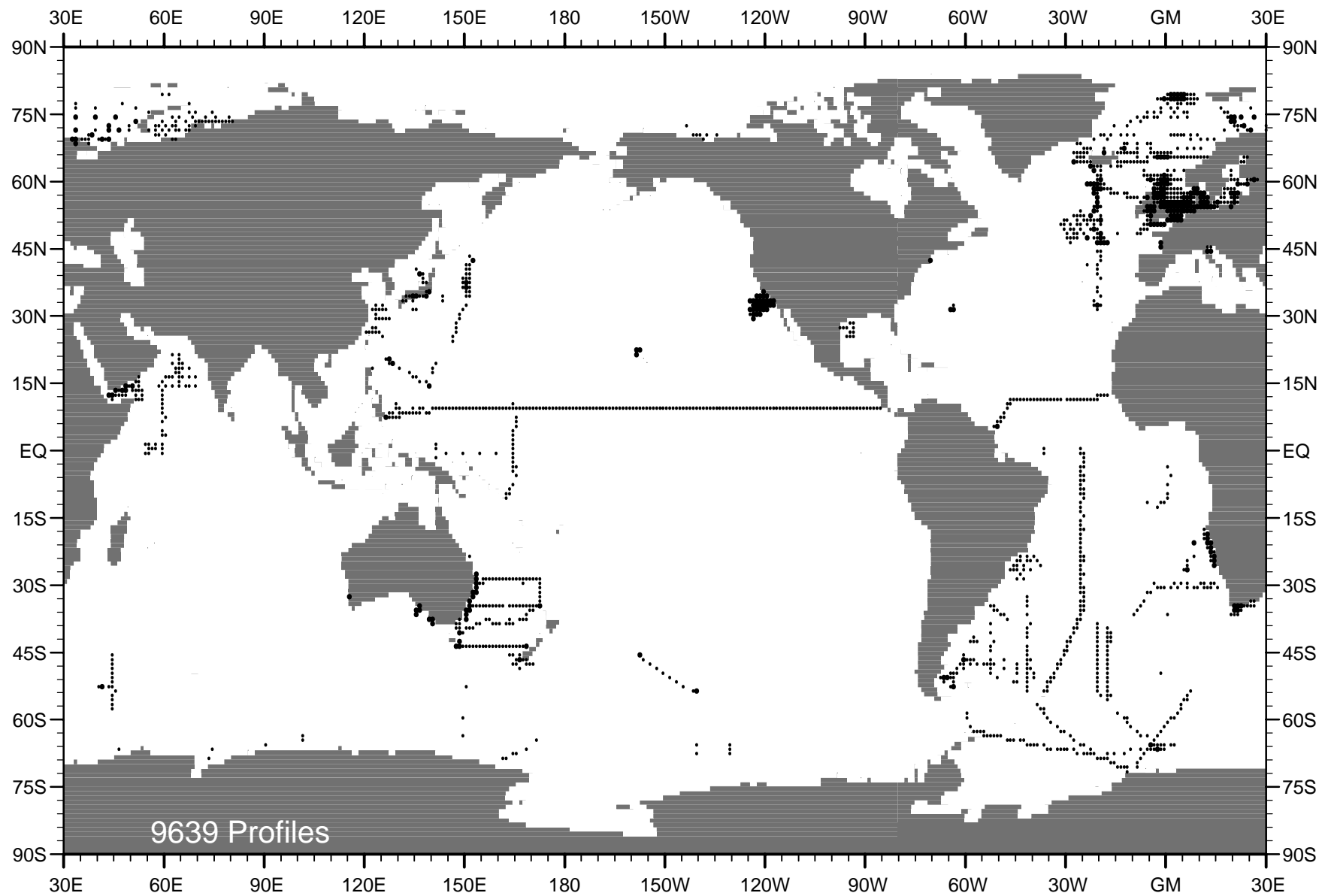


Fig. B62 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1989 .

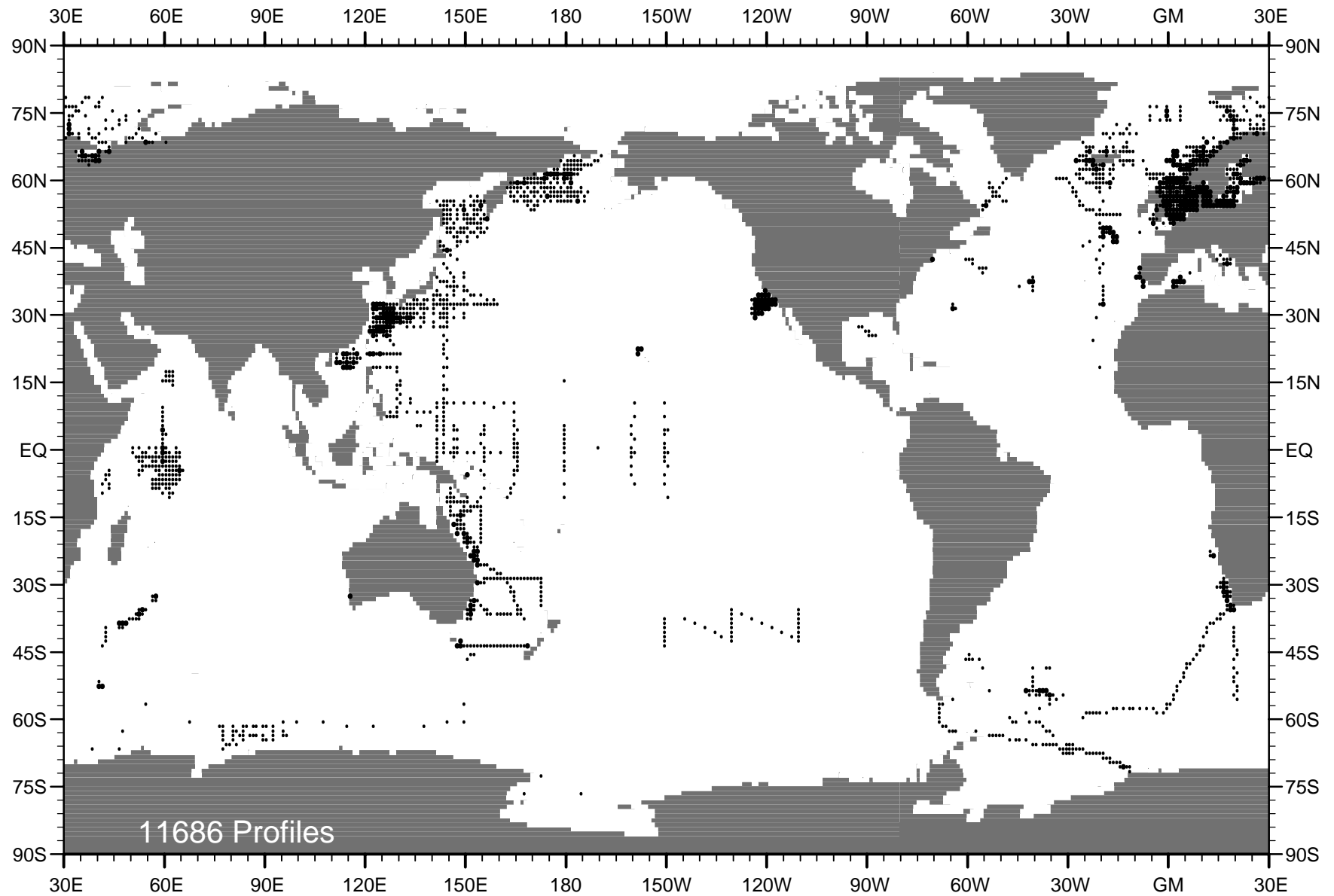


Fig. B63 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1990 .

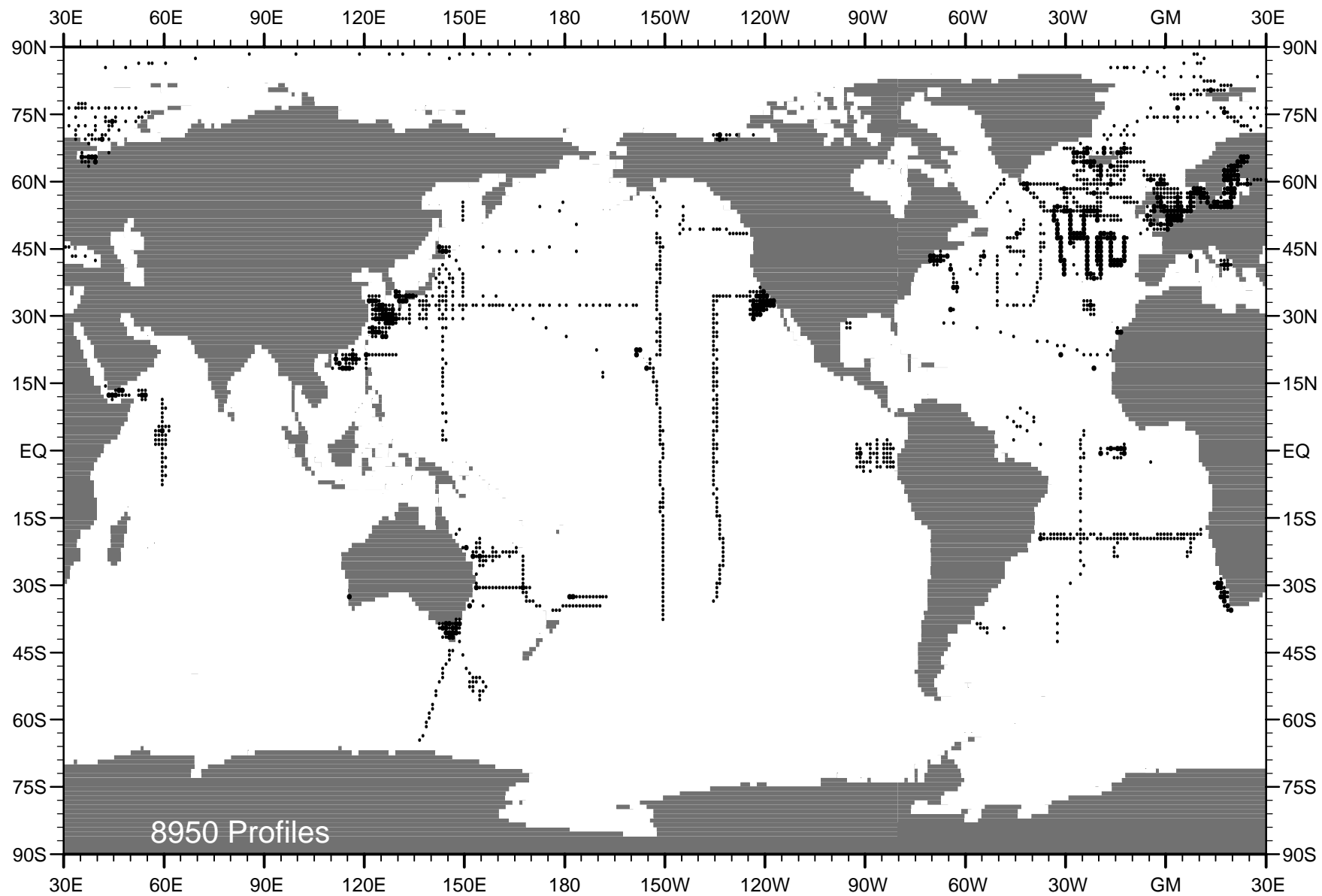


Fig. B64 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1991 .

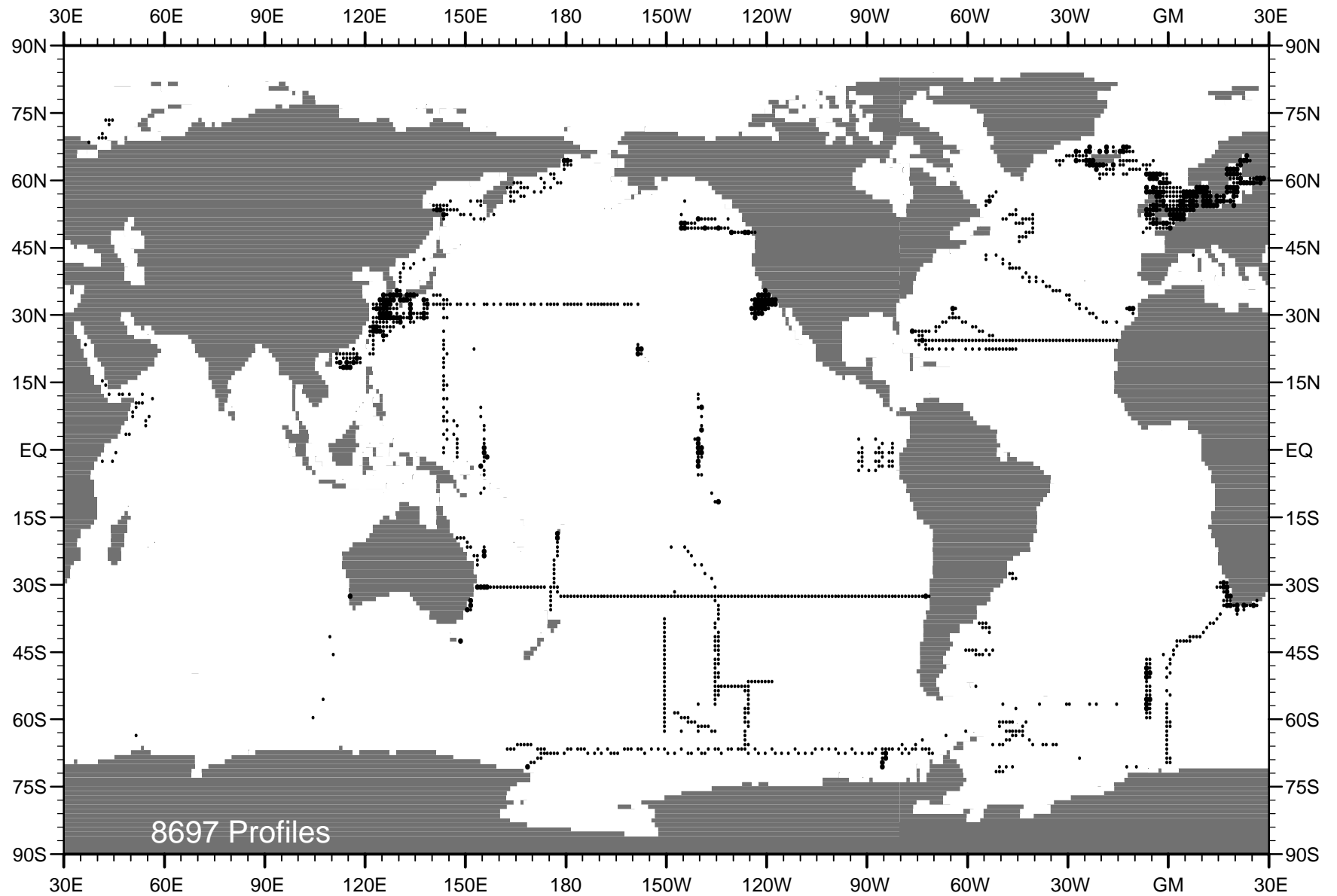


Fig. B65 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1992 .

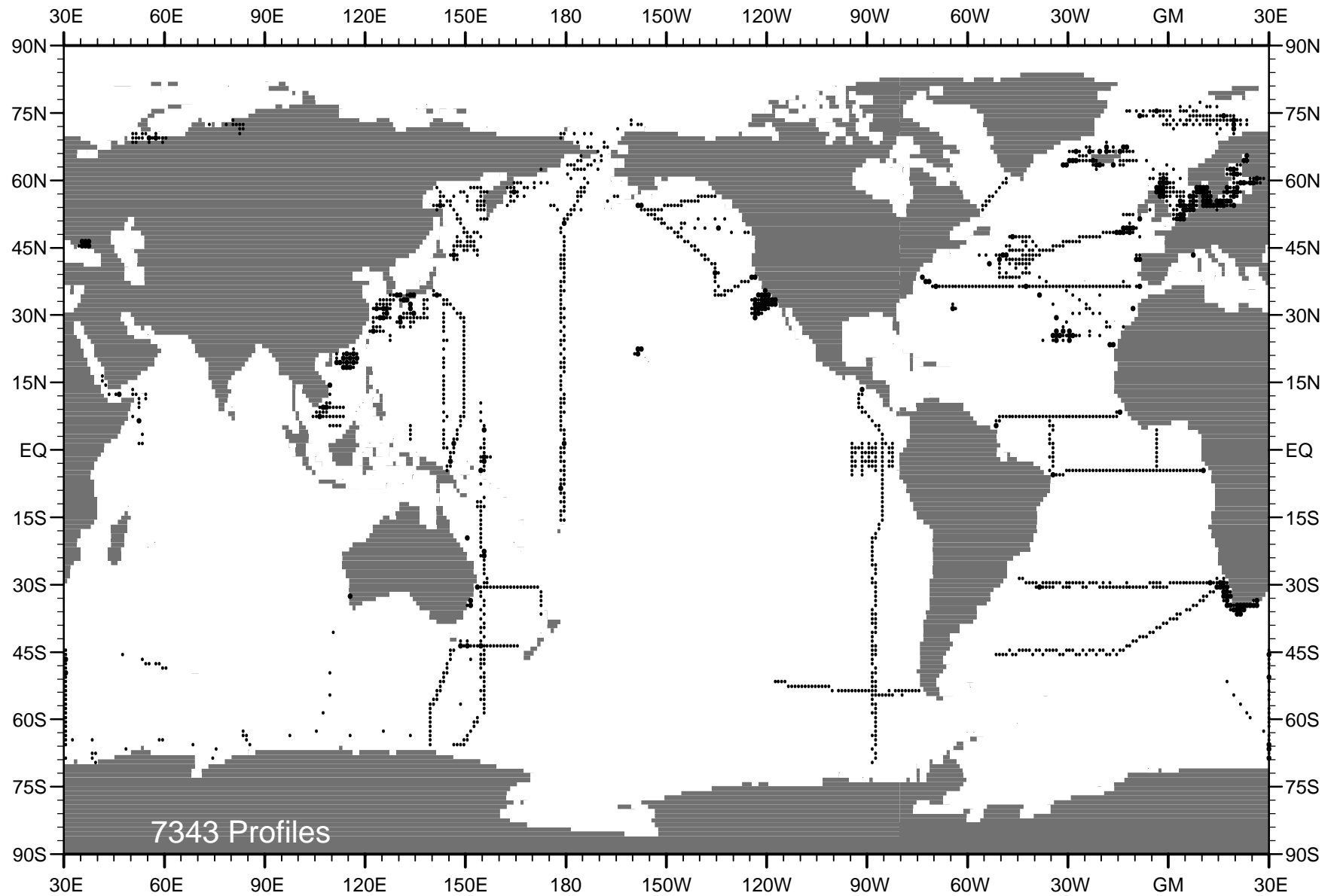


Fig. B66 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1993 .

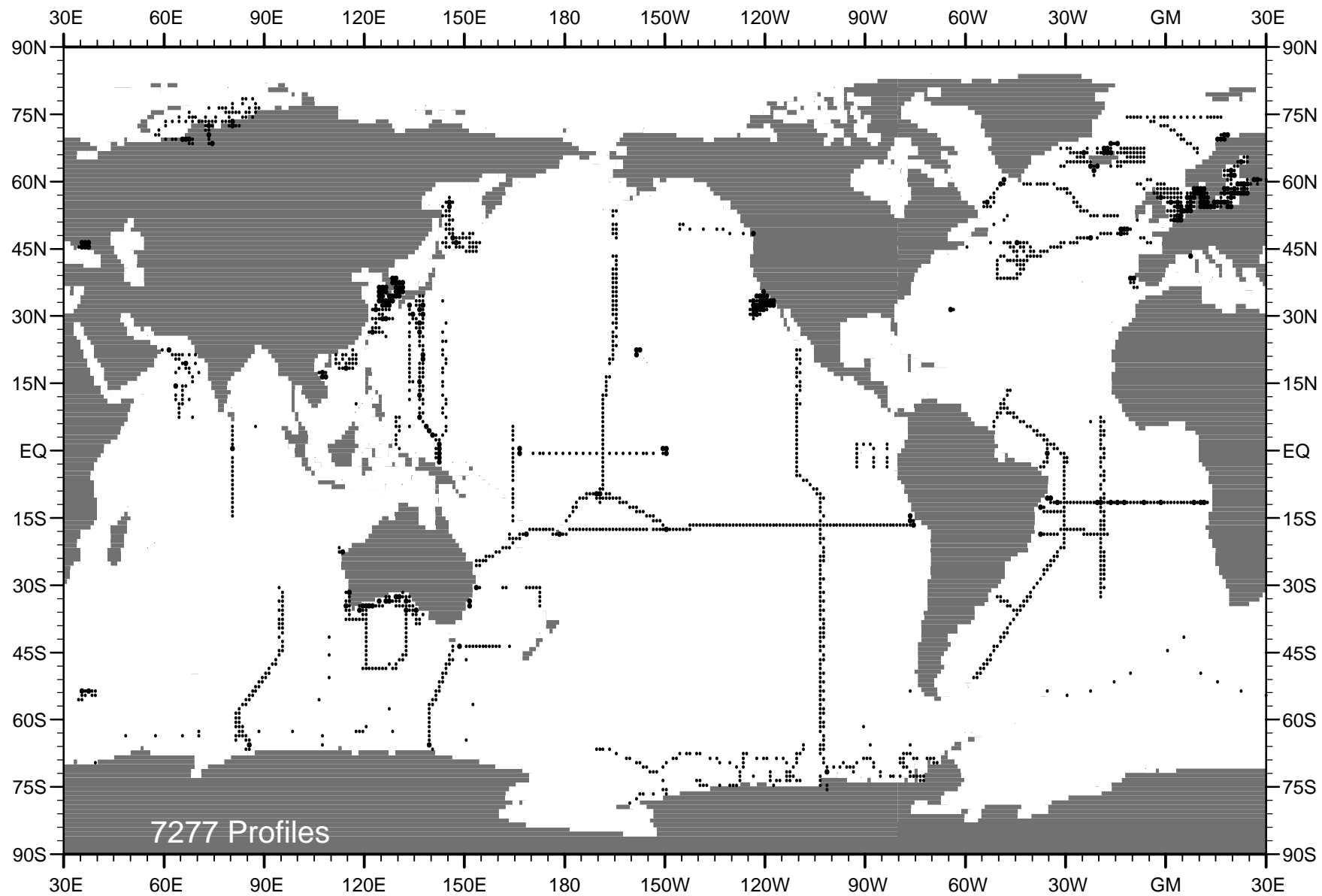


Fig. B67 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1994 .

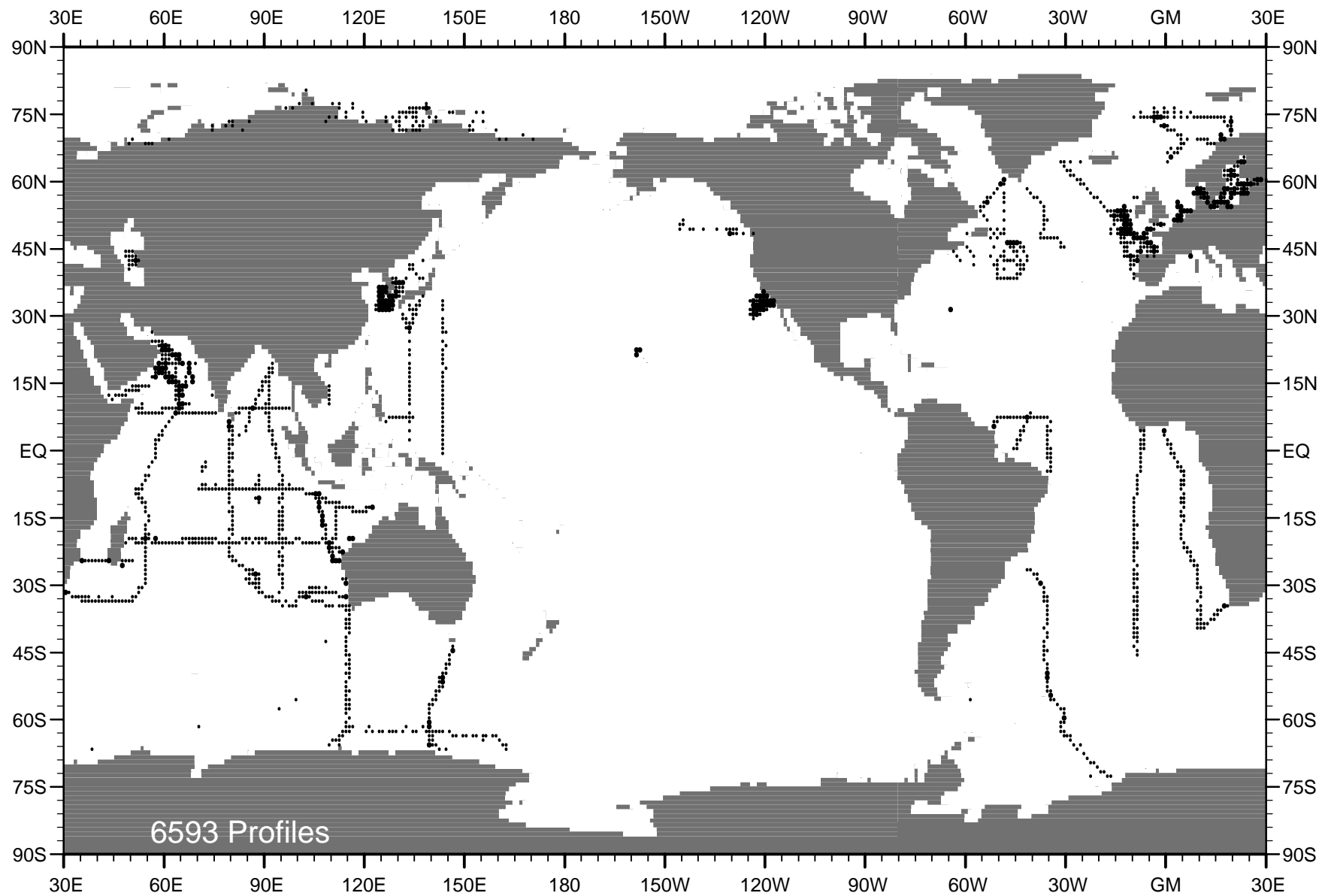


Fig. B68 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1995 .



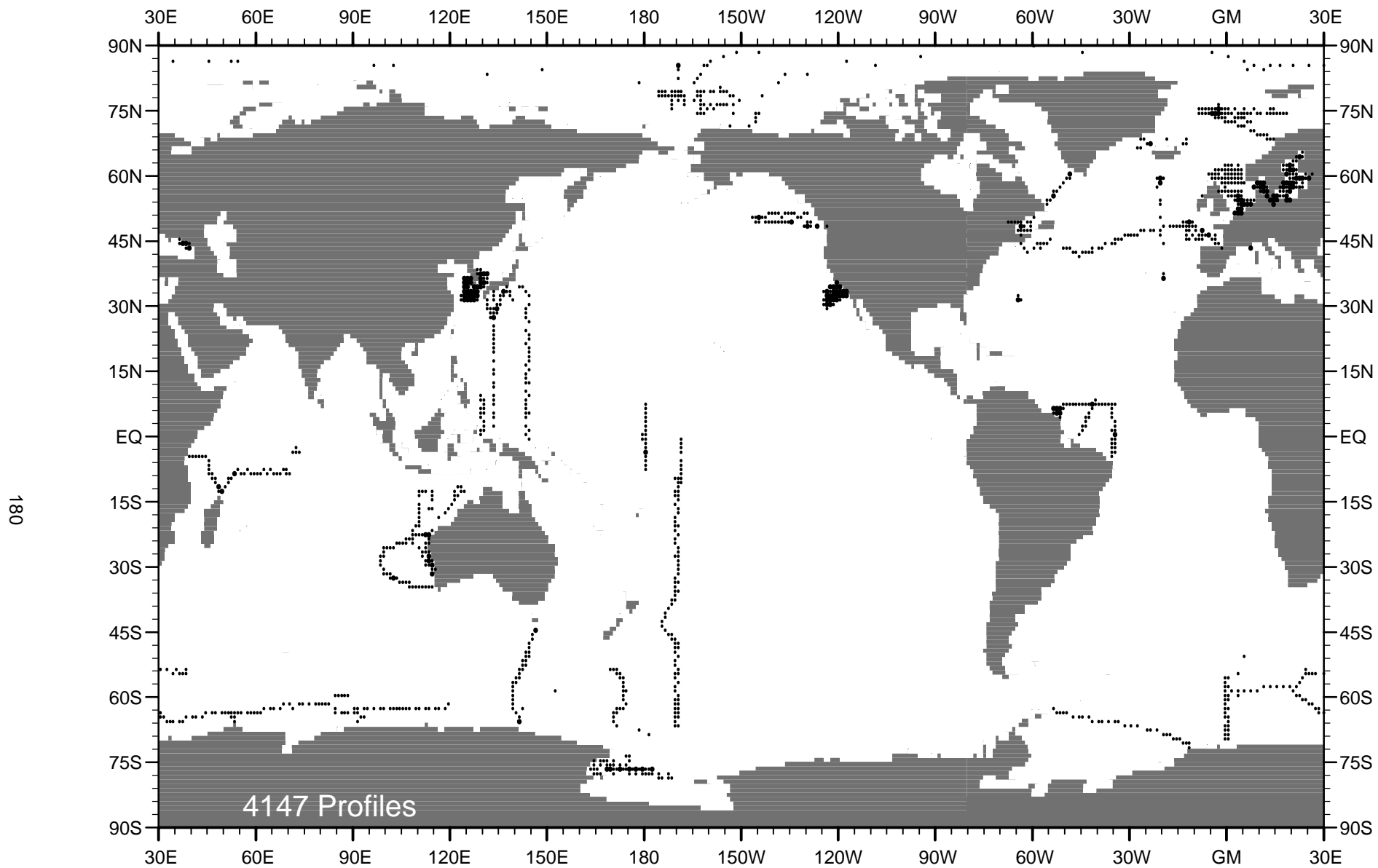


Fig. B69 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1996 .

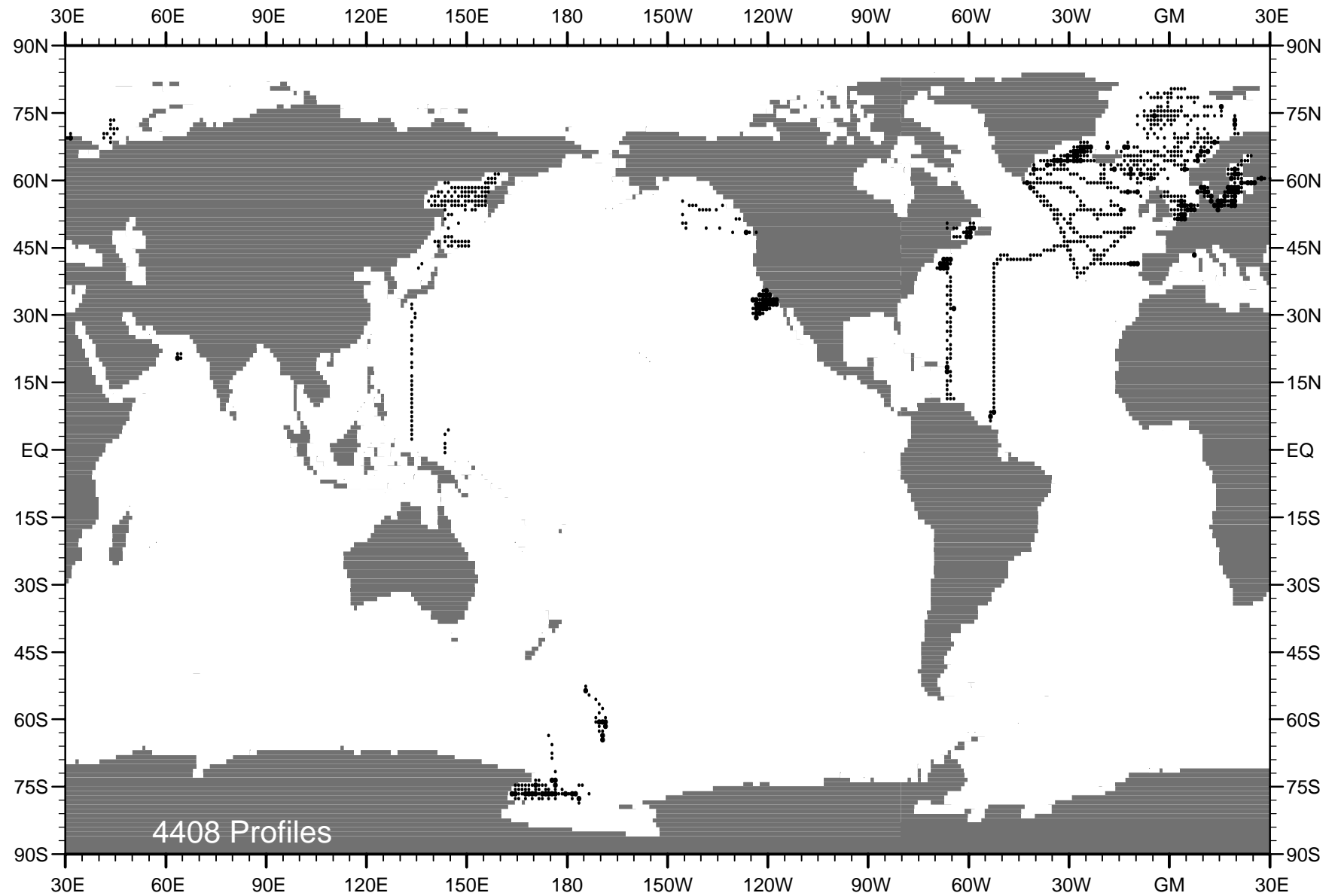


Fig. B70 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1997 .

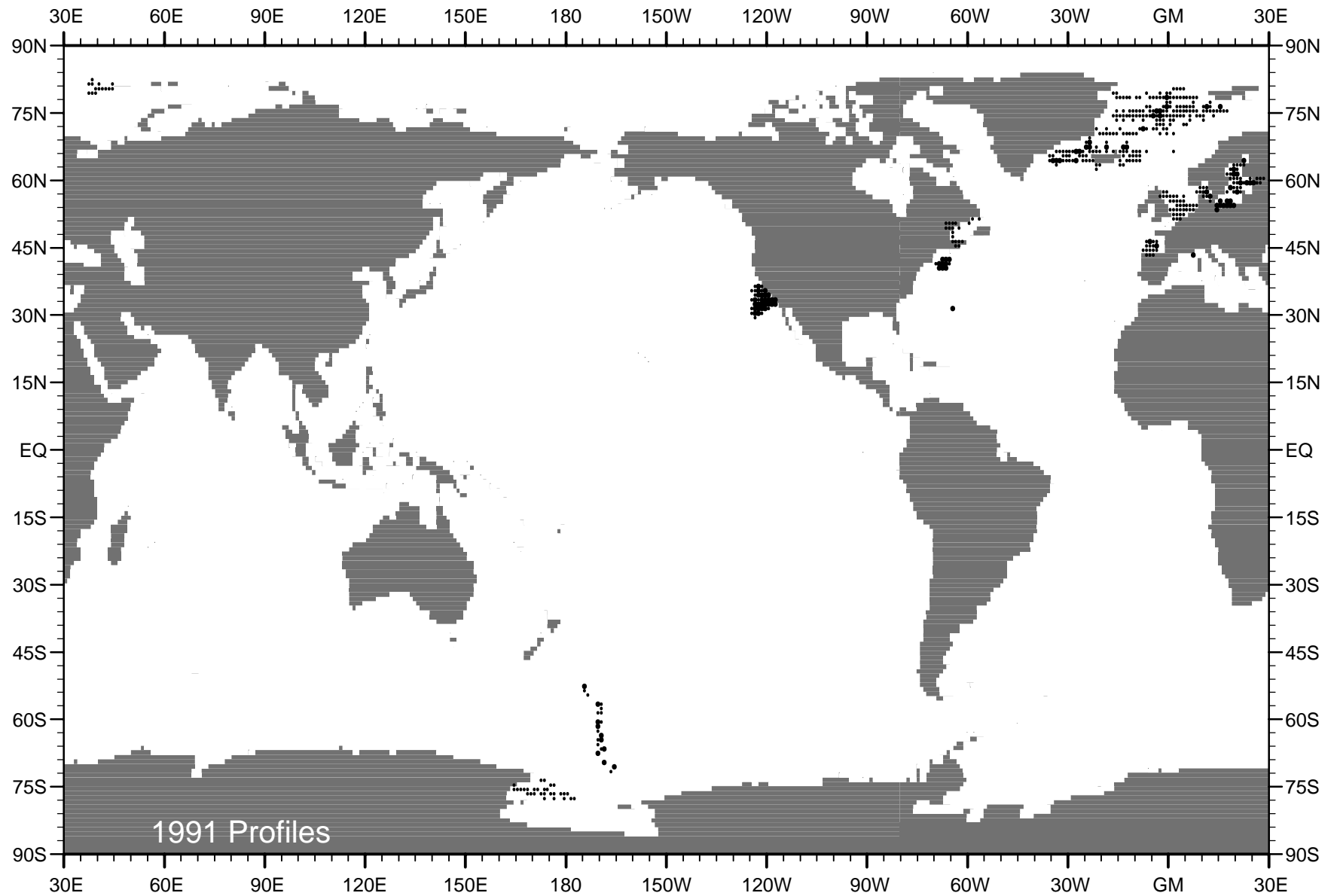


Fig. B71 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1998 .

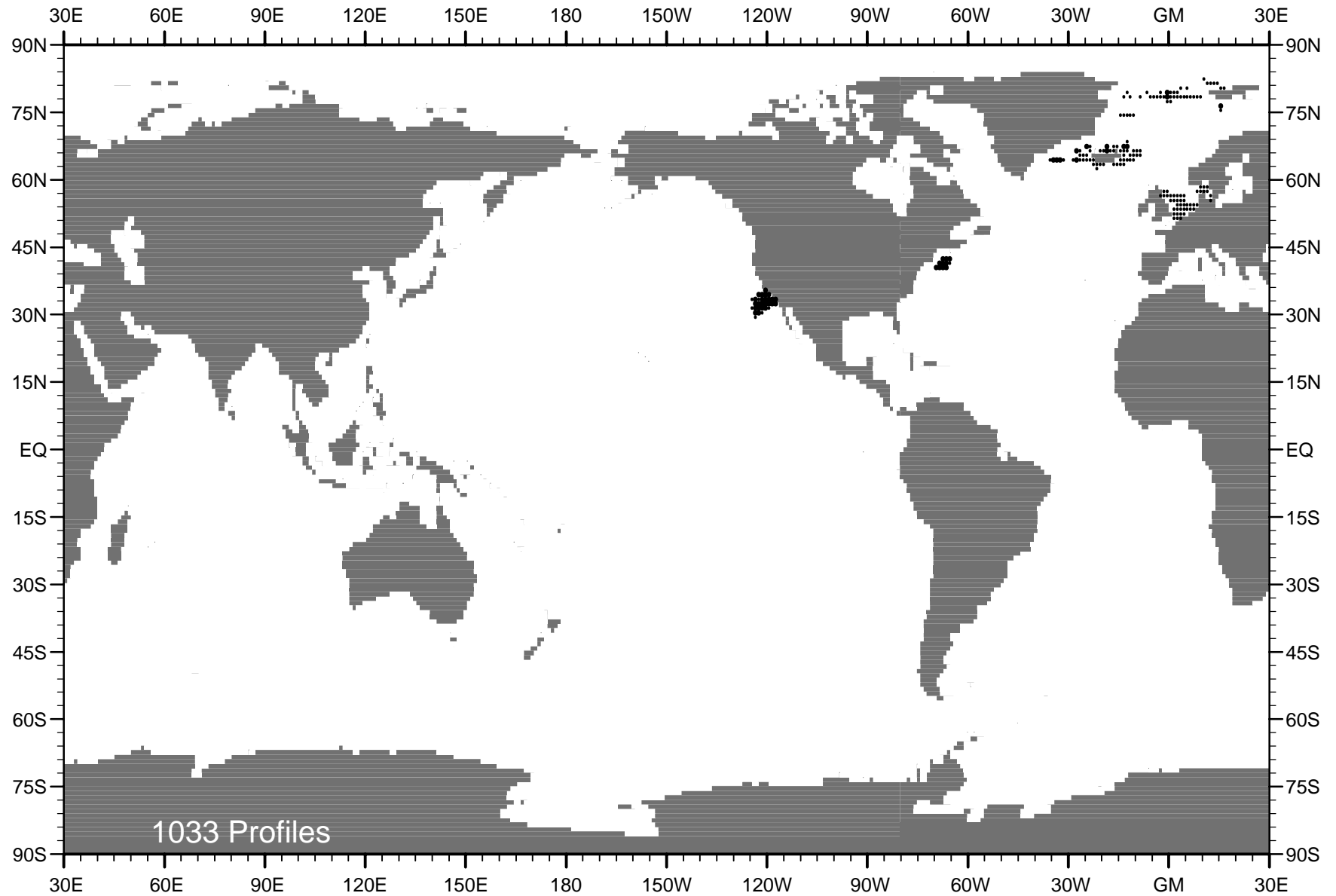


Fig. B72 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 1999 .

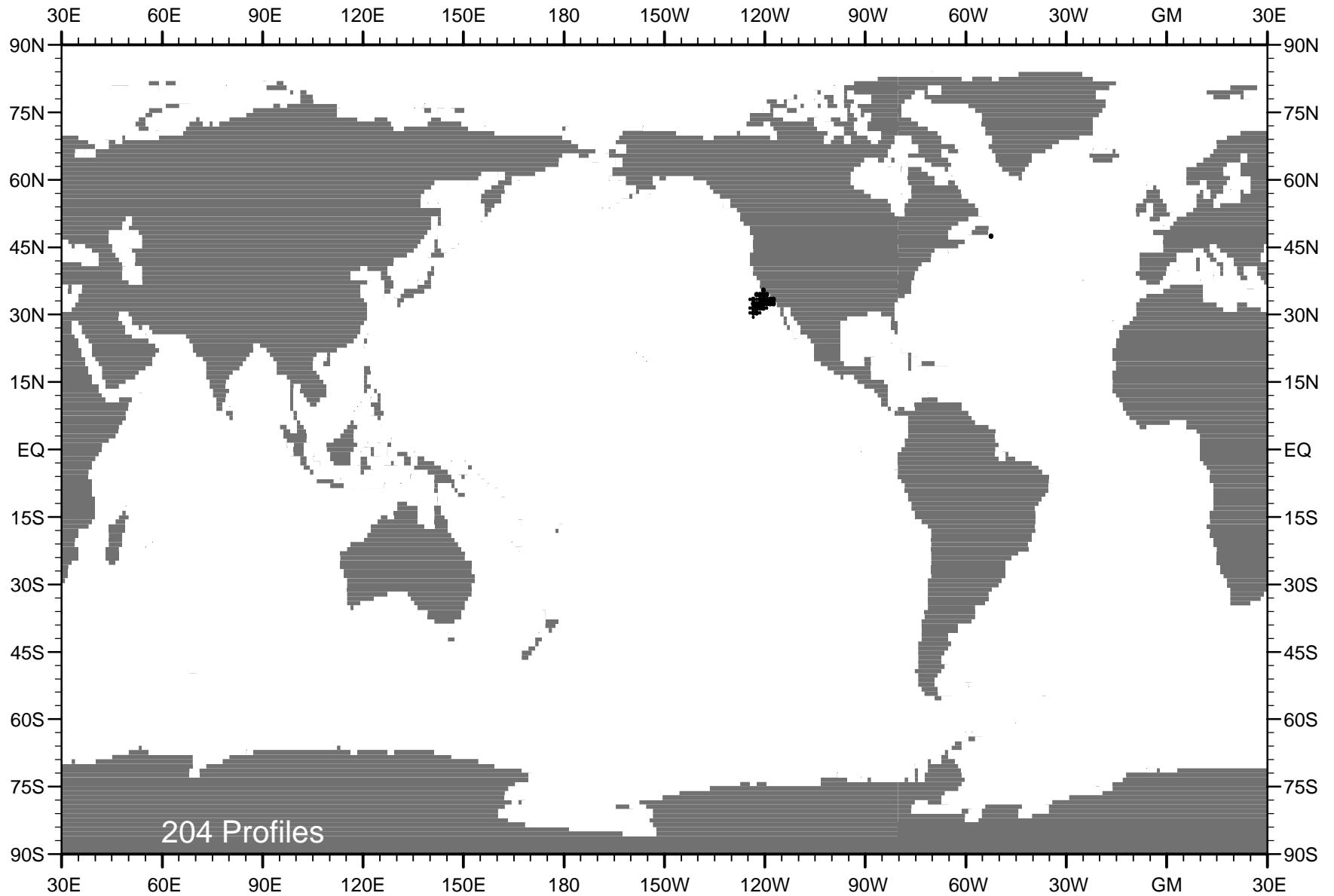


Fig. B73 Distribution of all Ocean Station Data (OSD) silicate profiles in WOD01 for year 2000 .

**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.

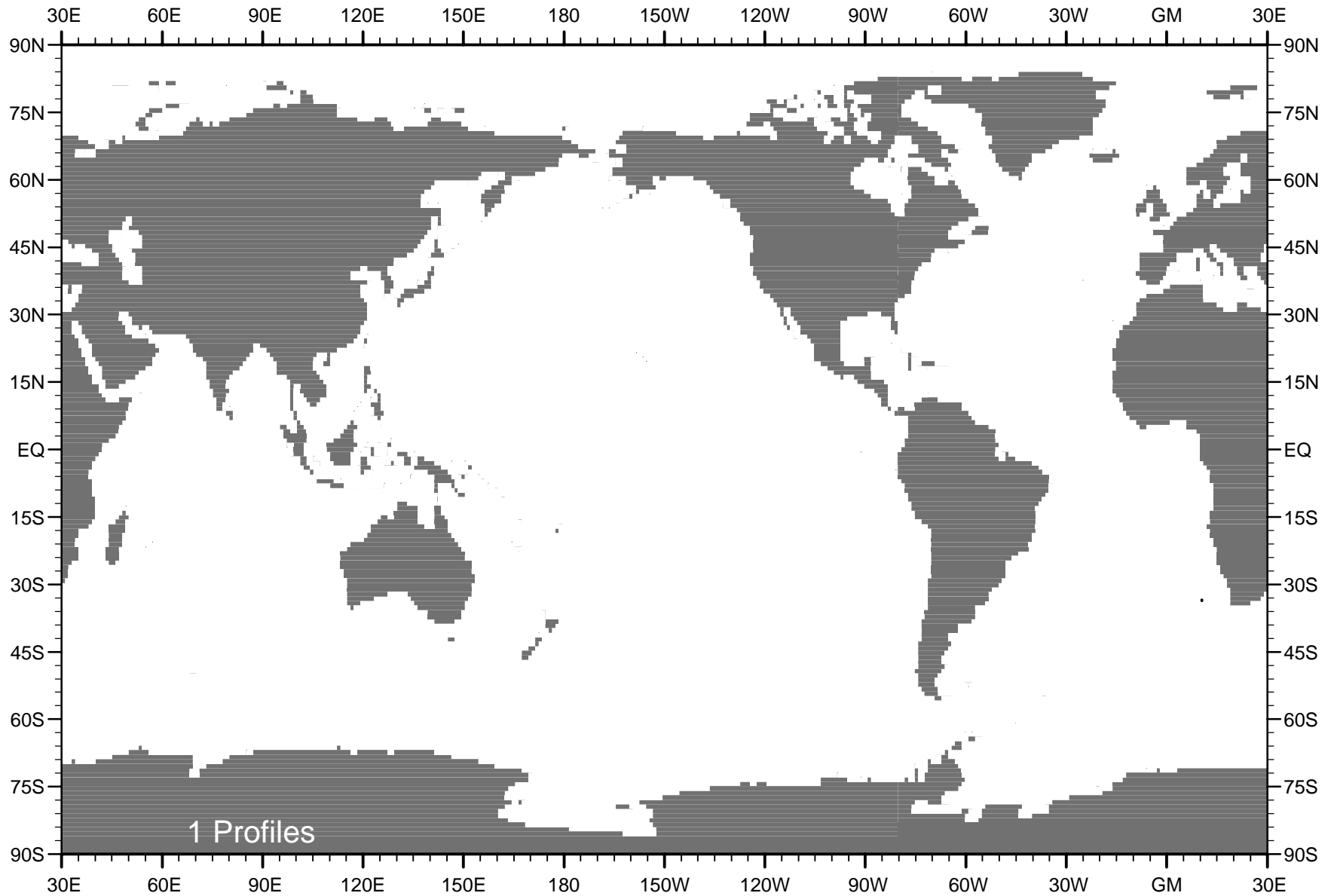


Fig. C1 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1925 .

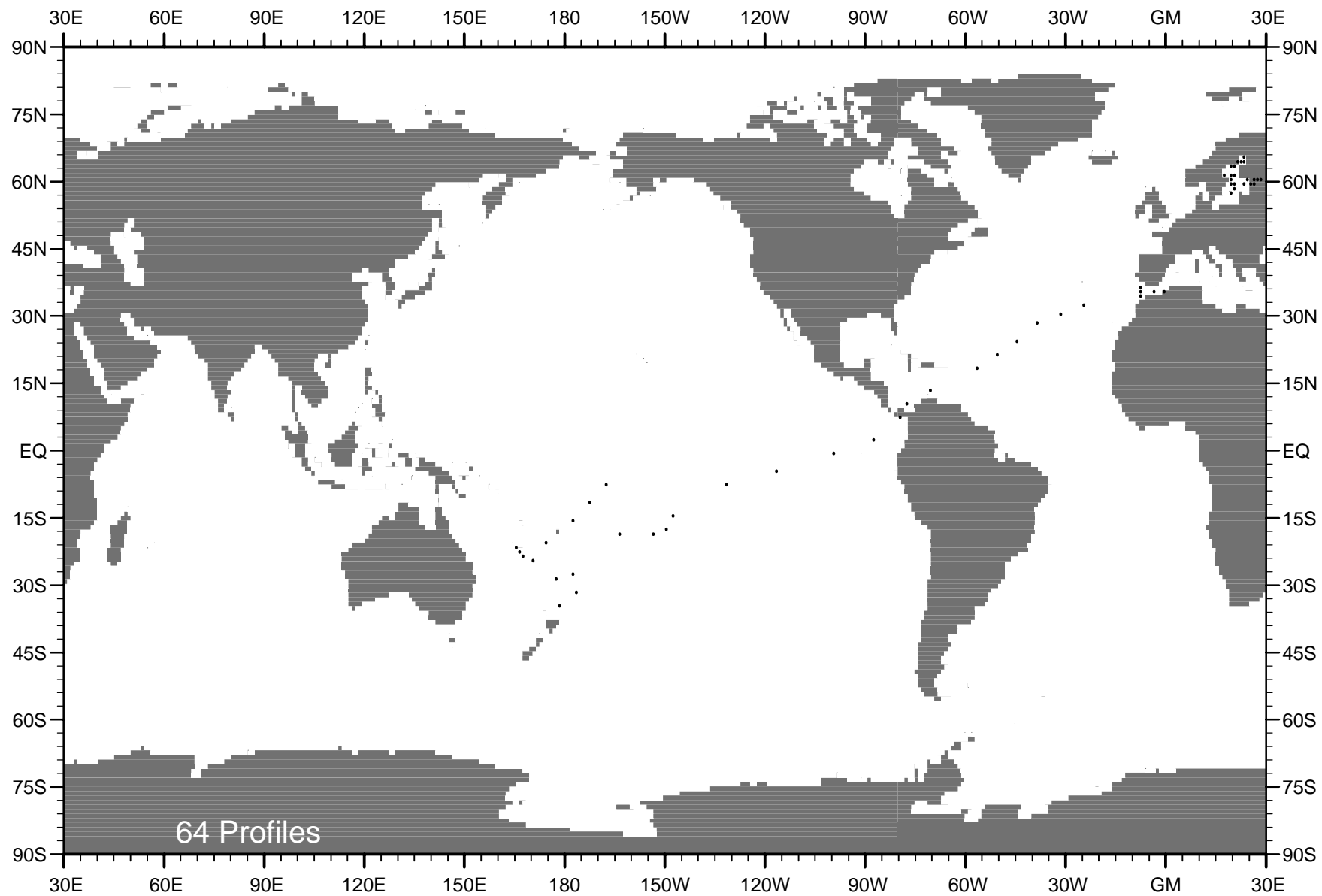


Fig. C2 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1928 .



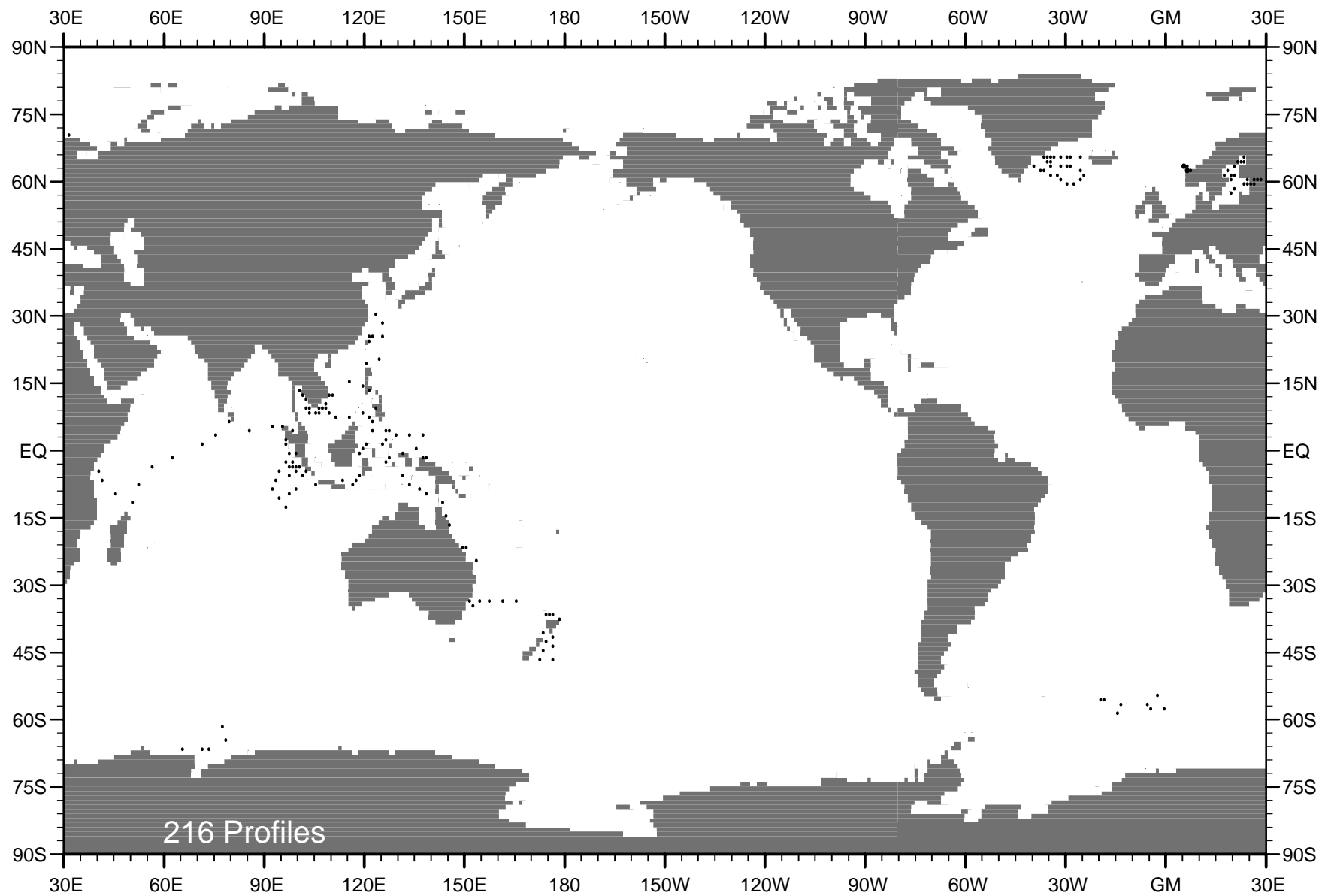


Fig. C3 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1929 .

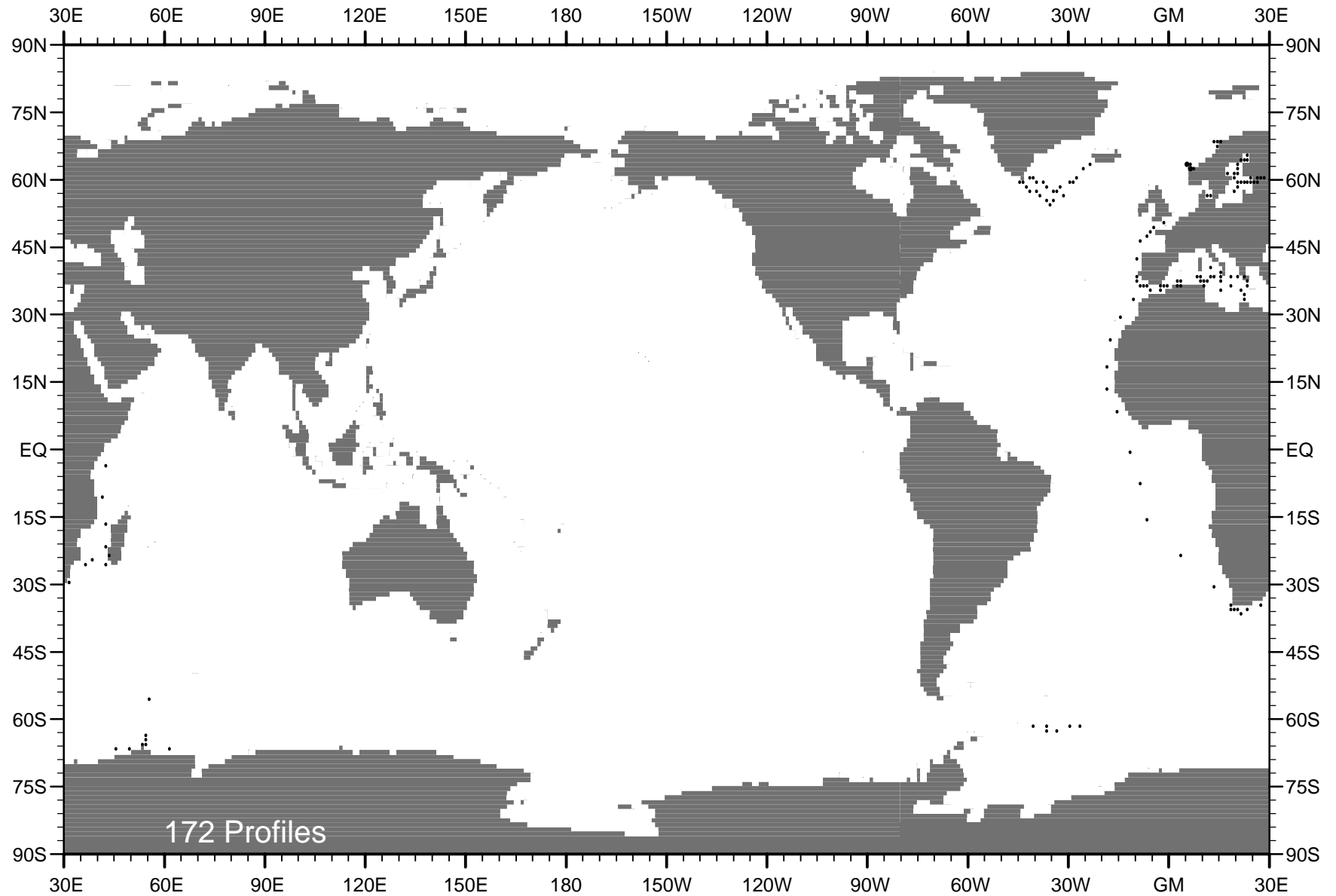


Fig. C4 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1930 .

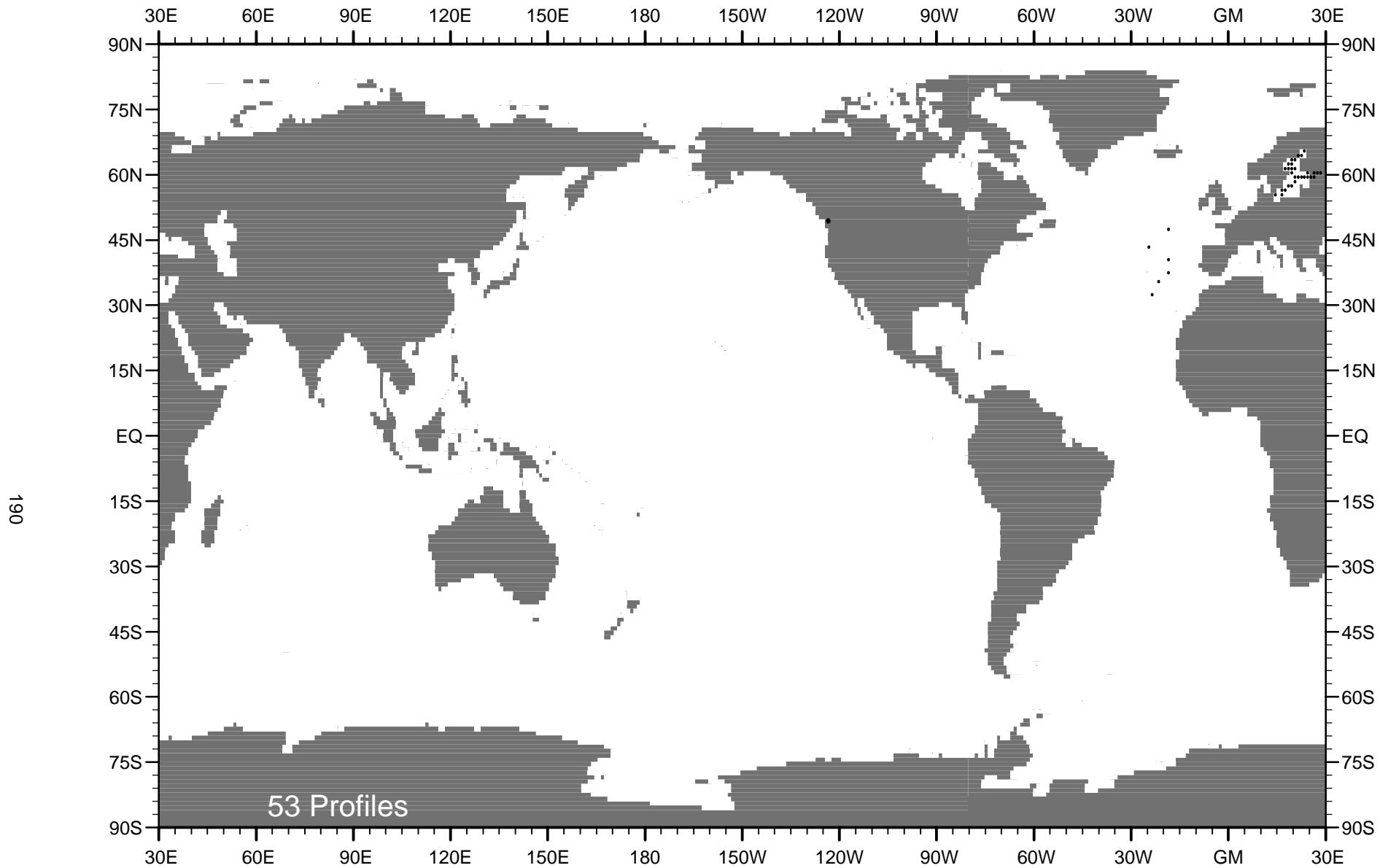


Fig. C5 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1931 .

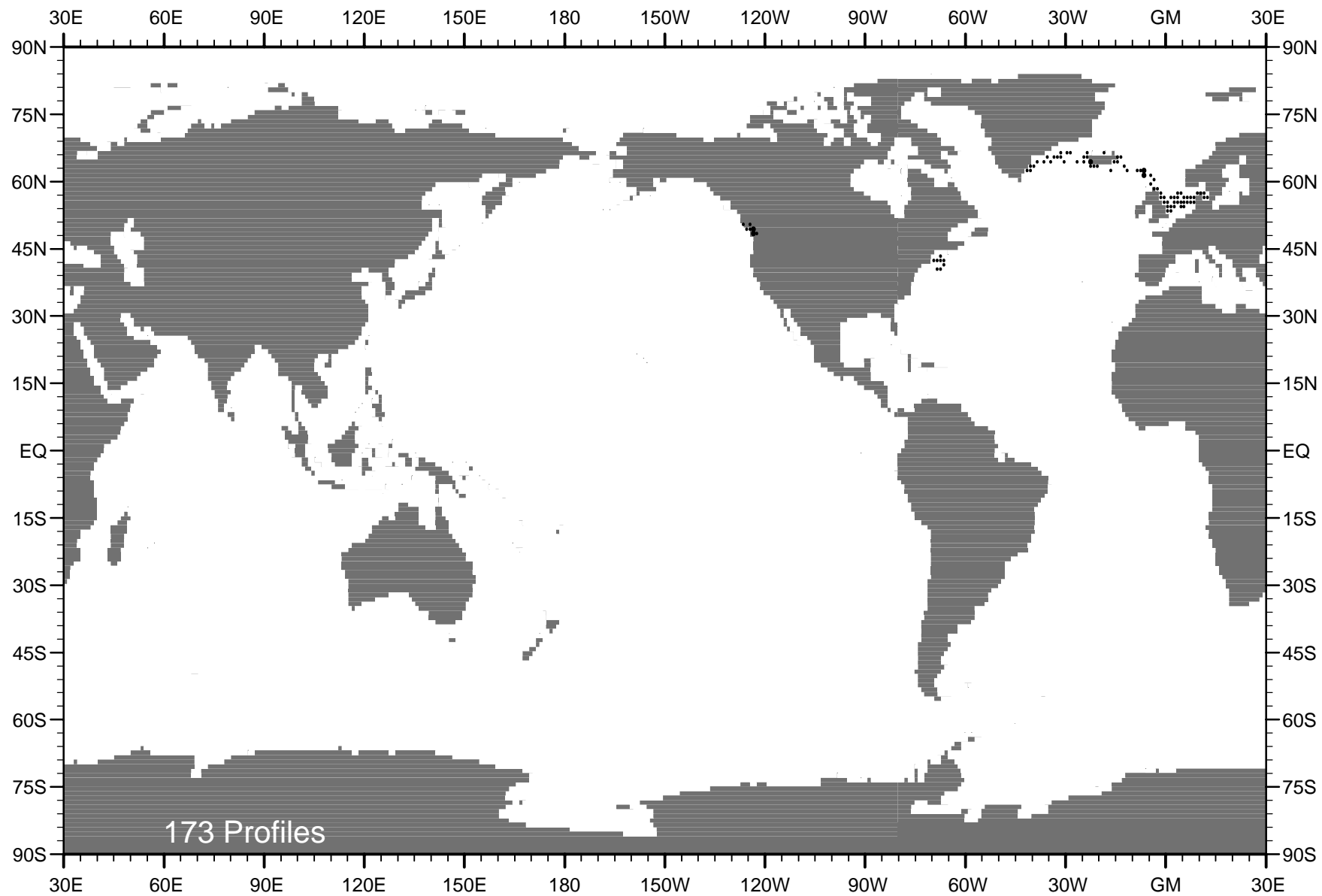


Fig. C6 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1932 .

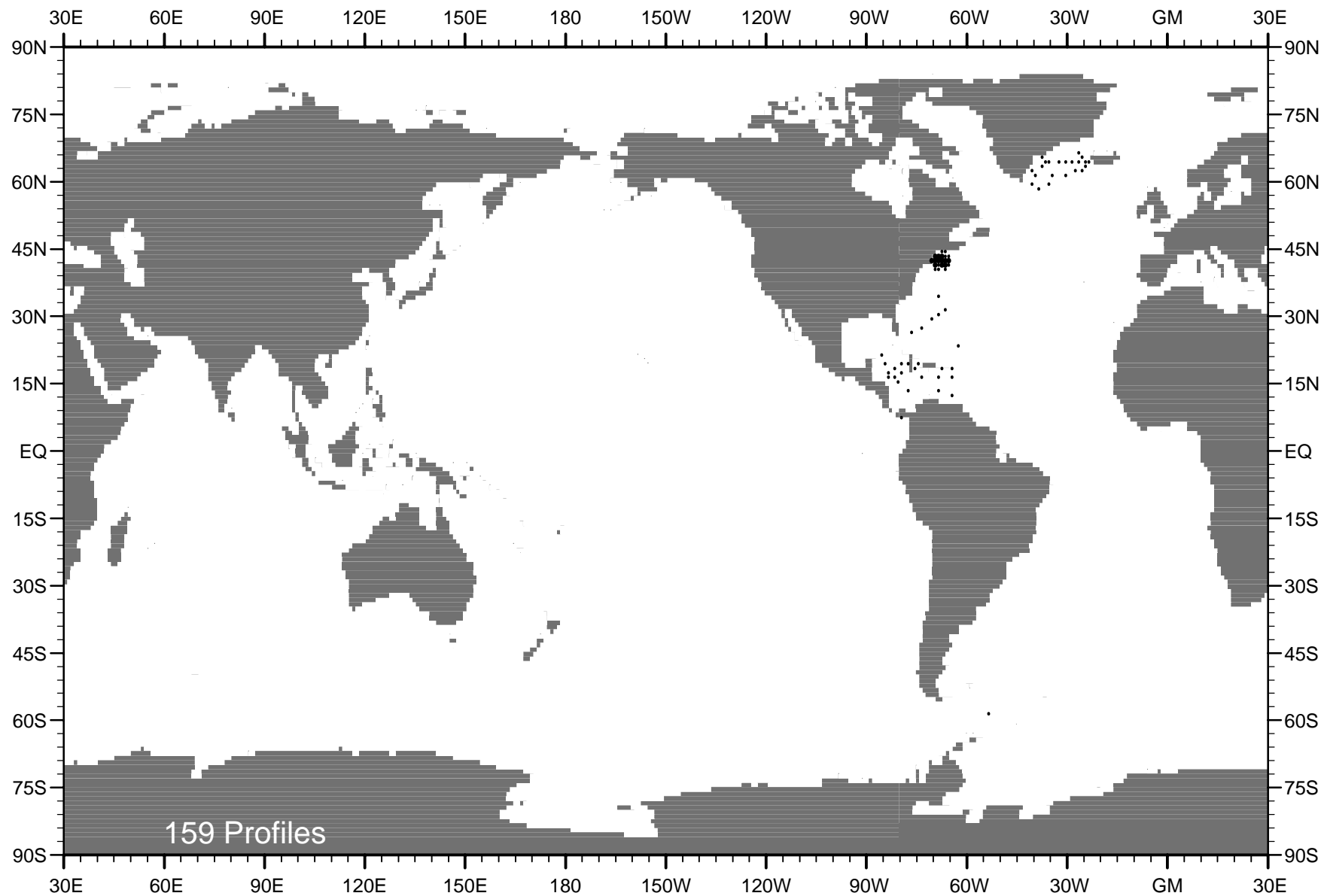


Fig. C7 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1933 .

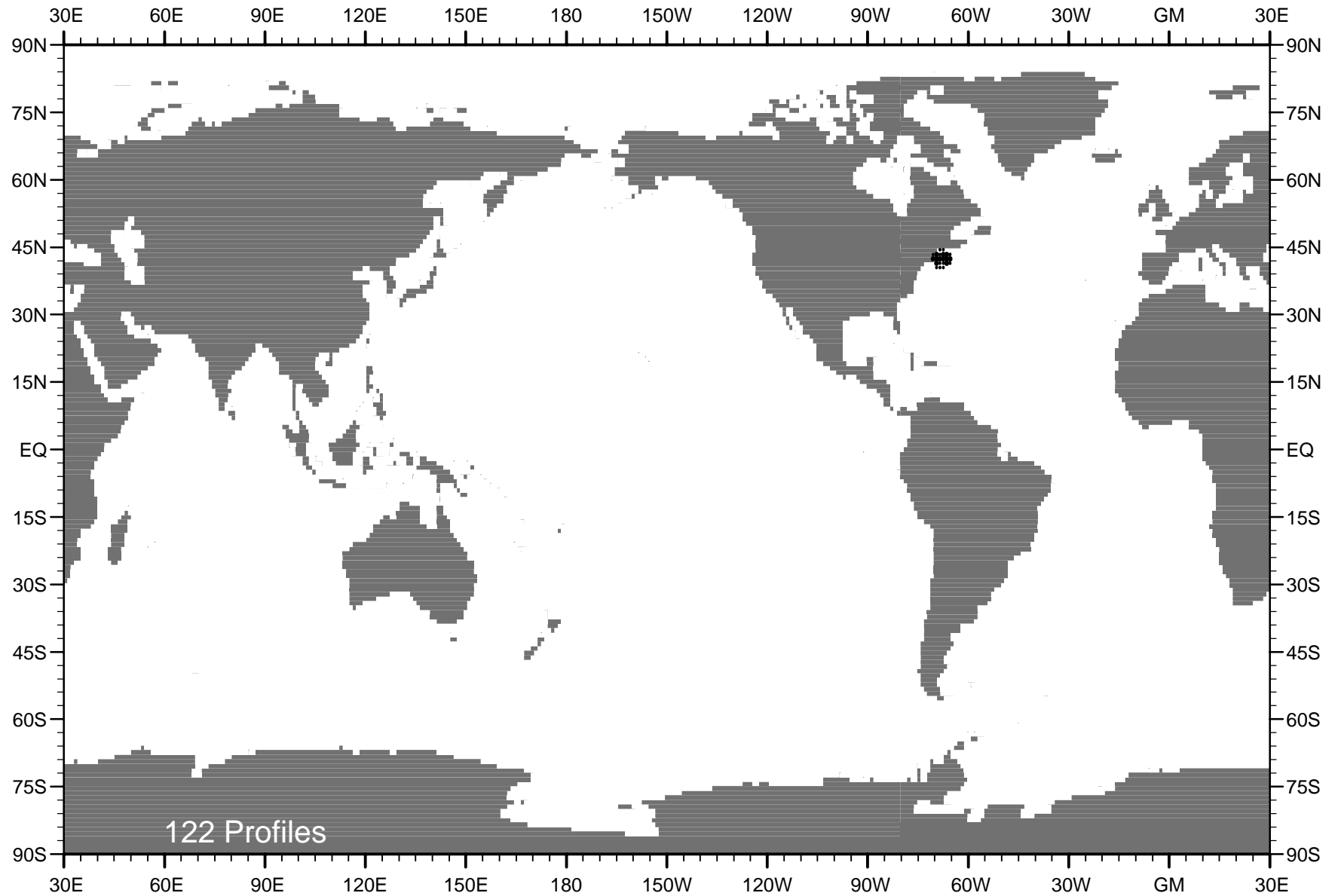


Fig. C8 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1934 .

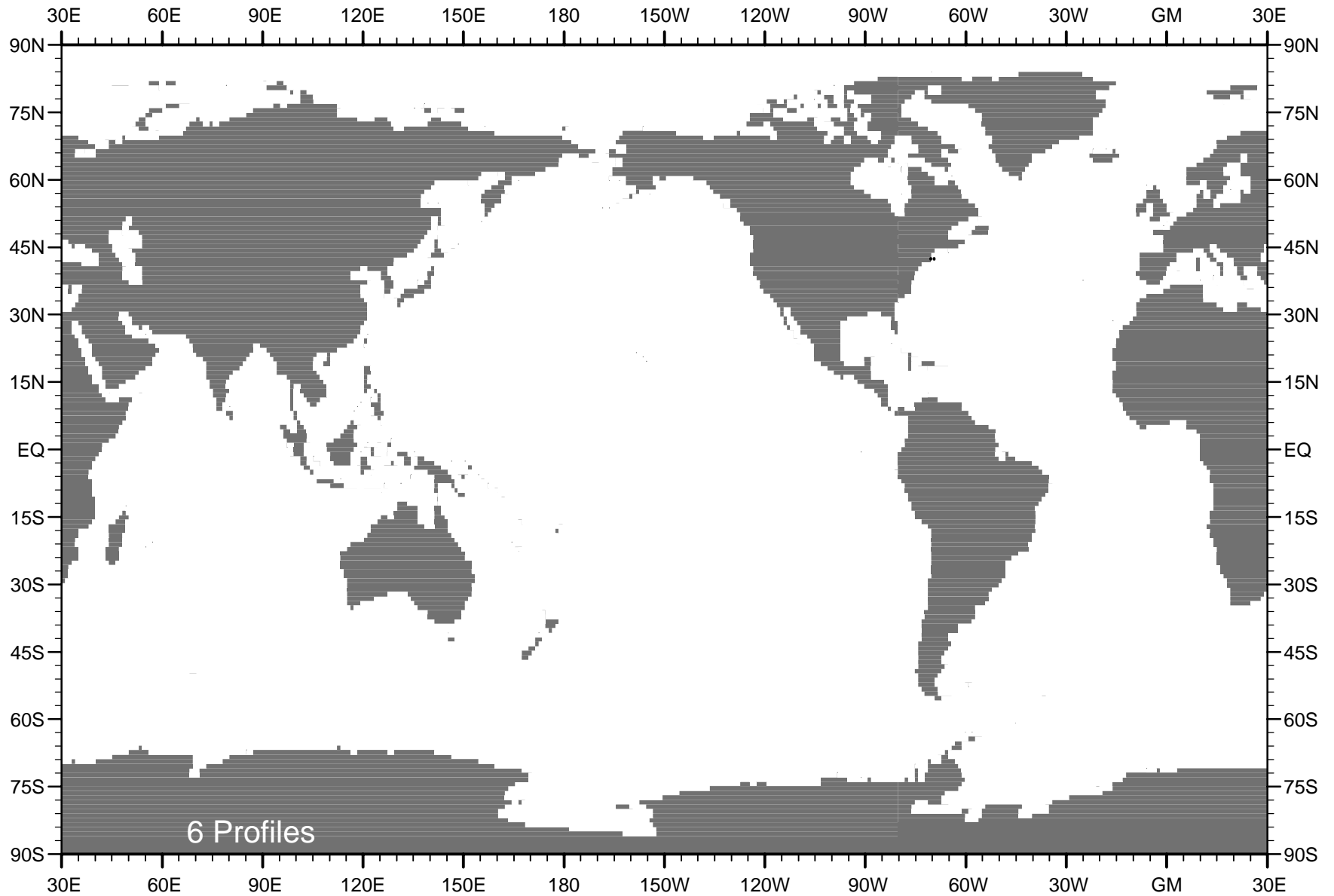


Fig. C9 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1935 .

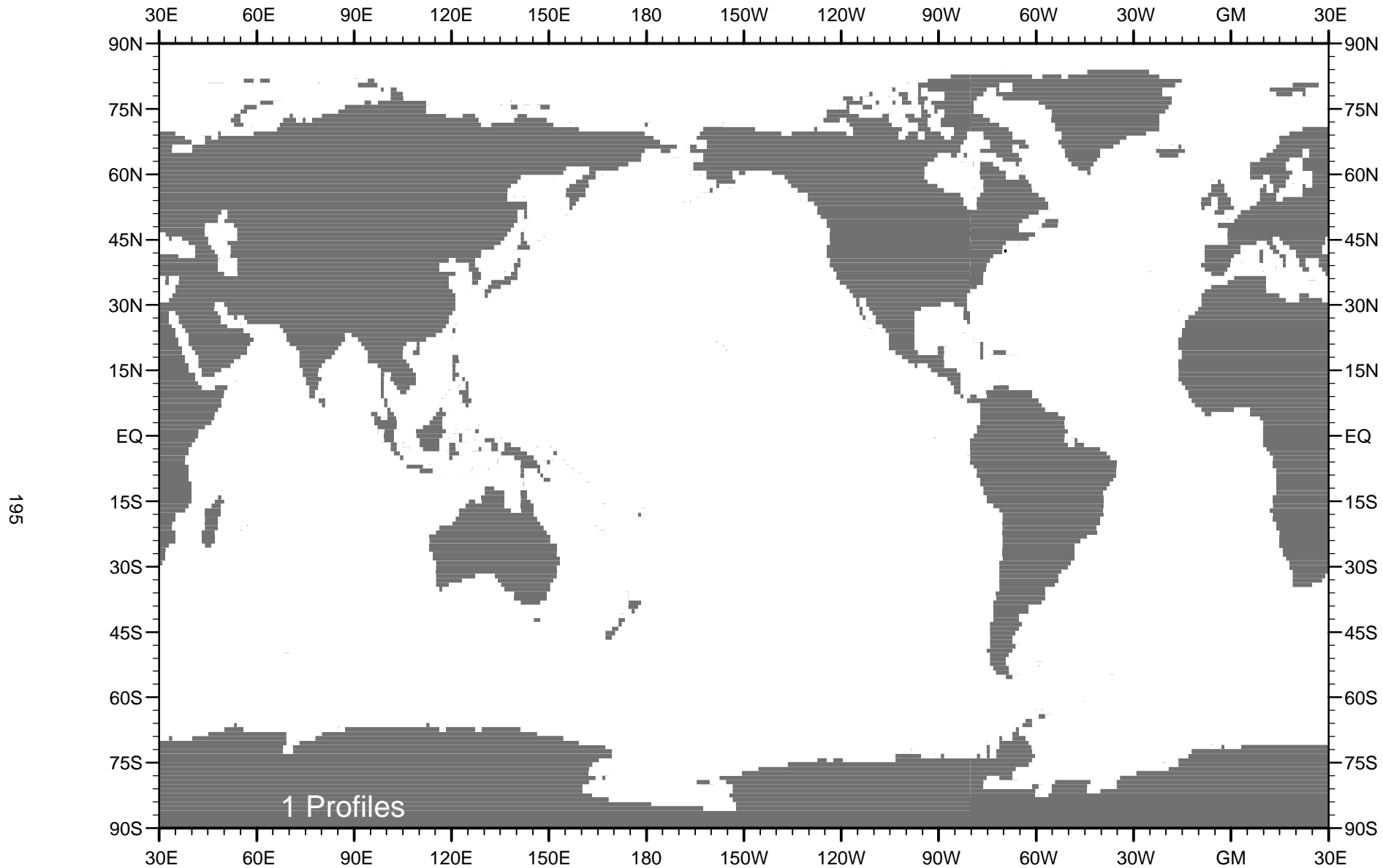


Fig. C10 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1936 .



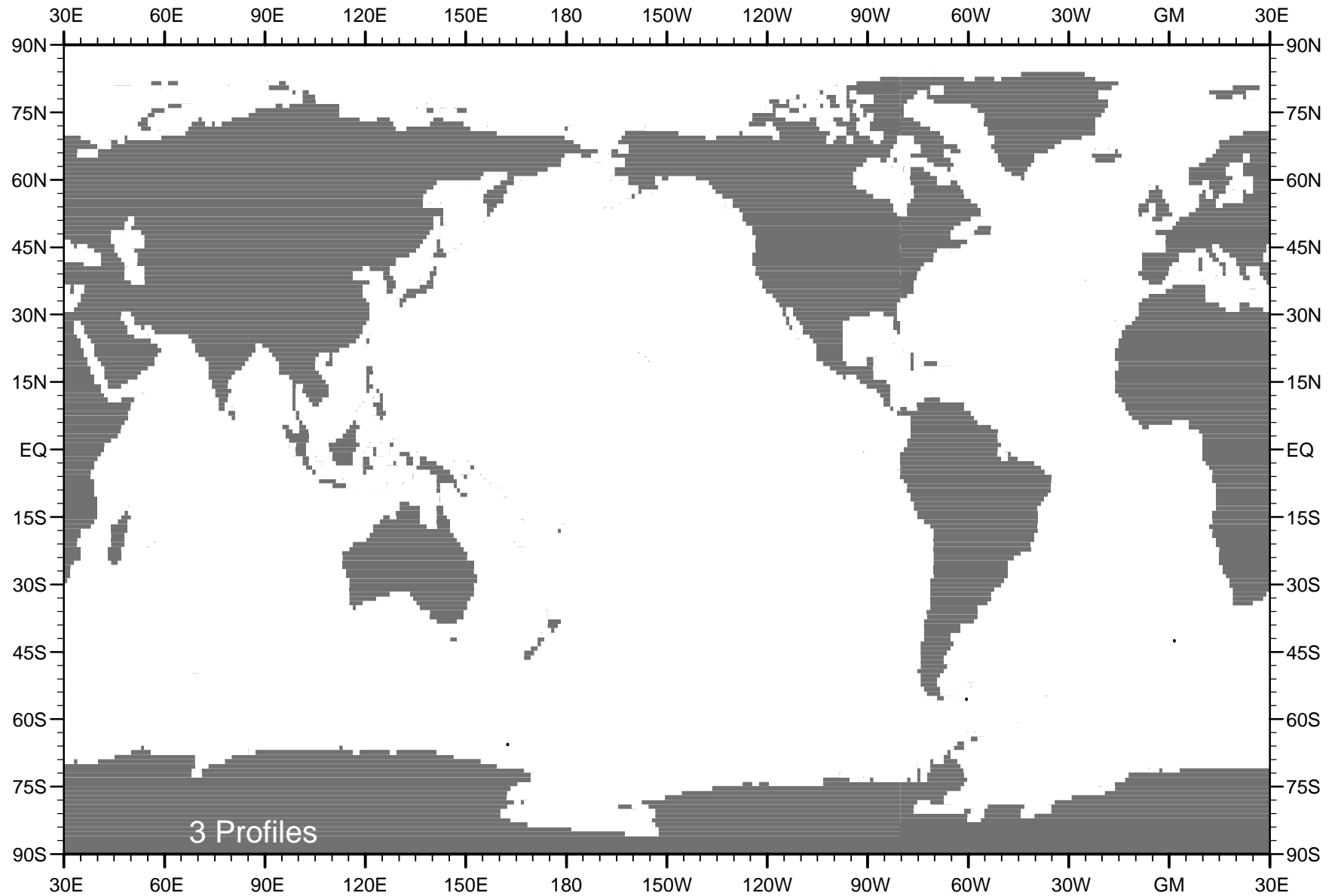


Fig. C11 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1938 .

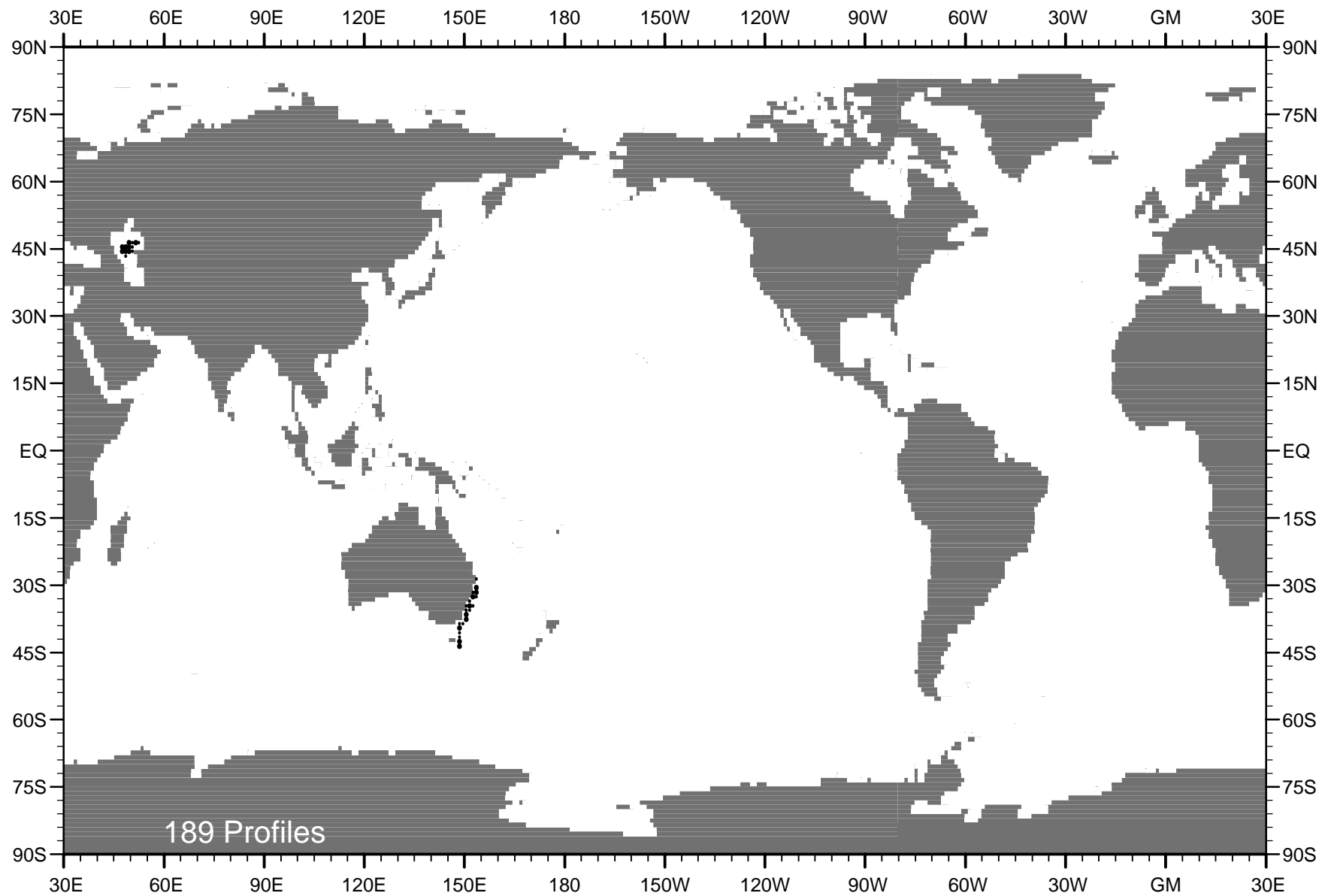


Fig. C12 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1940 .

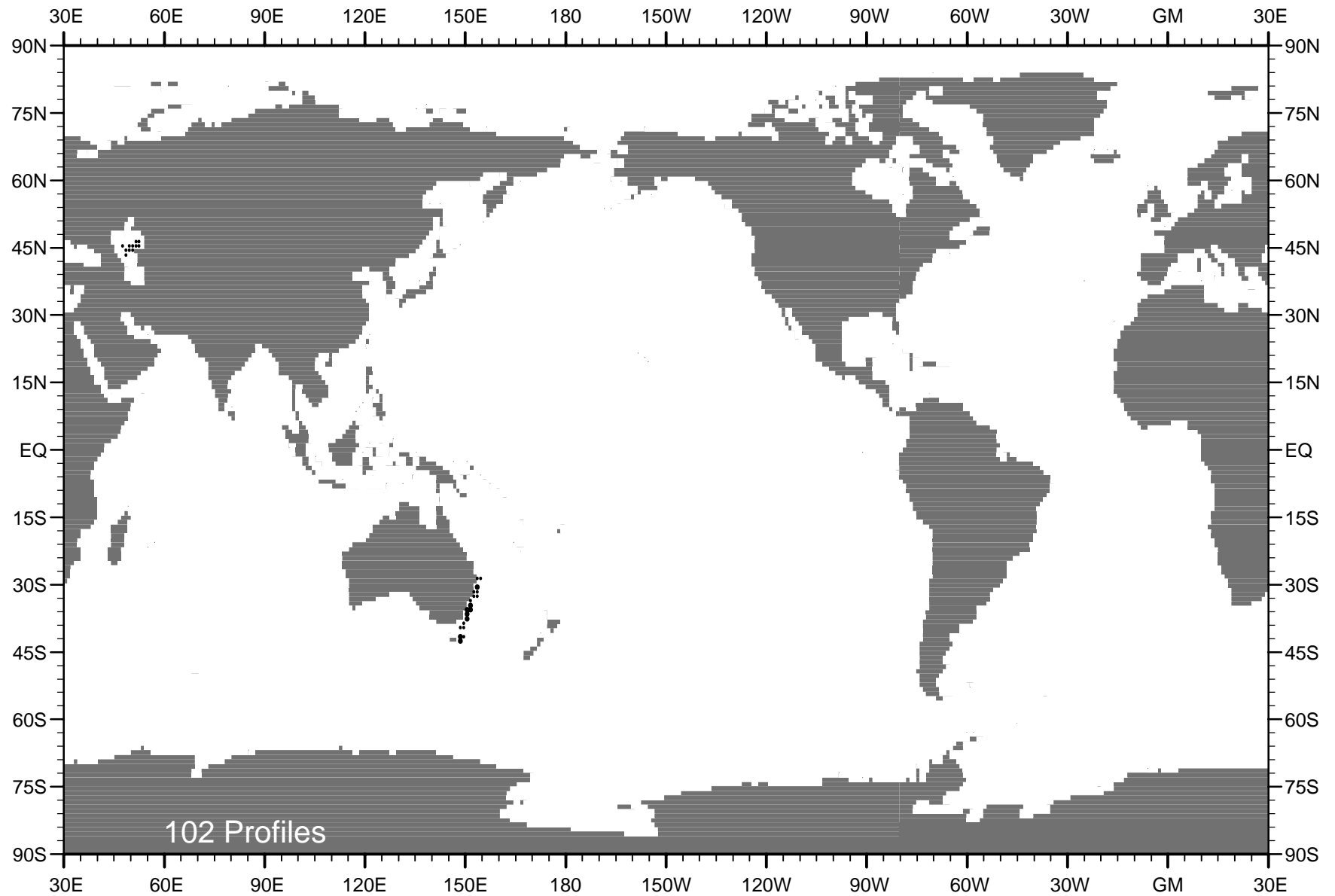


Fig. C13 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1941 .

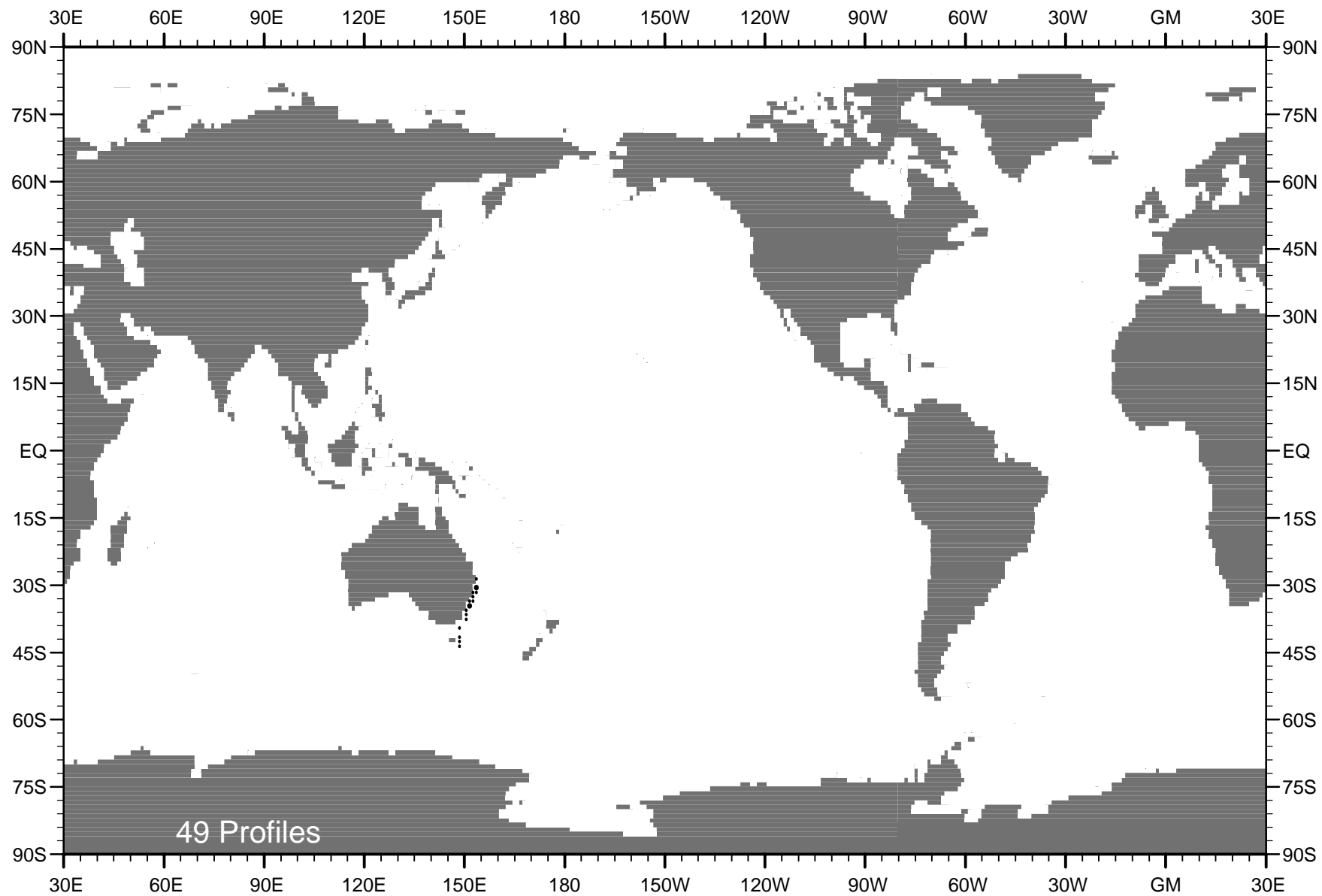


Fig. C14 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1942 .

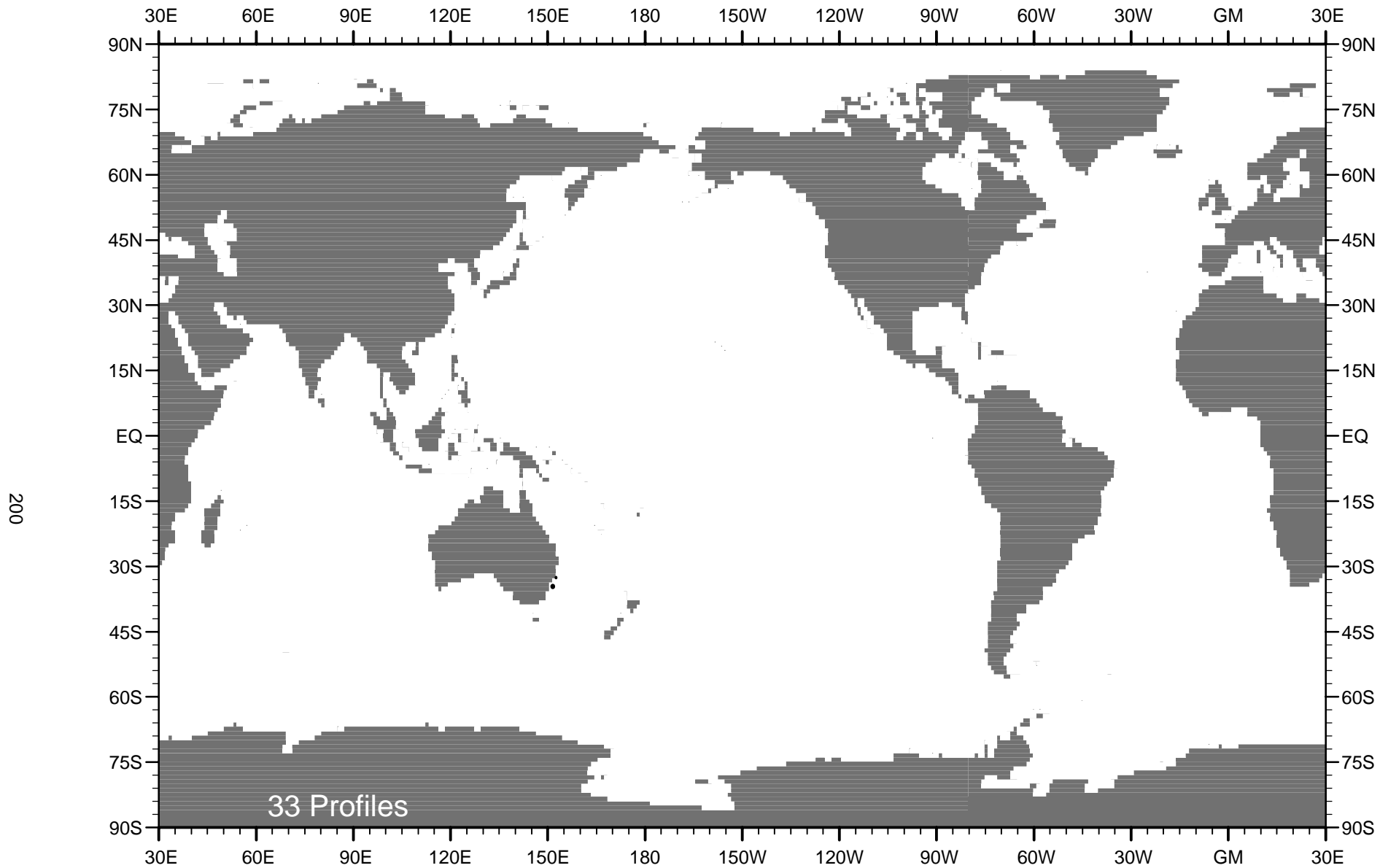


Fig. C15 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1943 .

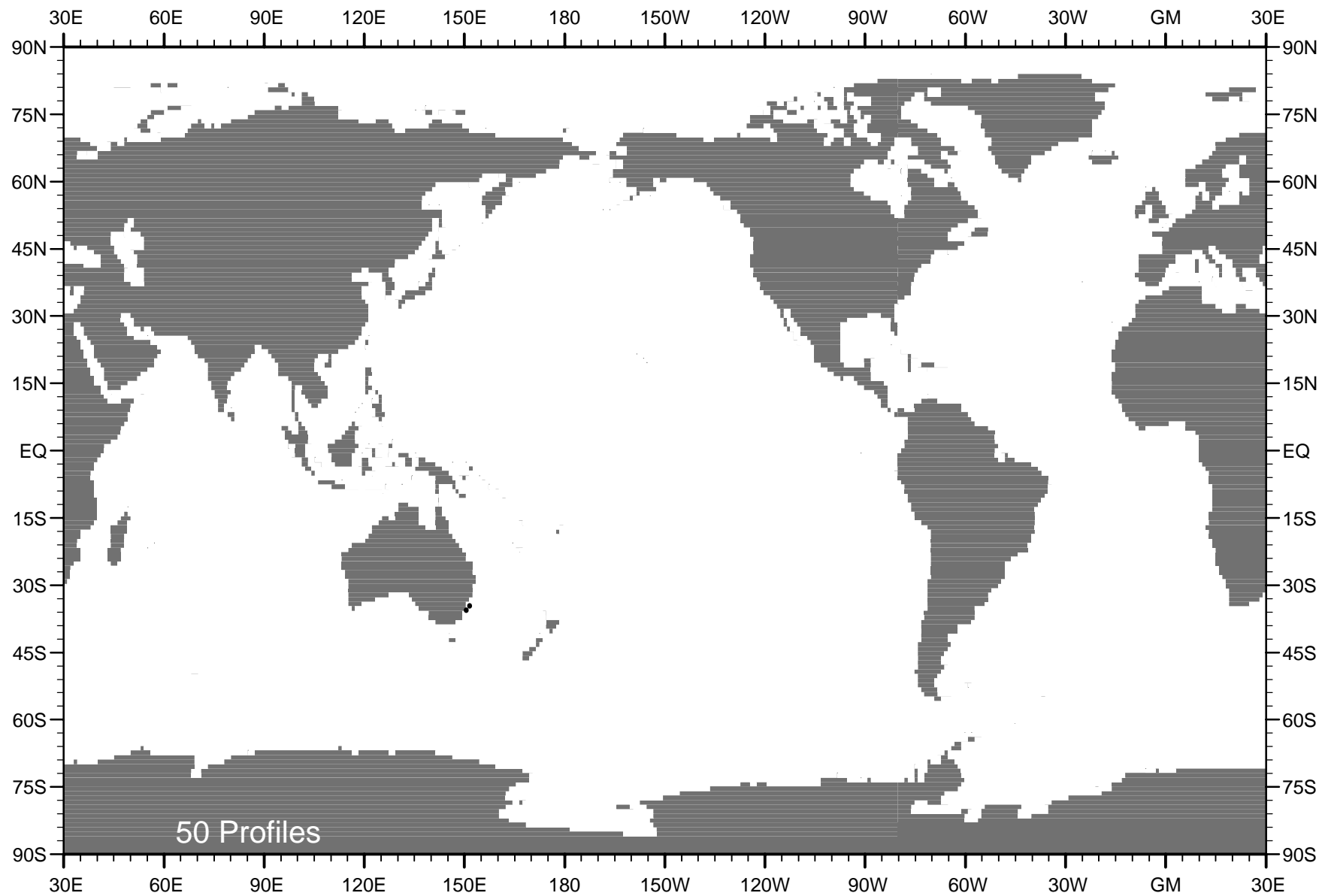


Fig. C16 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1944 .

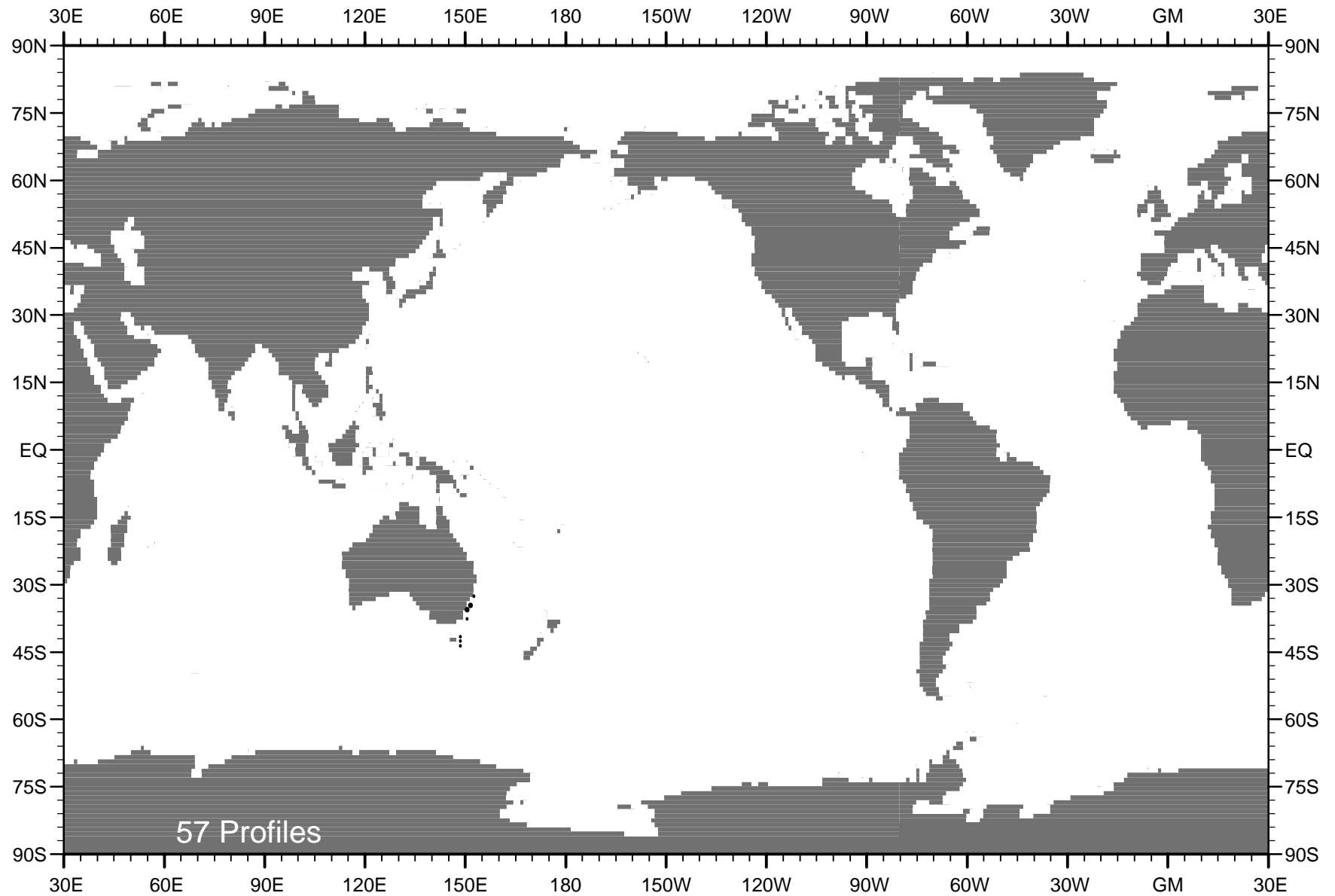


Fig. C17 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1945 .

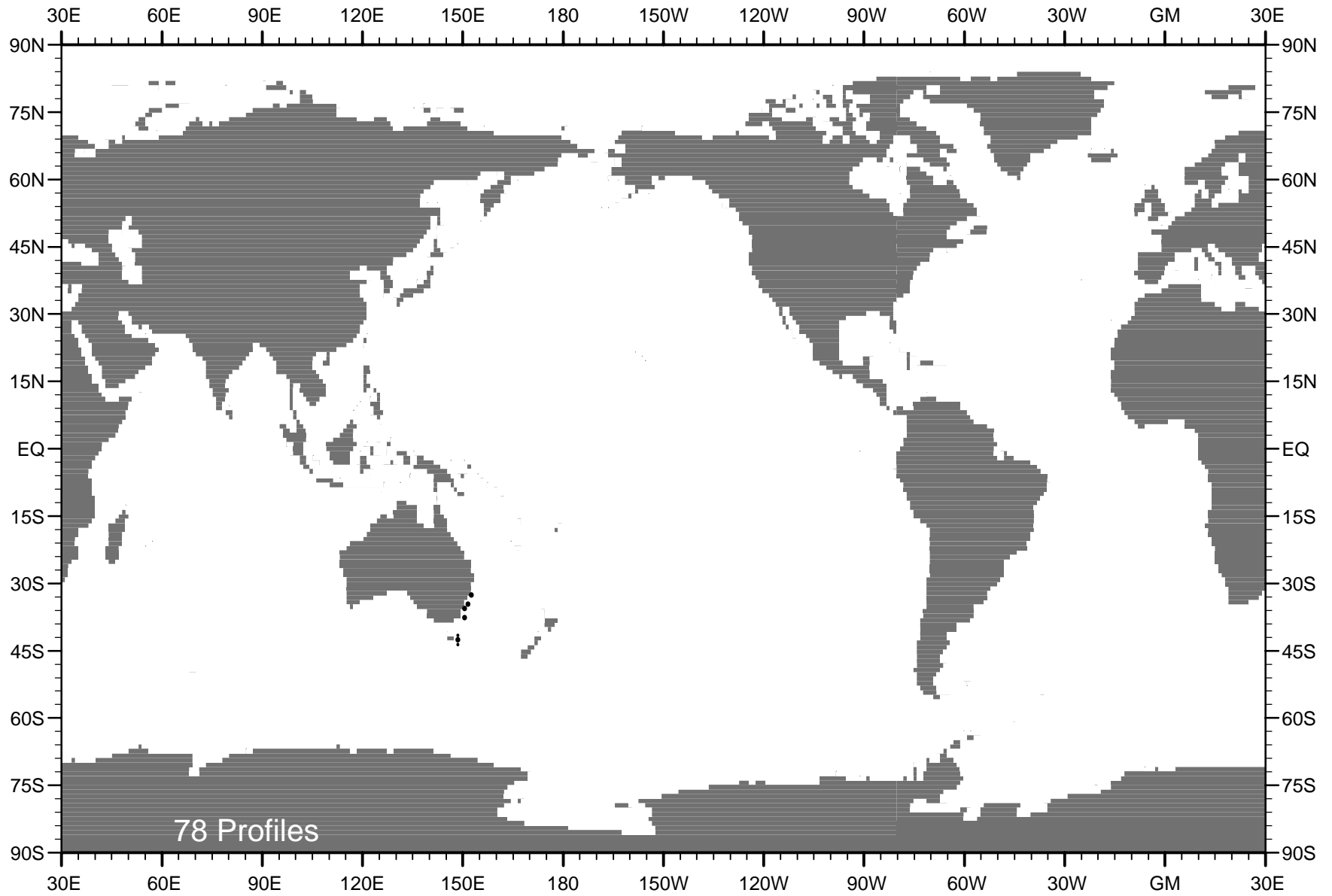


Fig. C18 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1946 .



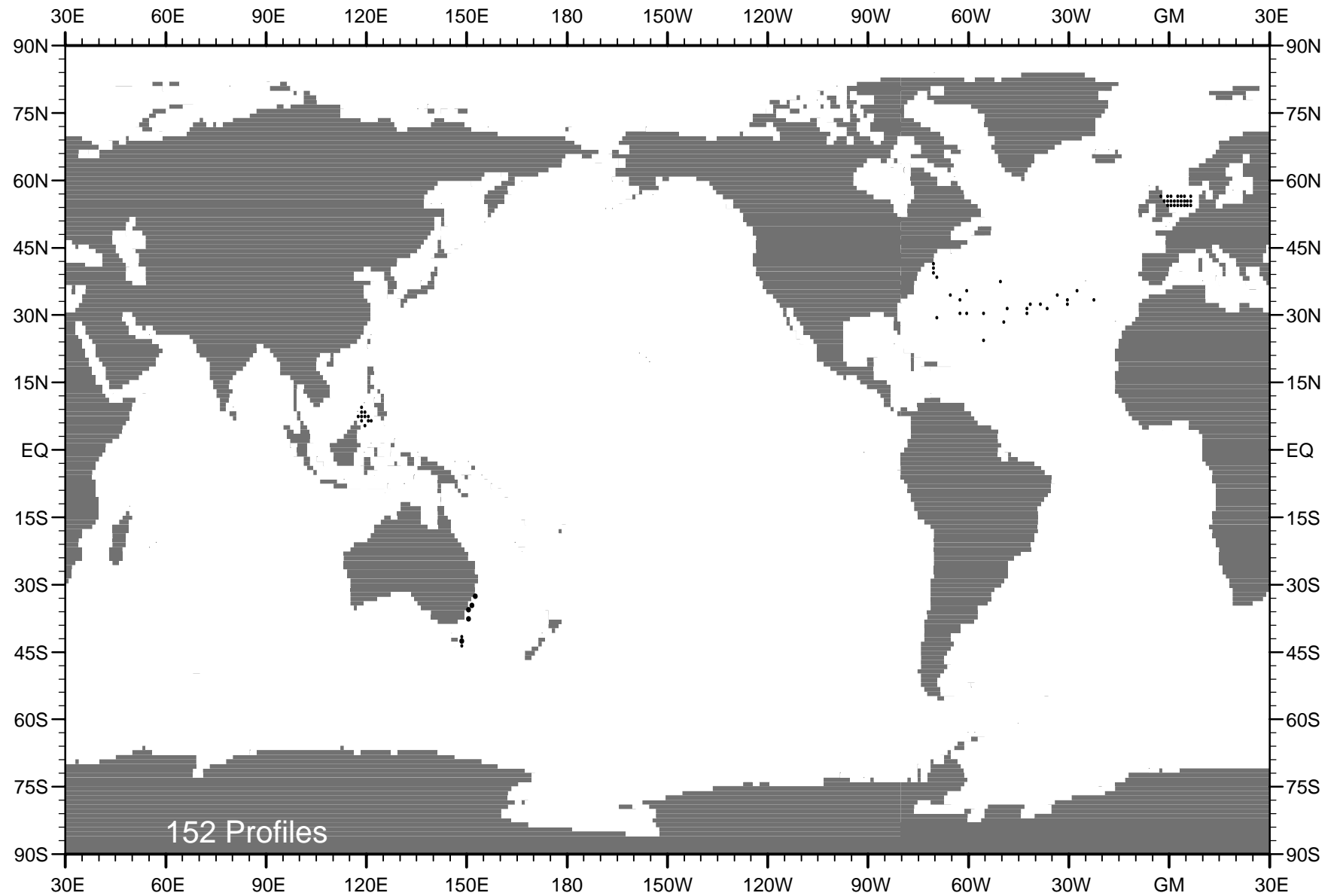


Fig. C19 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1947 .

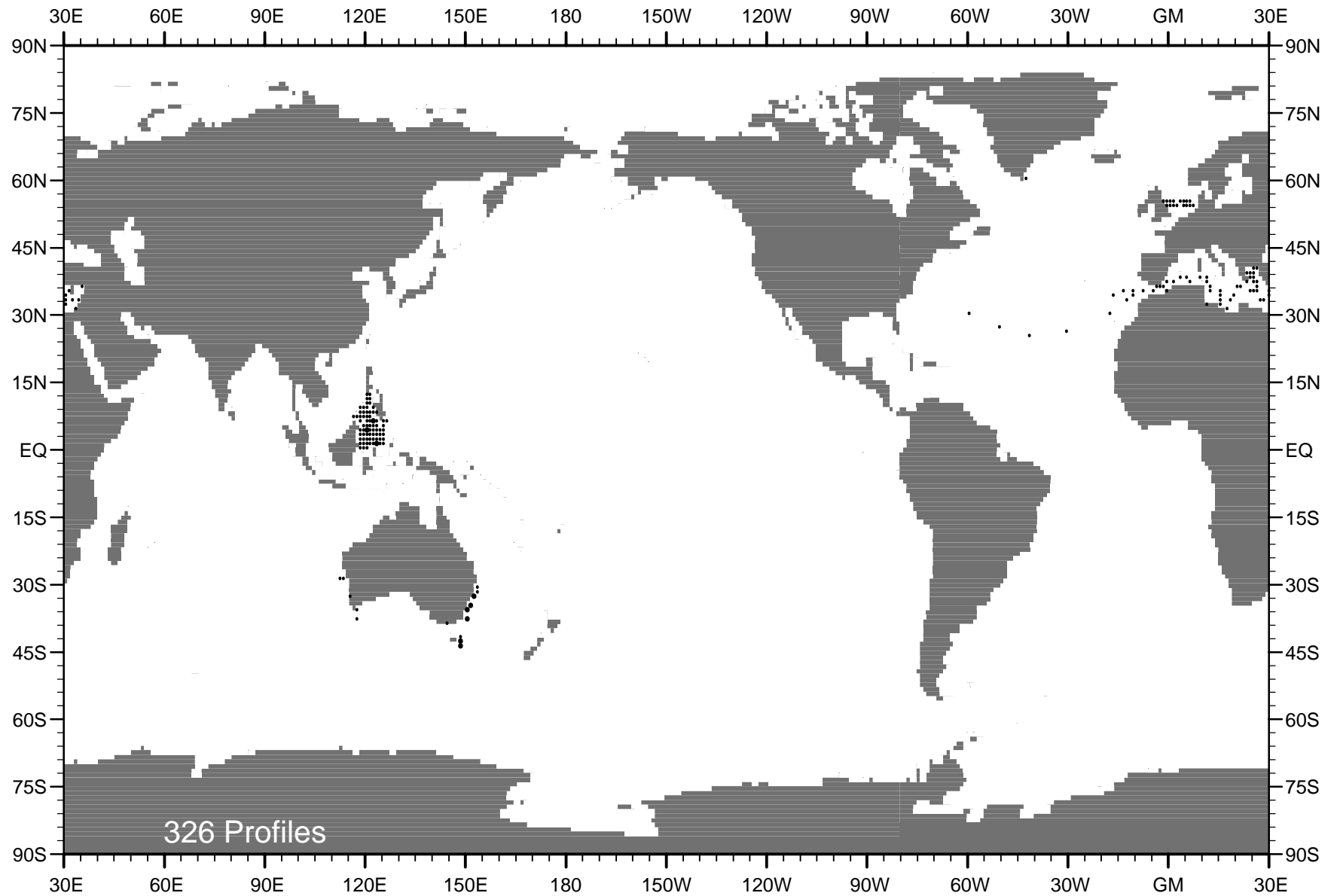


Fig. C20 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1948 .

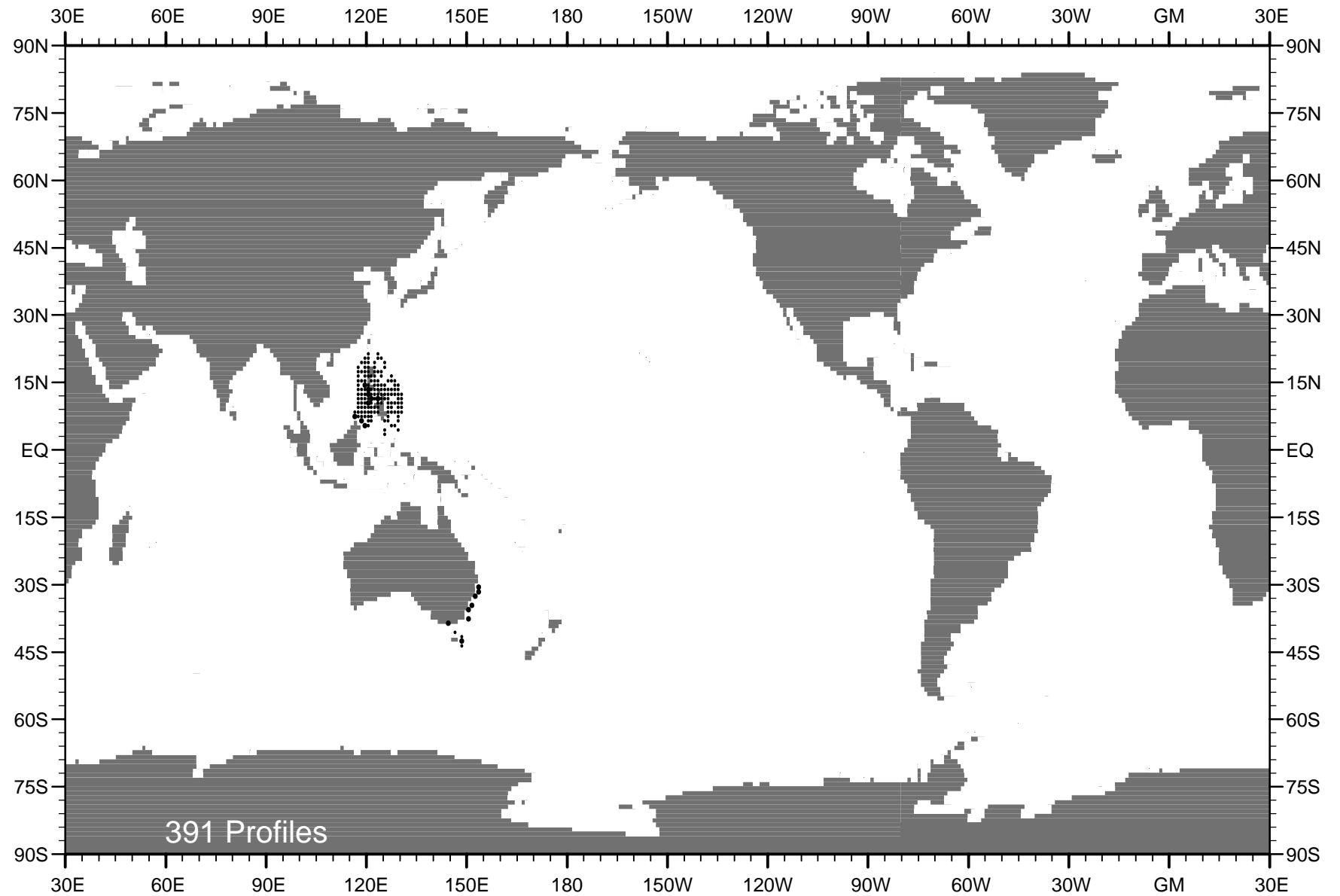


Fig. C21 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1949 .

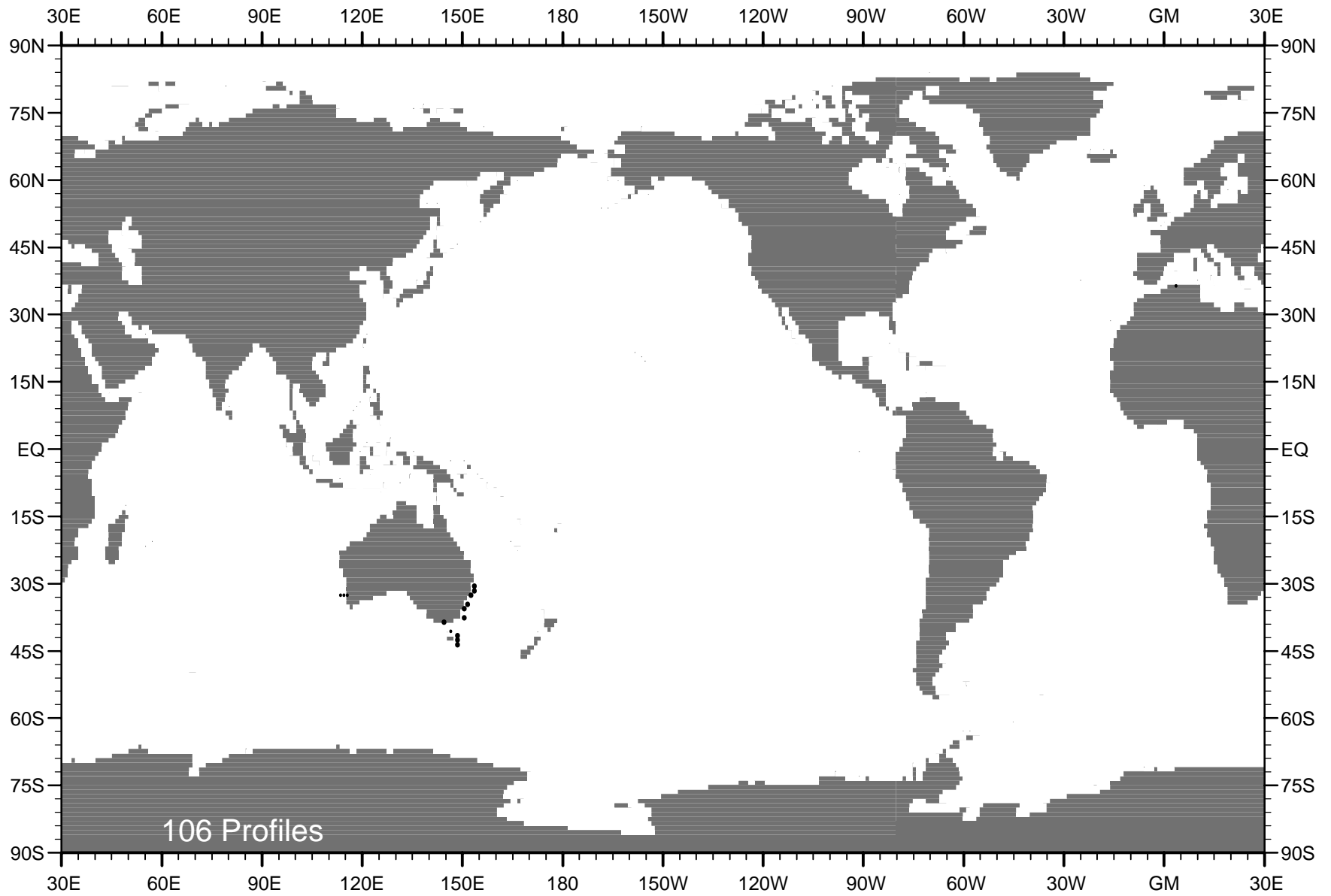


Fig. C22 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1950 .

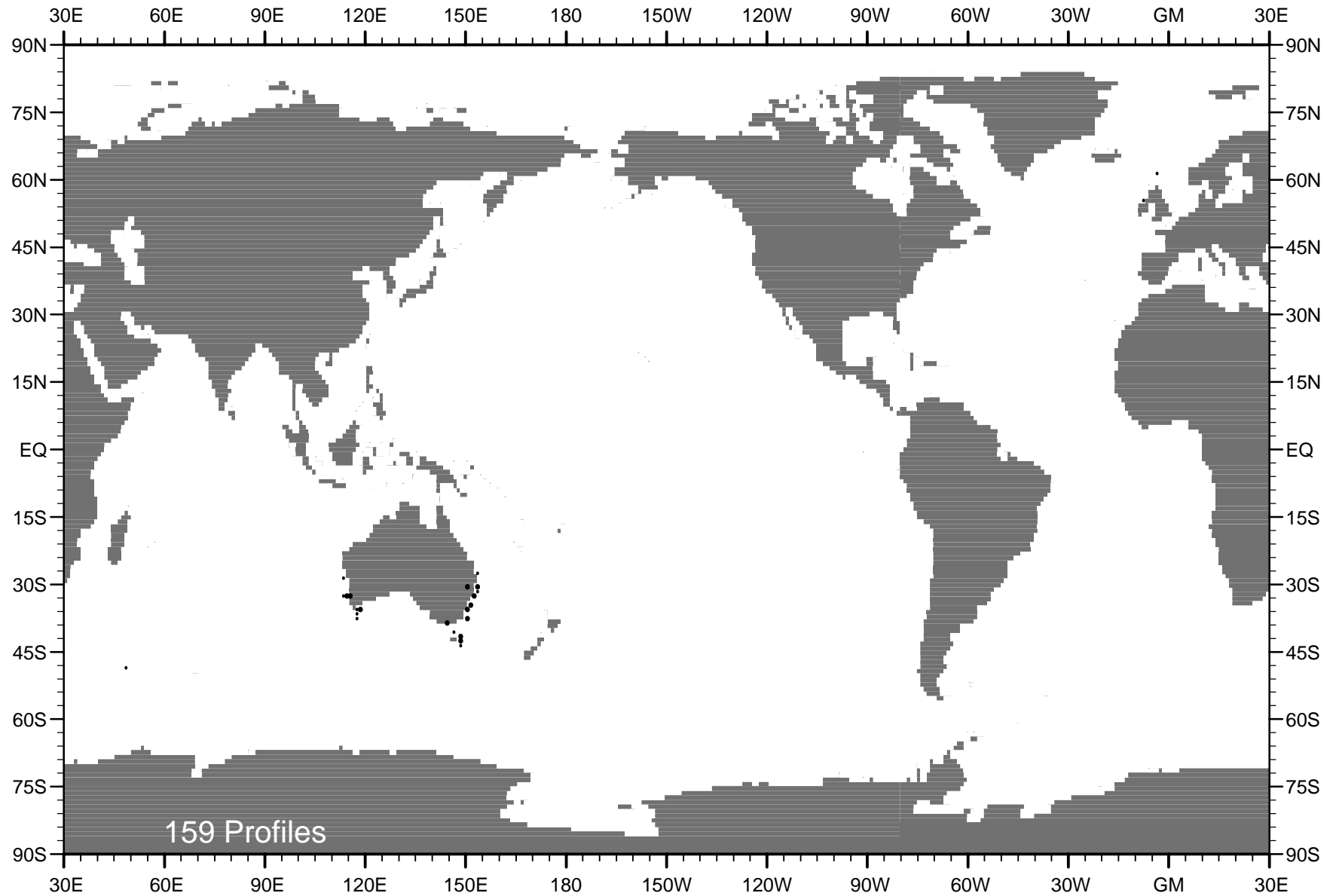


Fig. C23 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1951 .

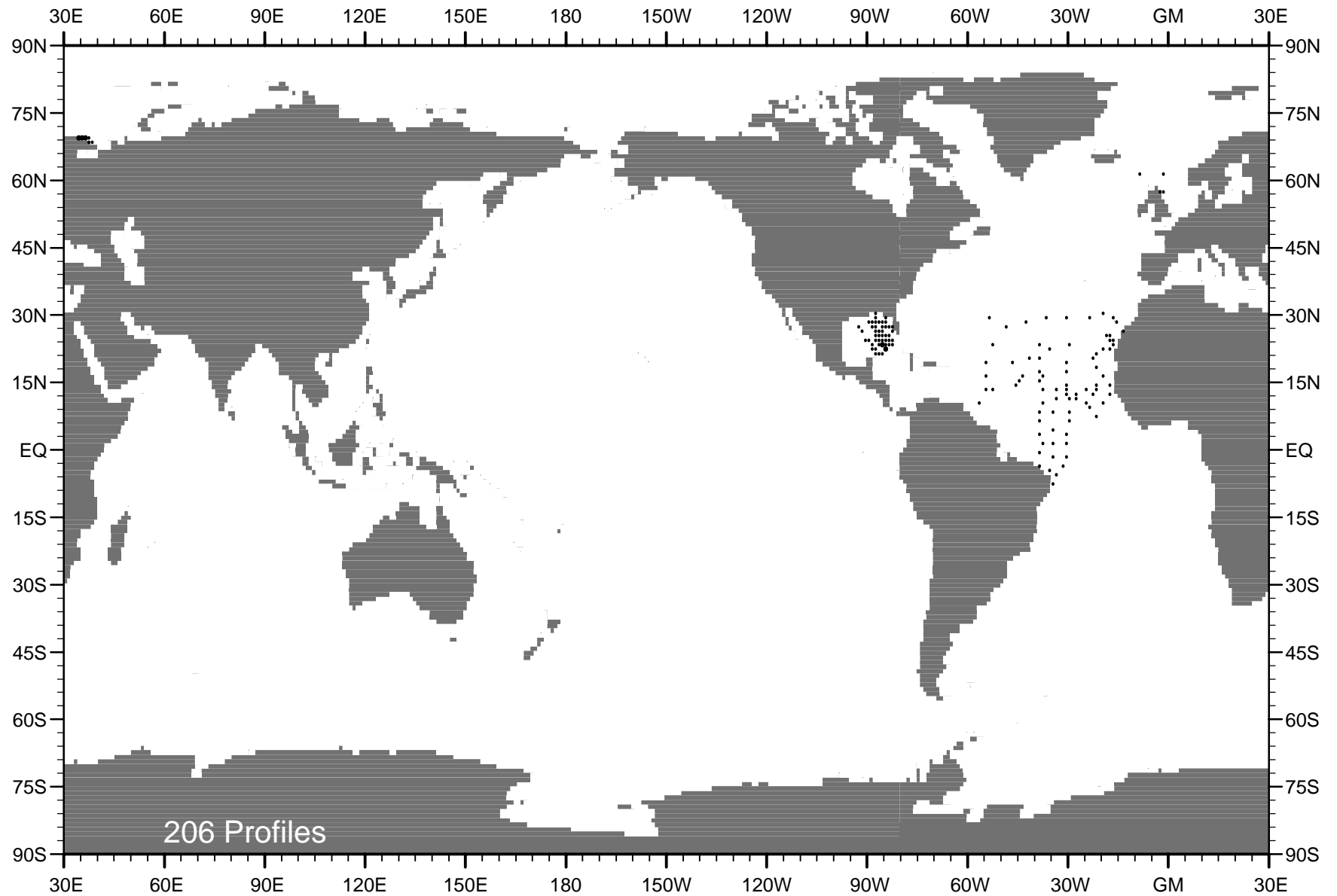


Fig. C24 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1952 .

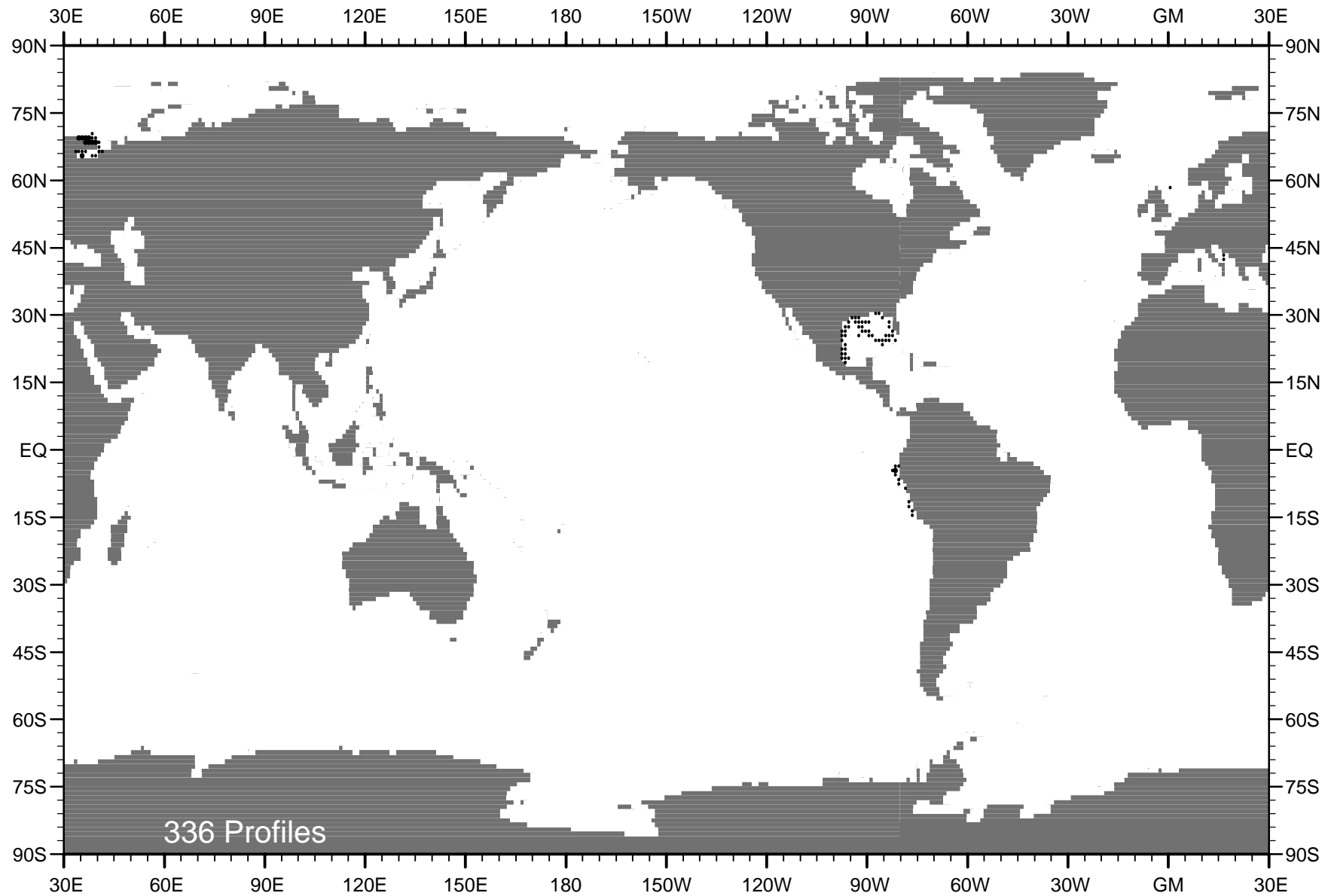


Fig. C25 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1953 .

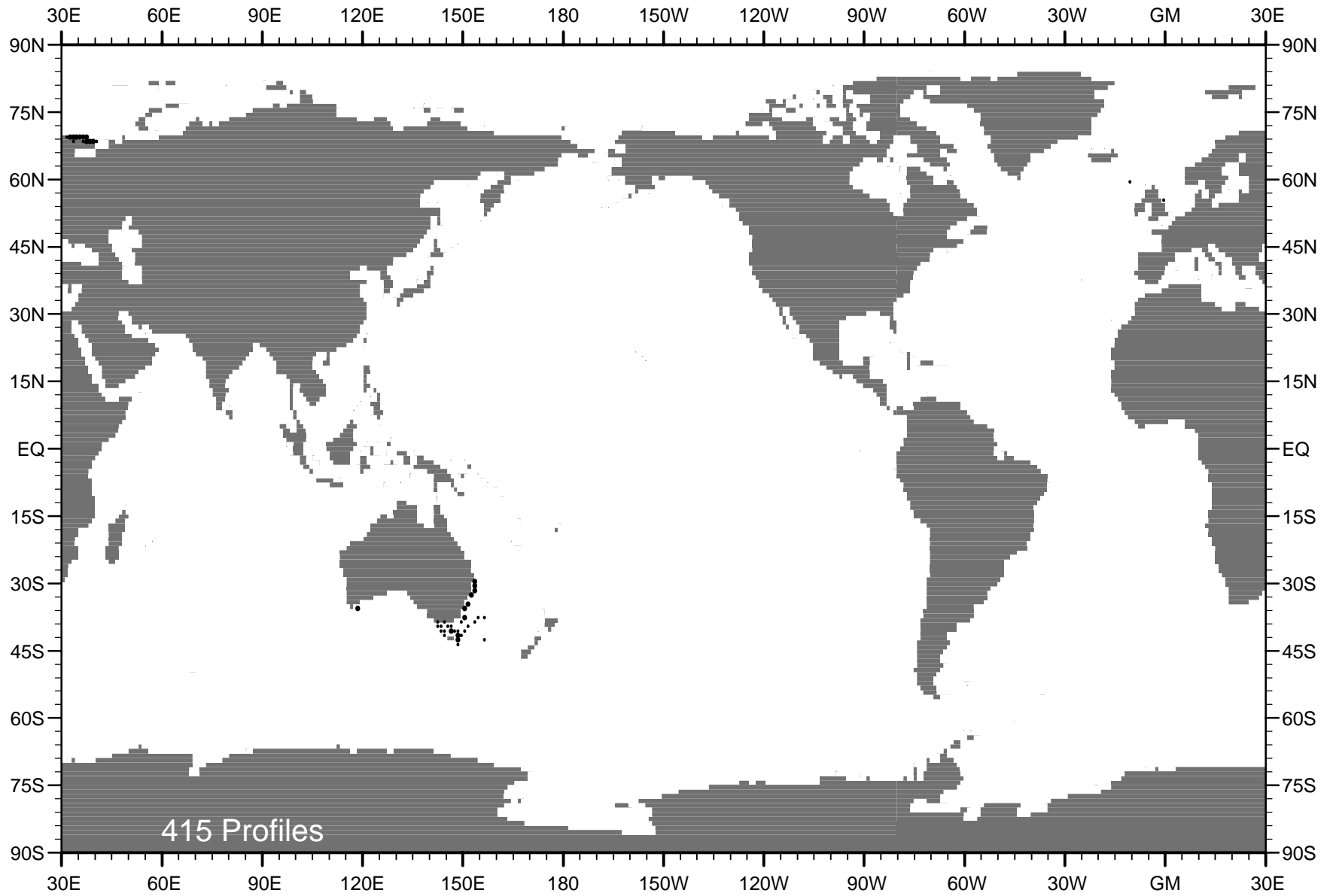


Fig. C26 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1954 .



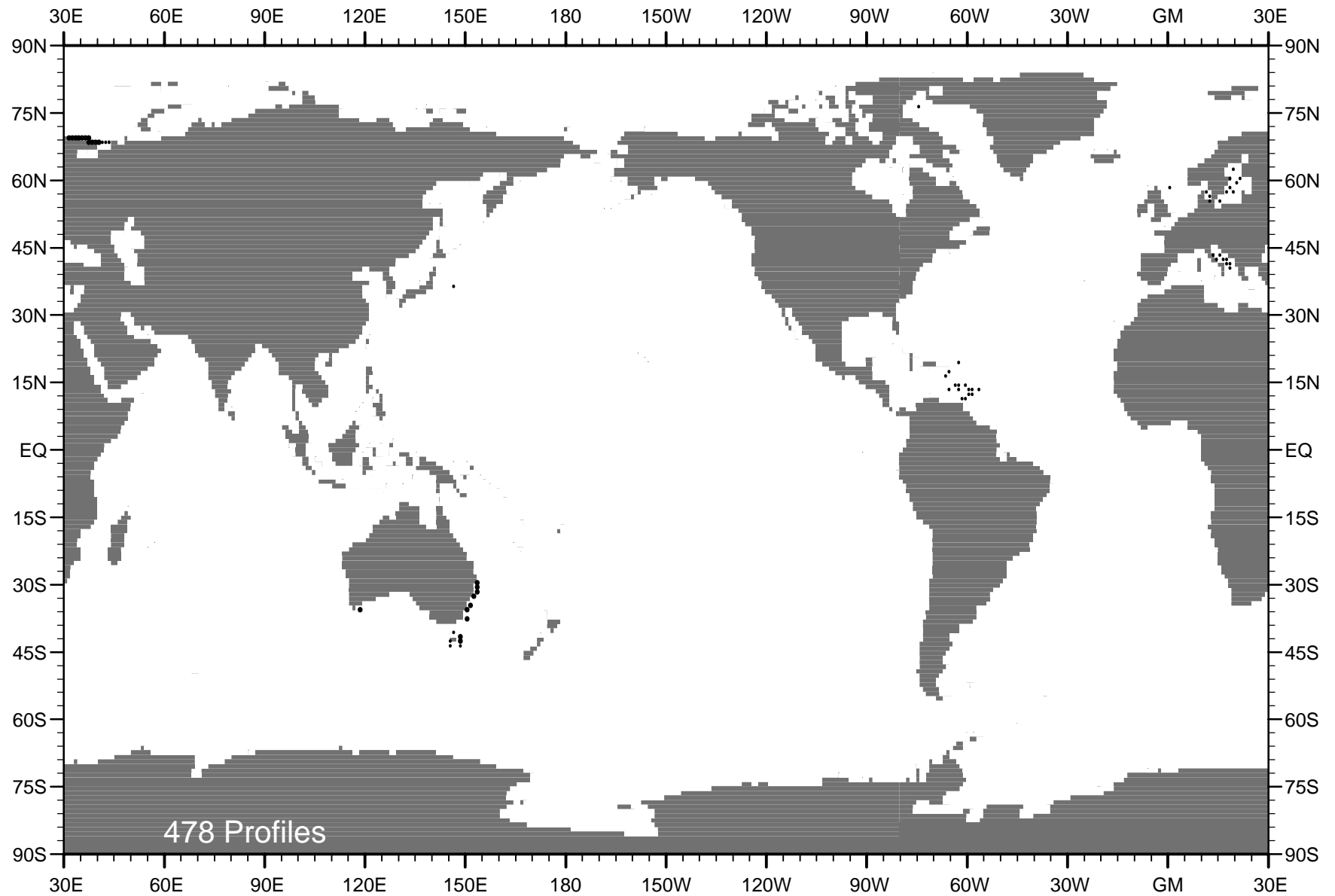


Fig. C27 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1955 .

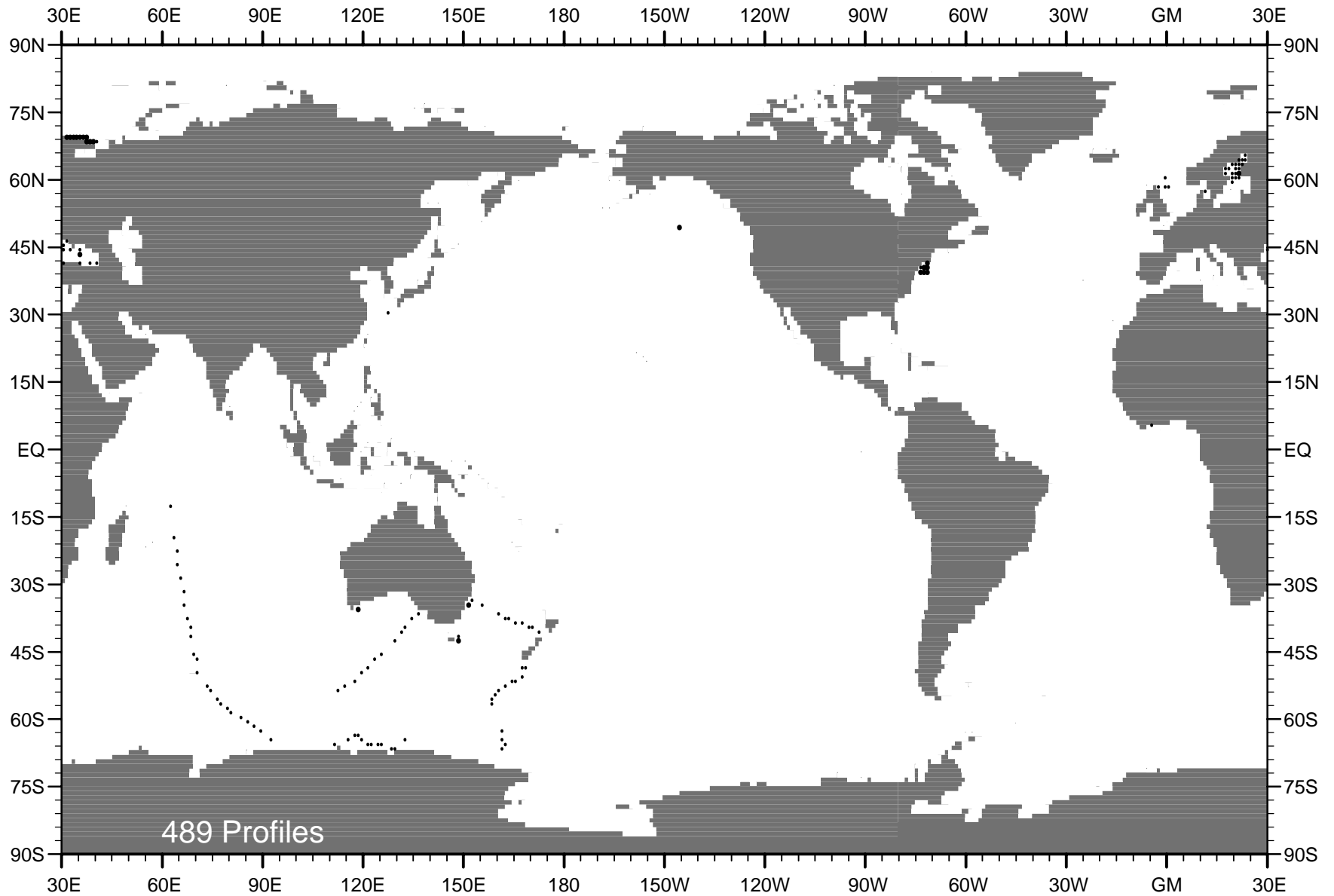


Fig. C28 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1956 .

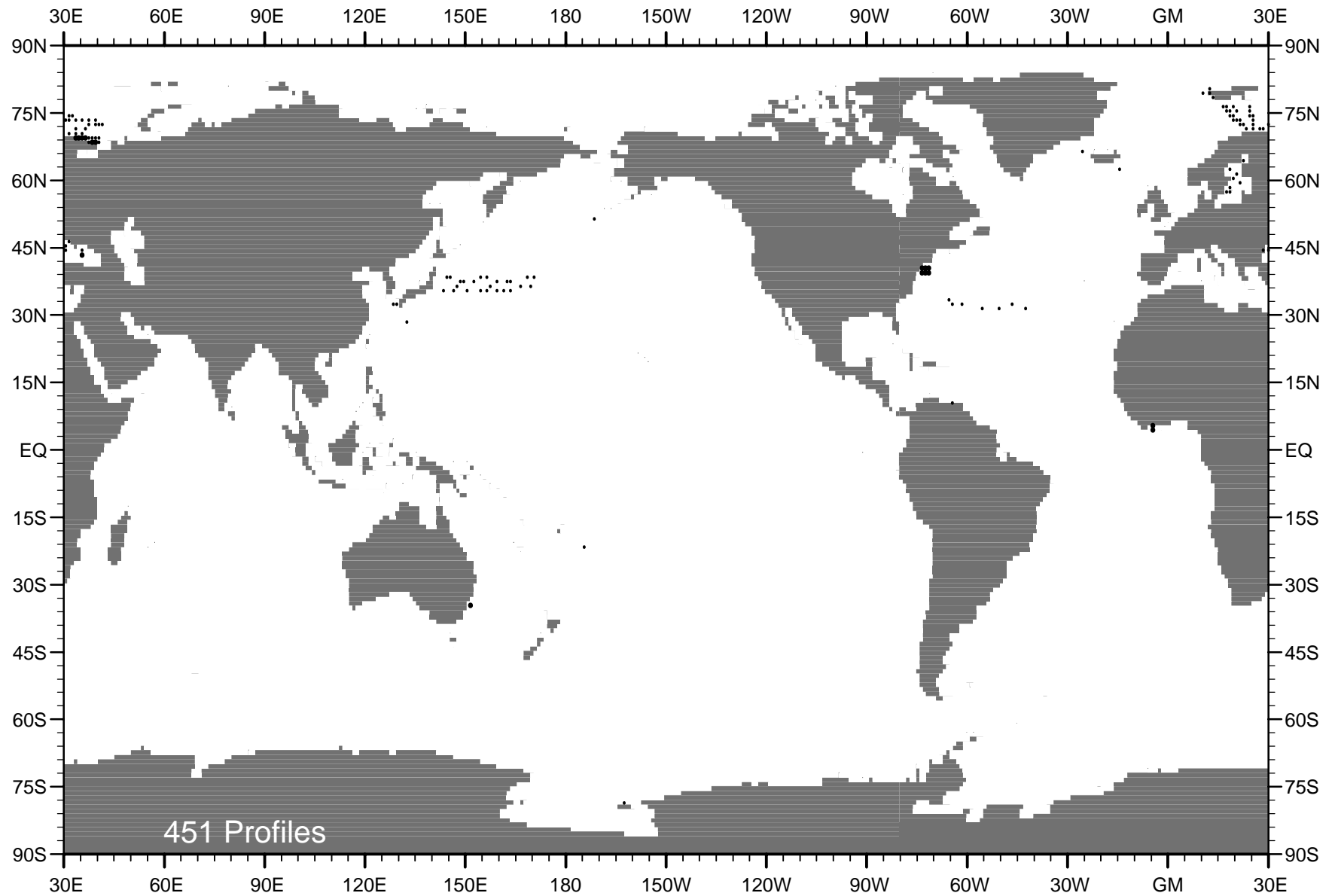


Fig. C29 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1957 .

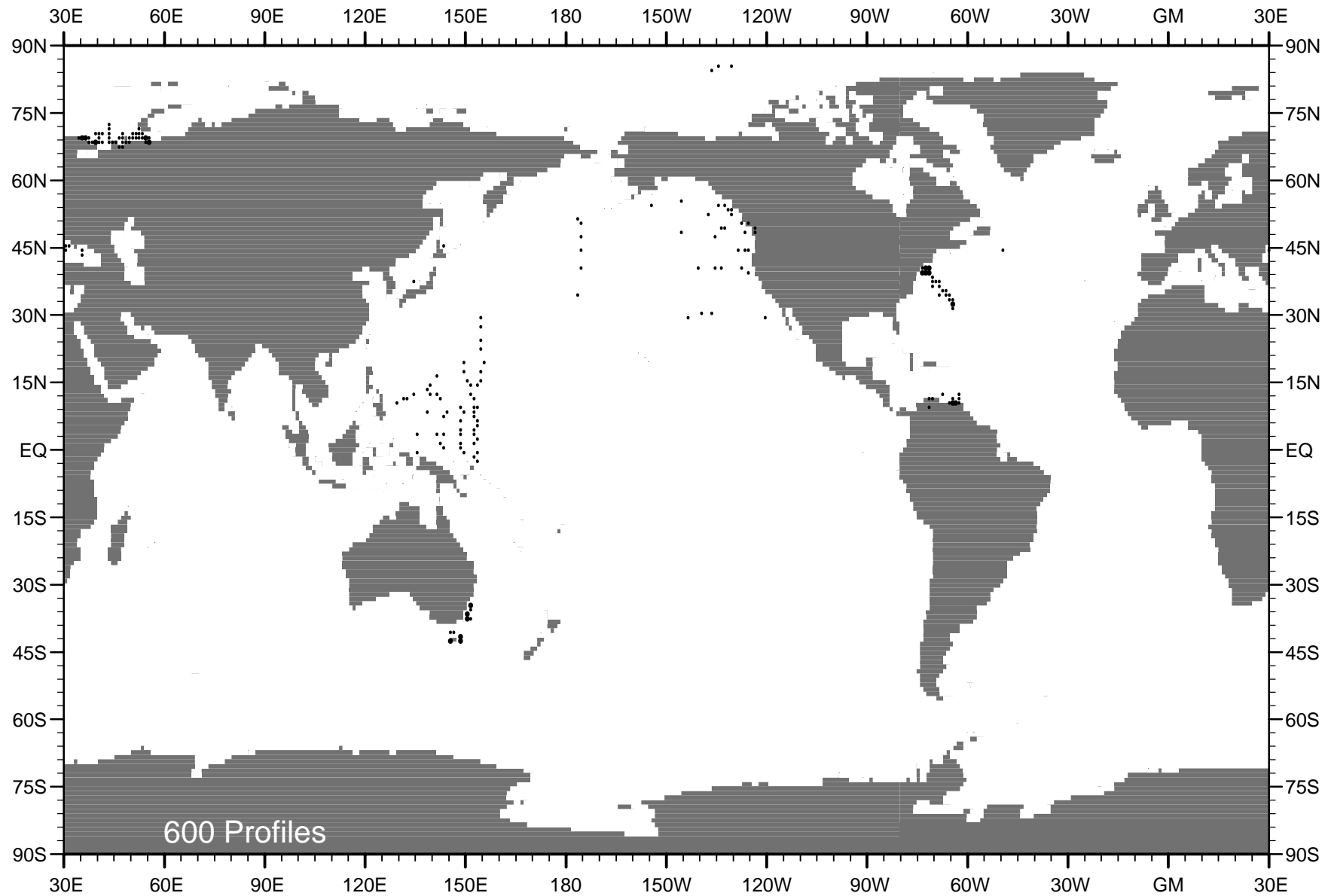


Fig. C30 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1958 .

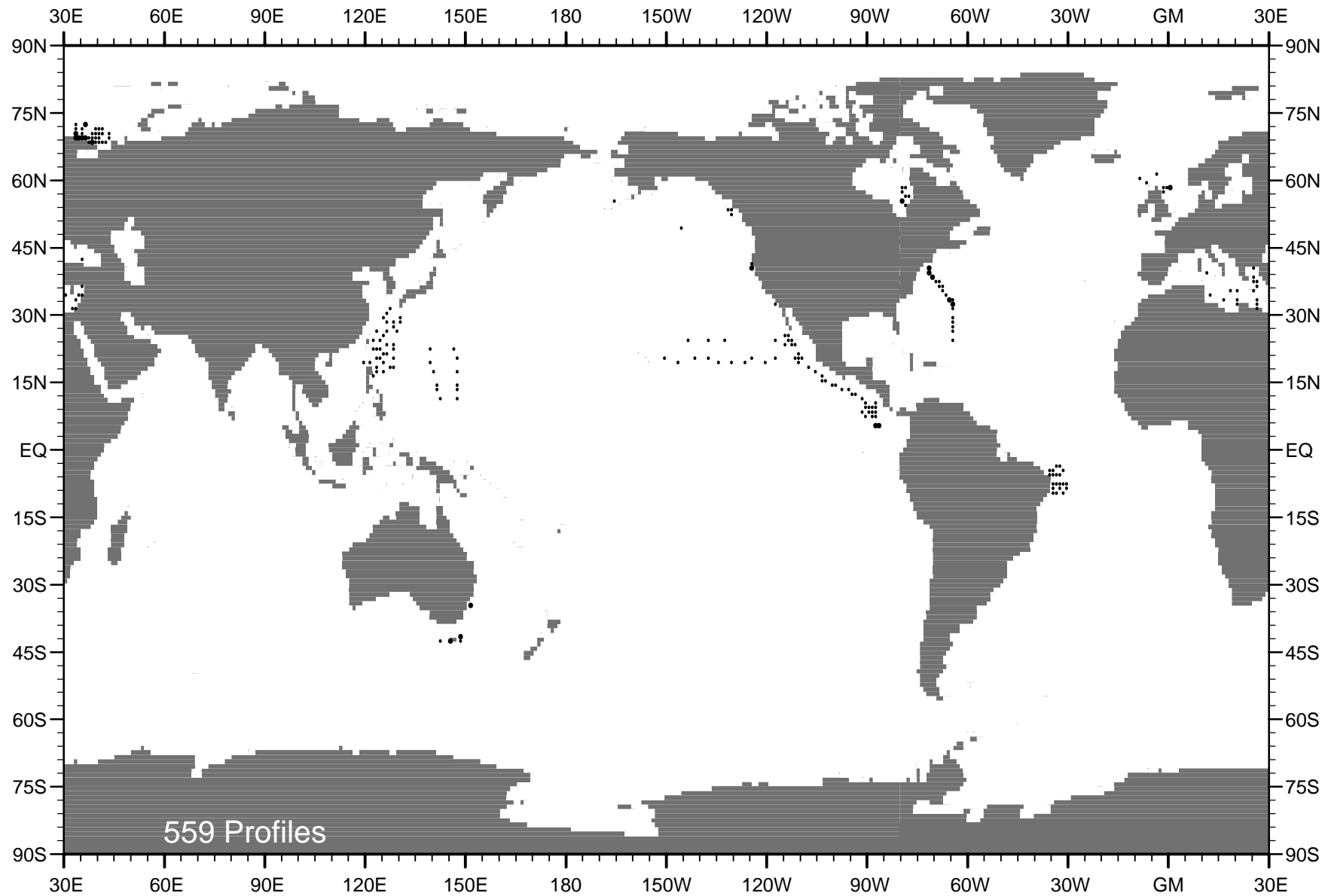


Fig. C31 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1959 .

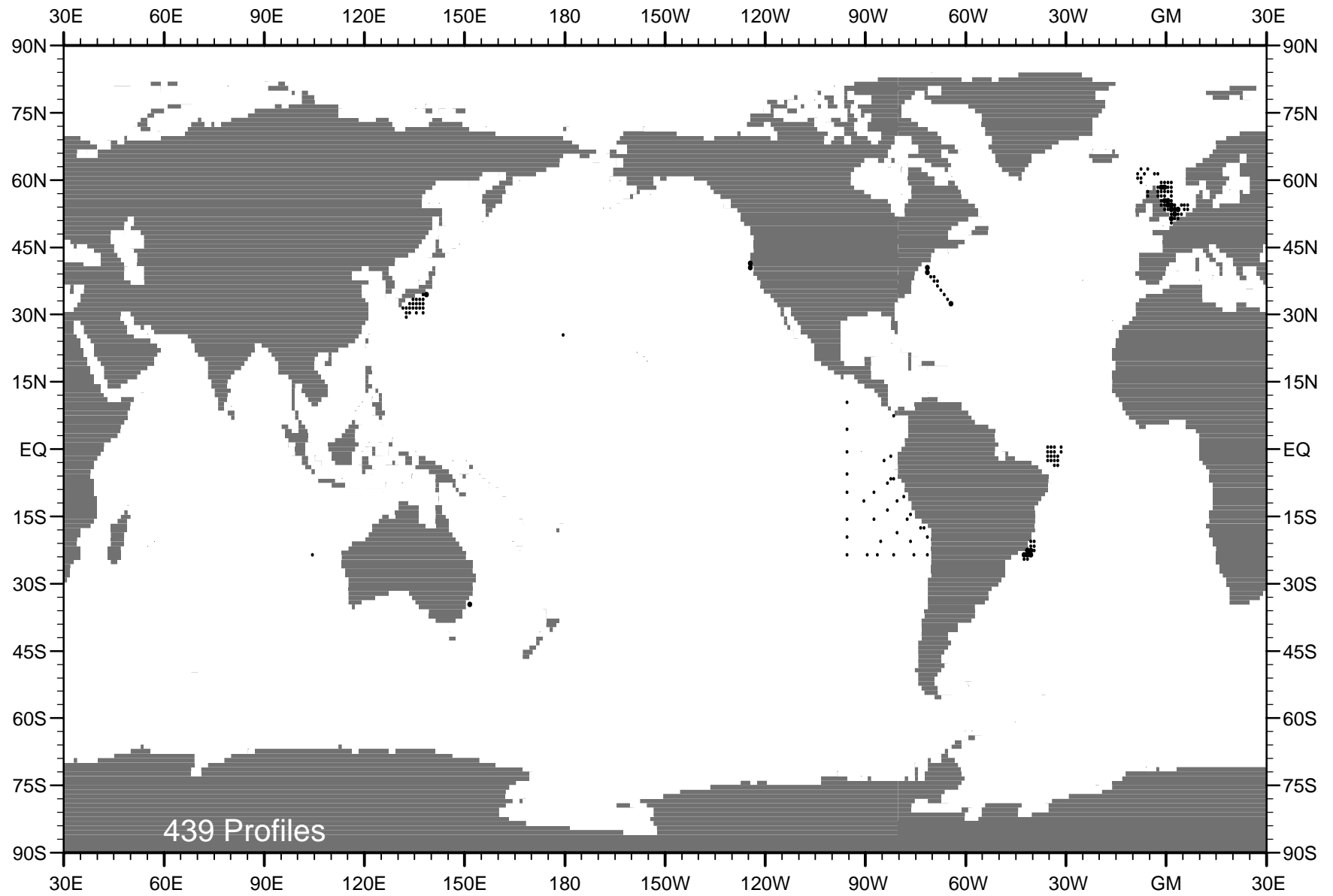


Fig. C32 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1960 .

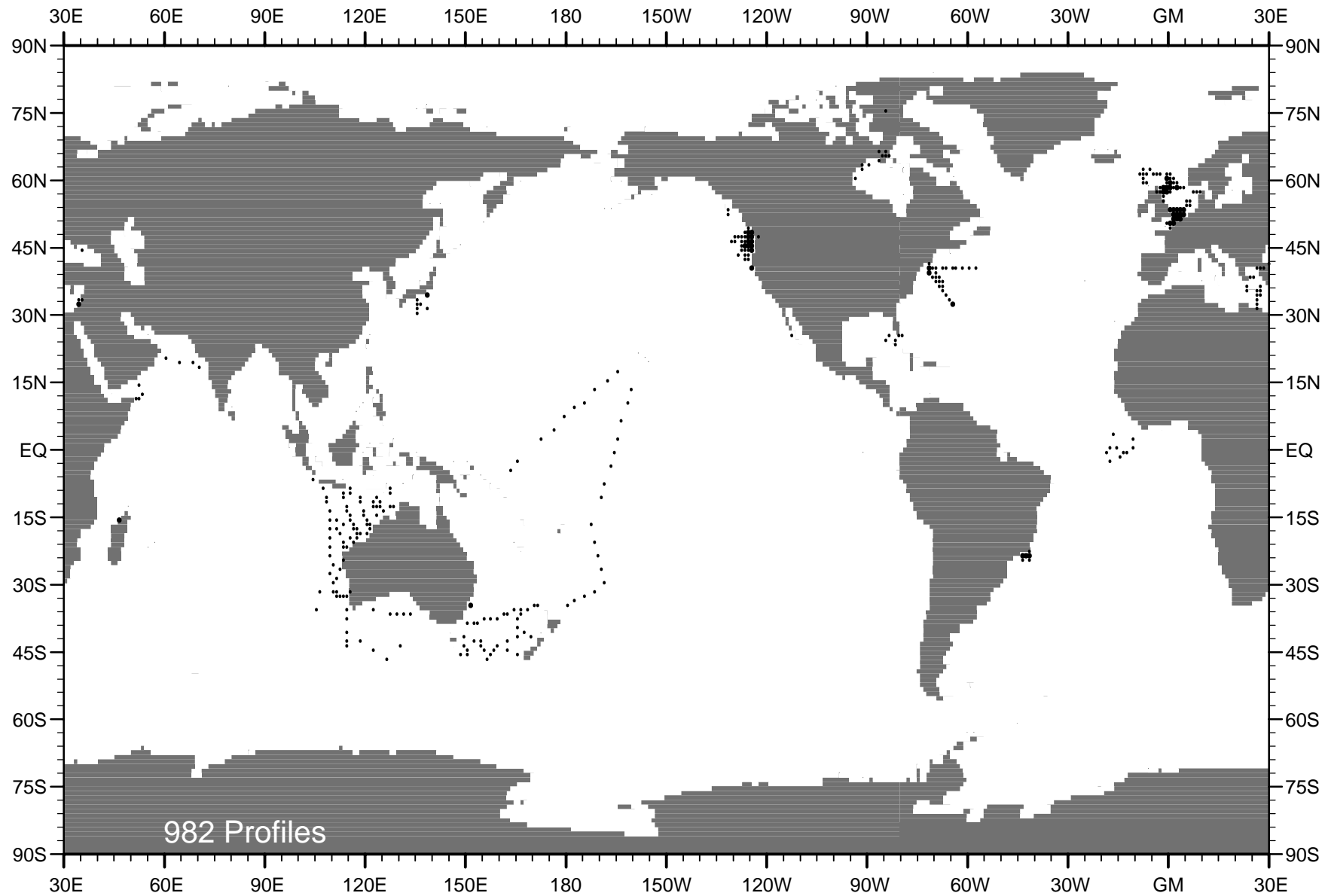


Fig. C33 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1961 .

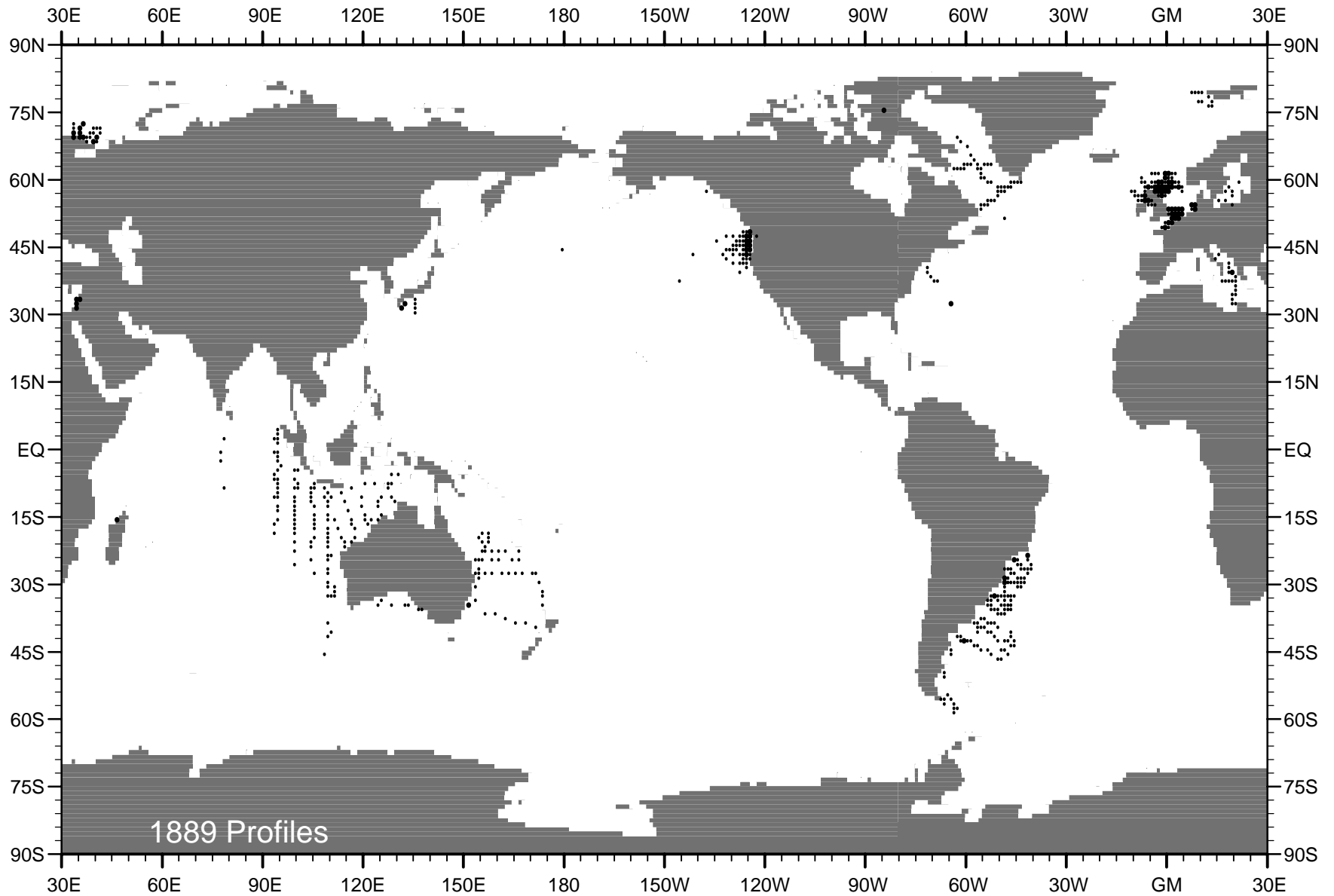


Fig. C34 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1962 .



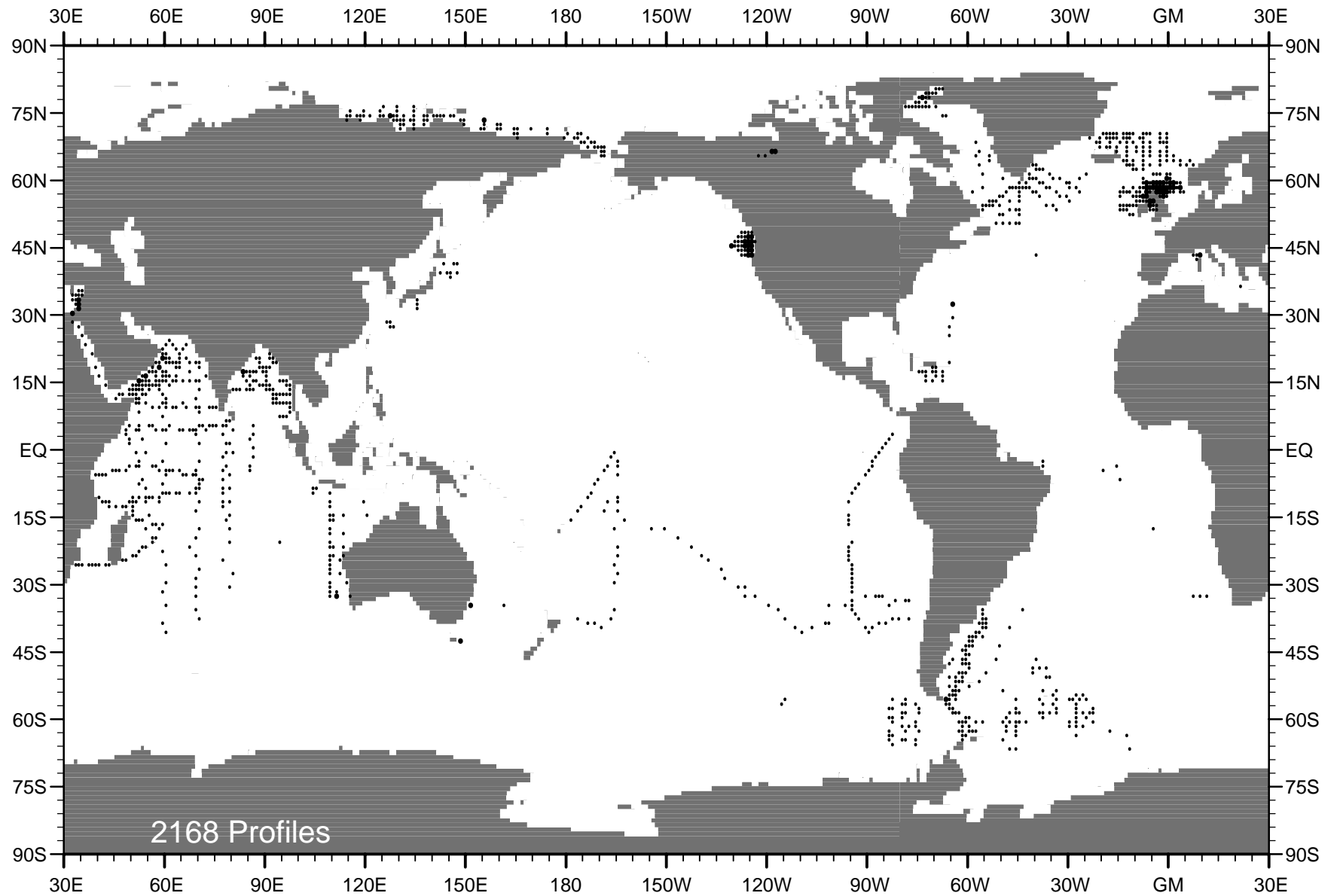


Fig. C35 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1963 .

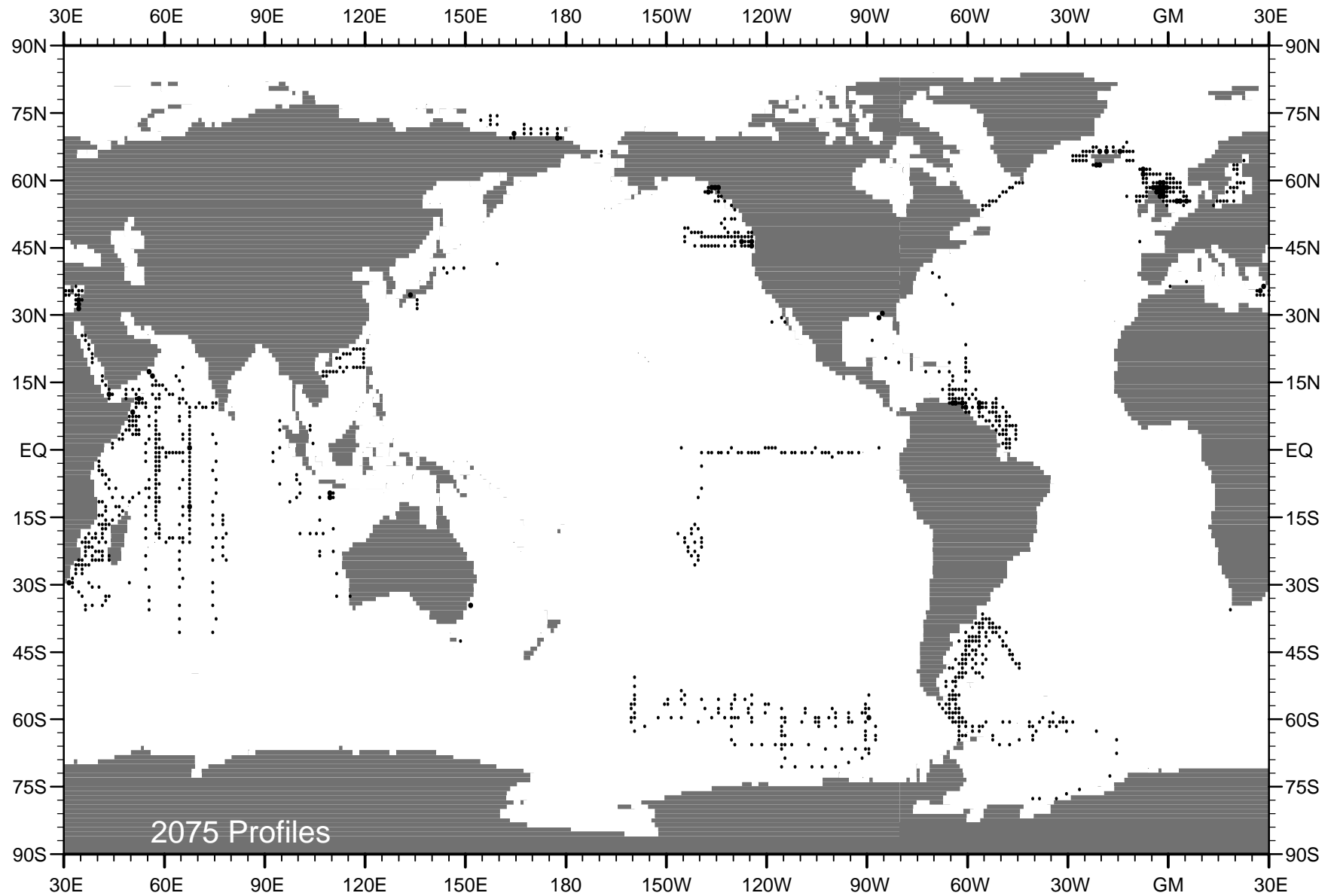


Fig. C36 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1964 .

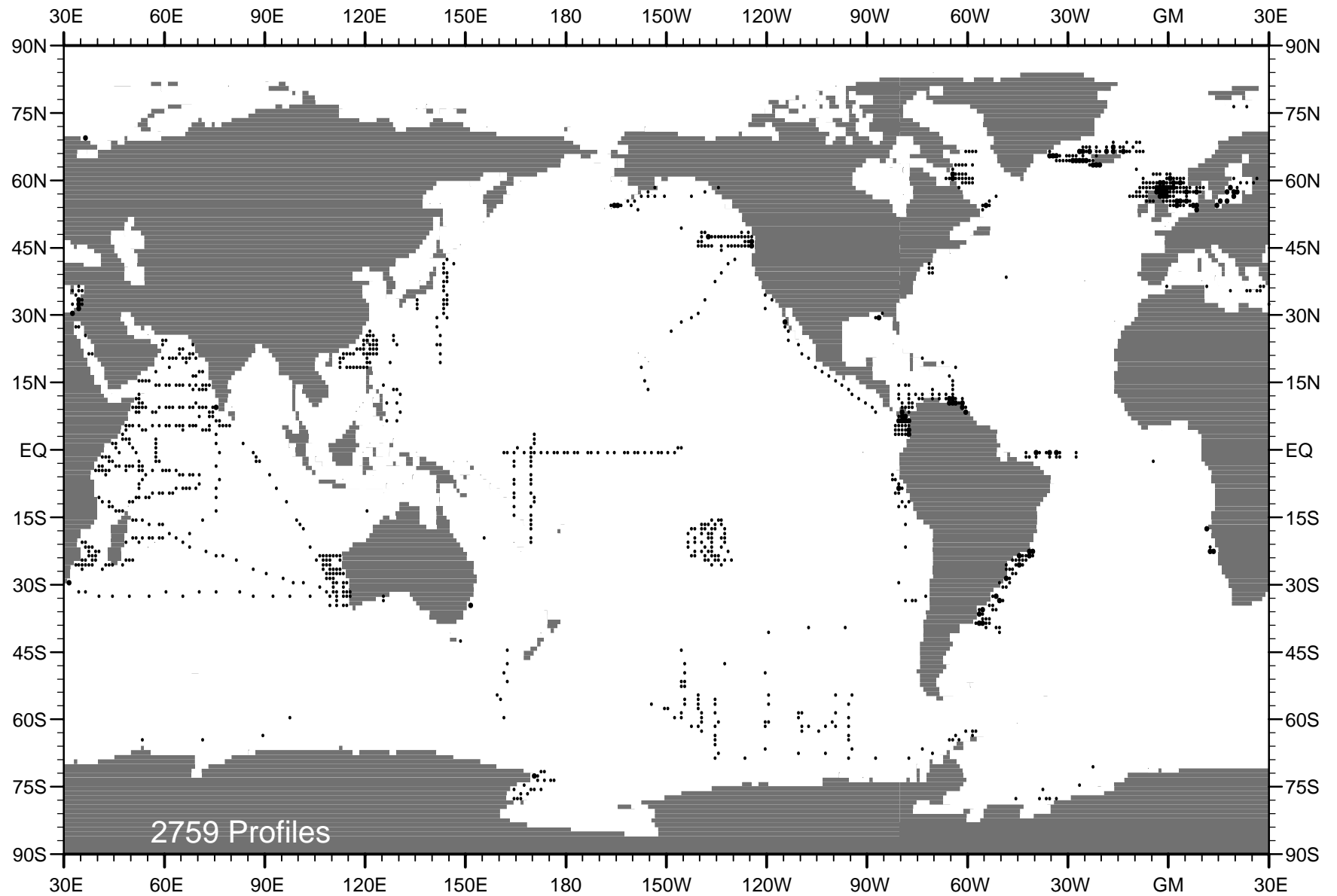


Fig. C37 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1965 .

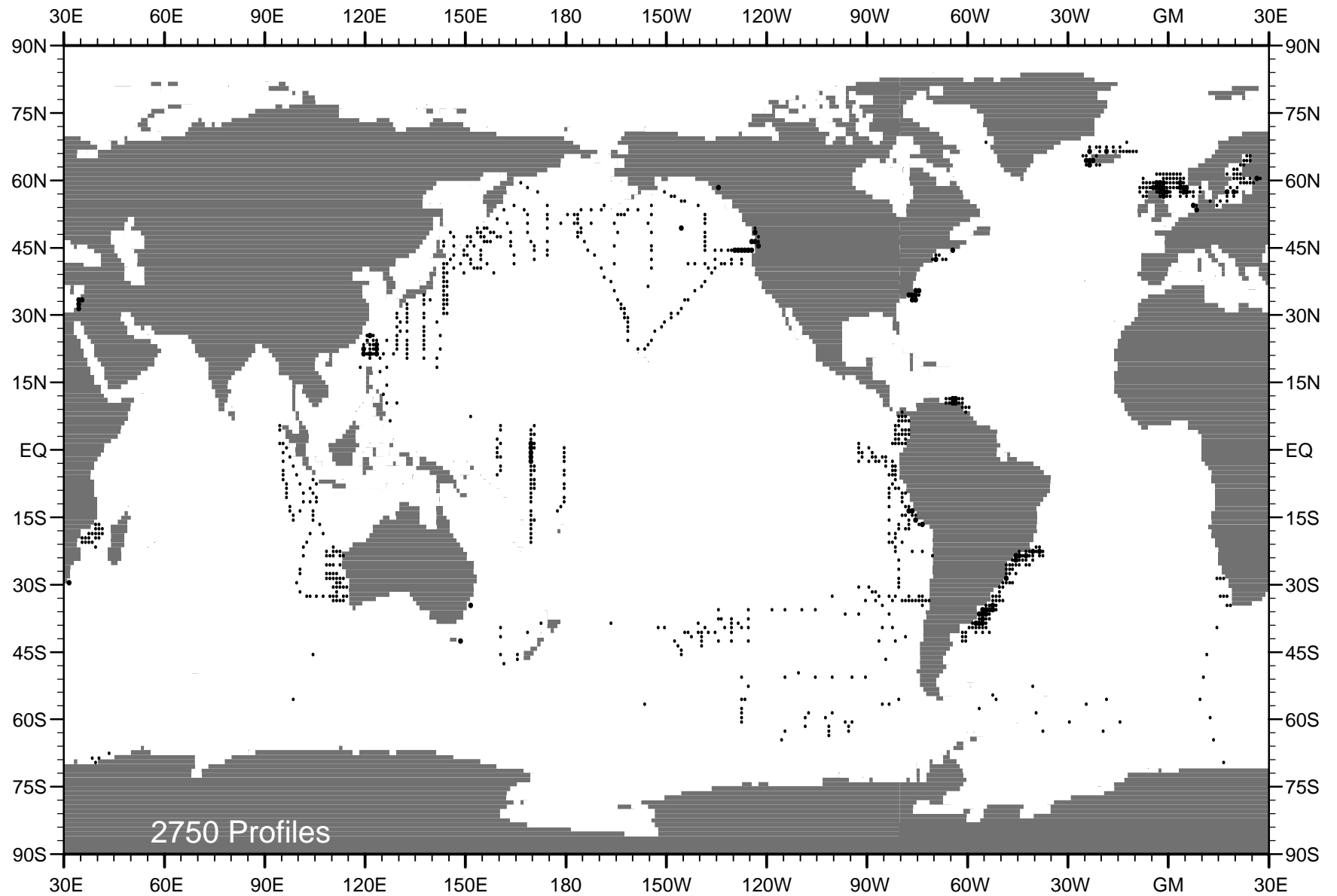


Fig. C38 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1966 .

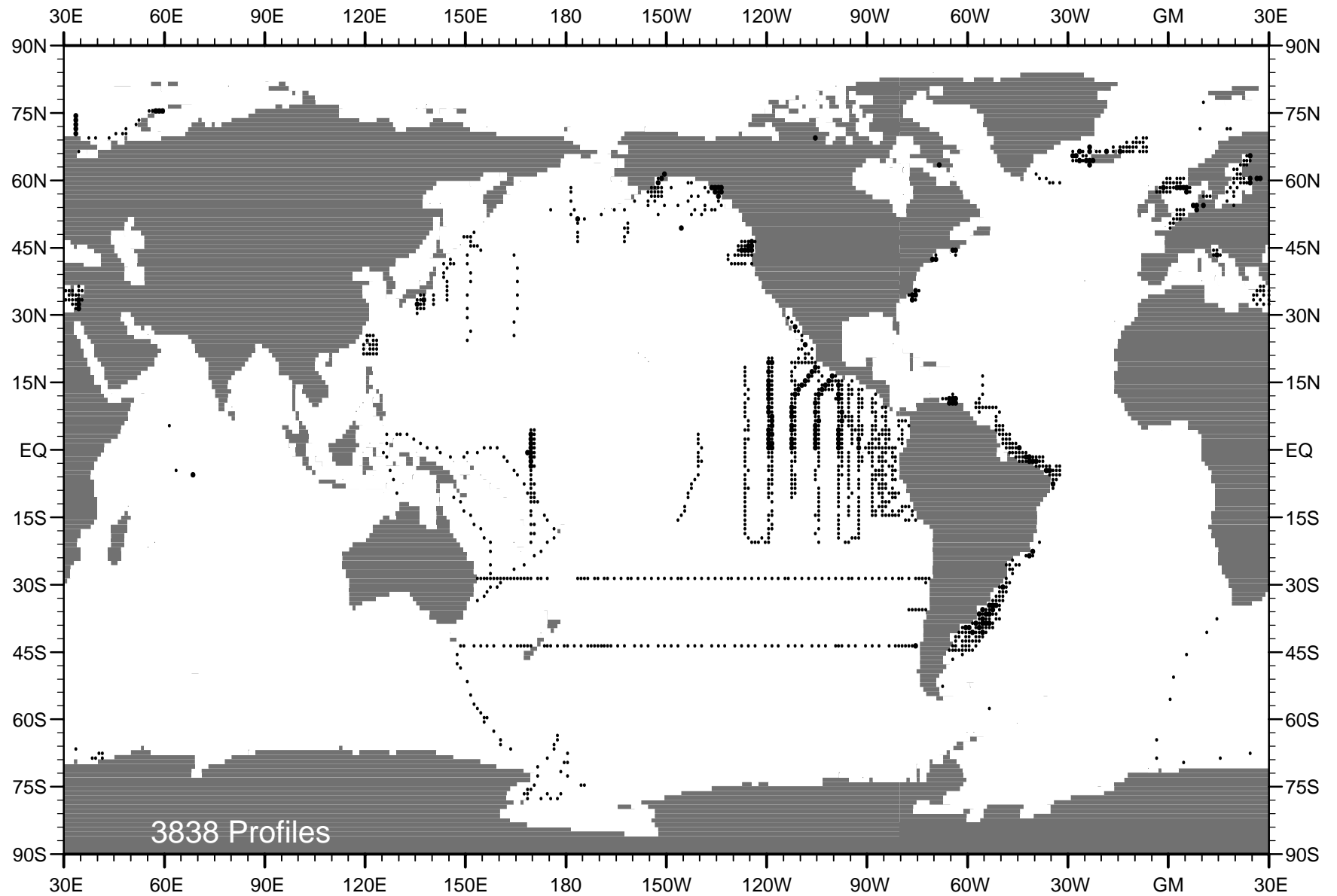


Fig. C39 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1967 .

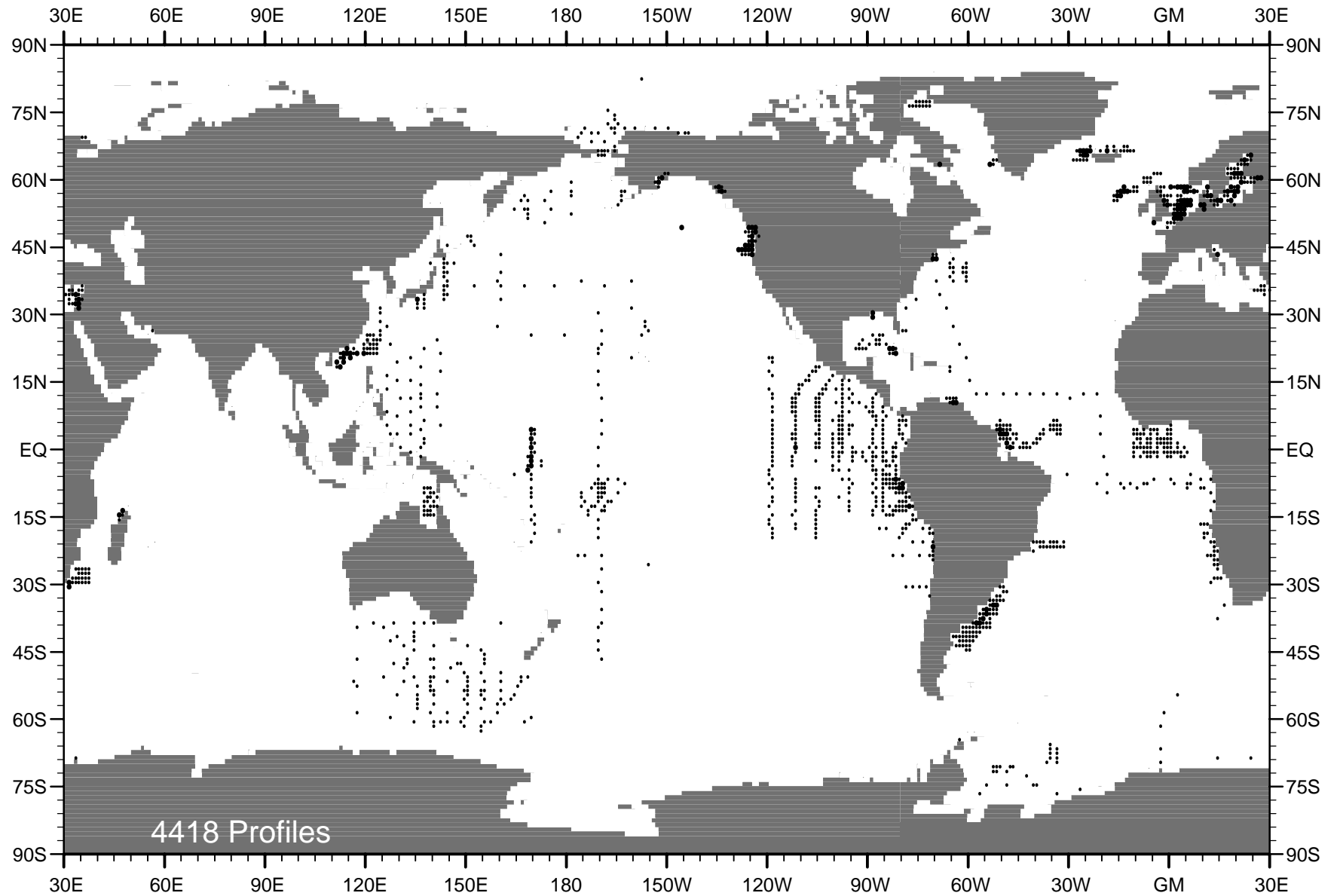


Fig. C40 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1968 .

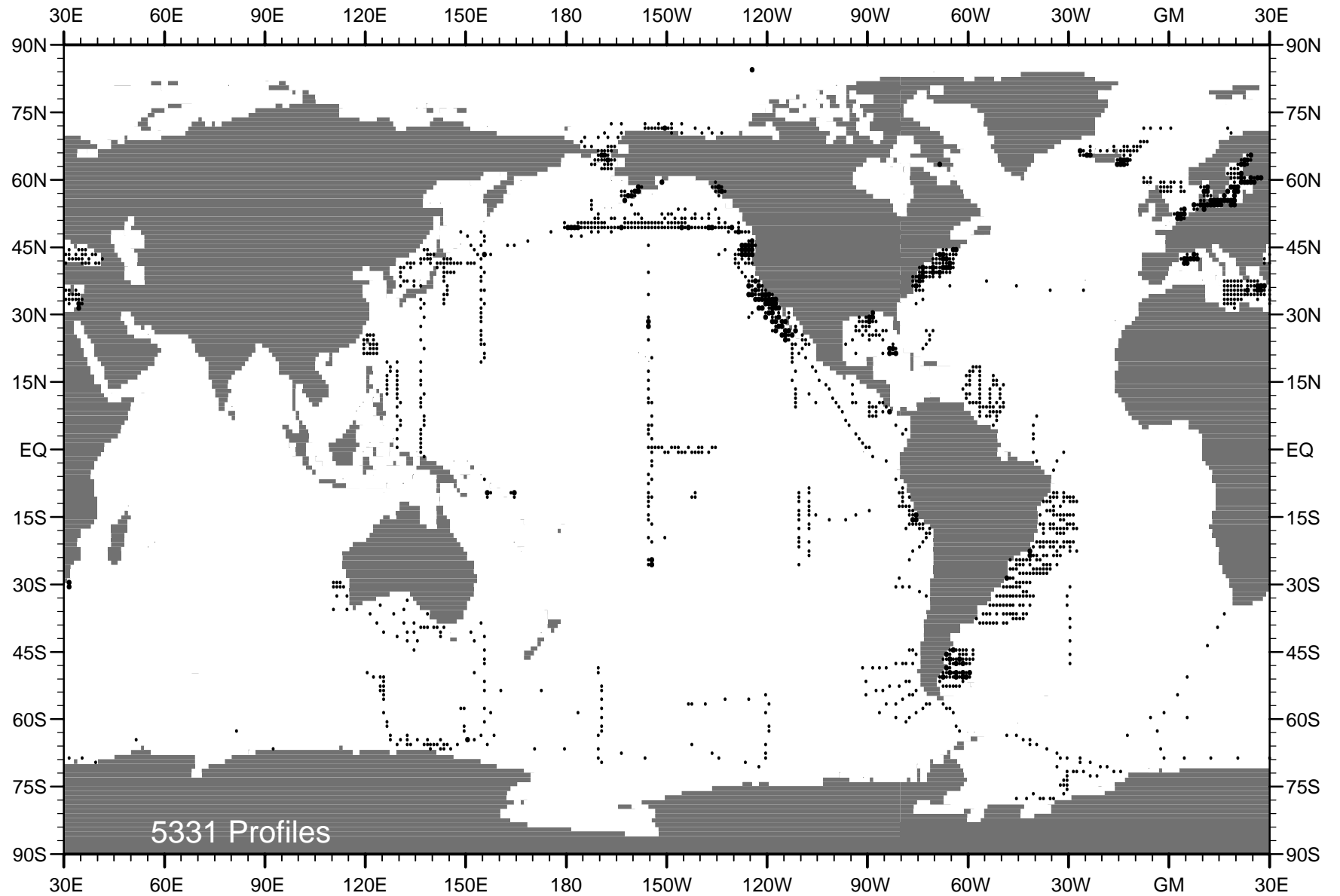


Fig. C41 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1969 .

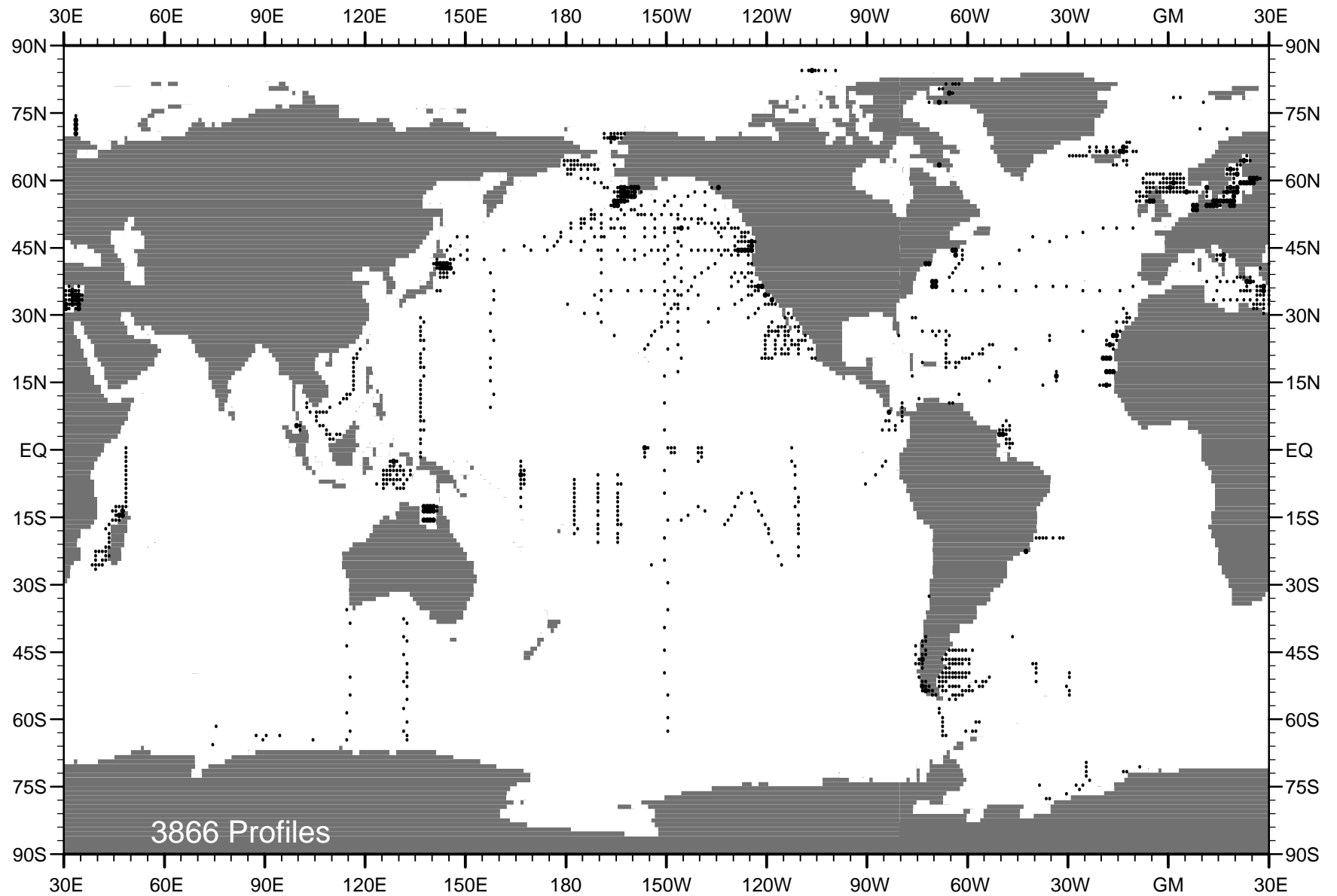


Fig. C42 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1970 .



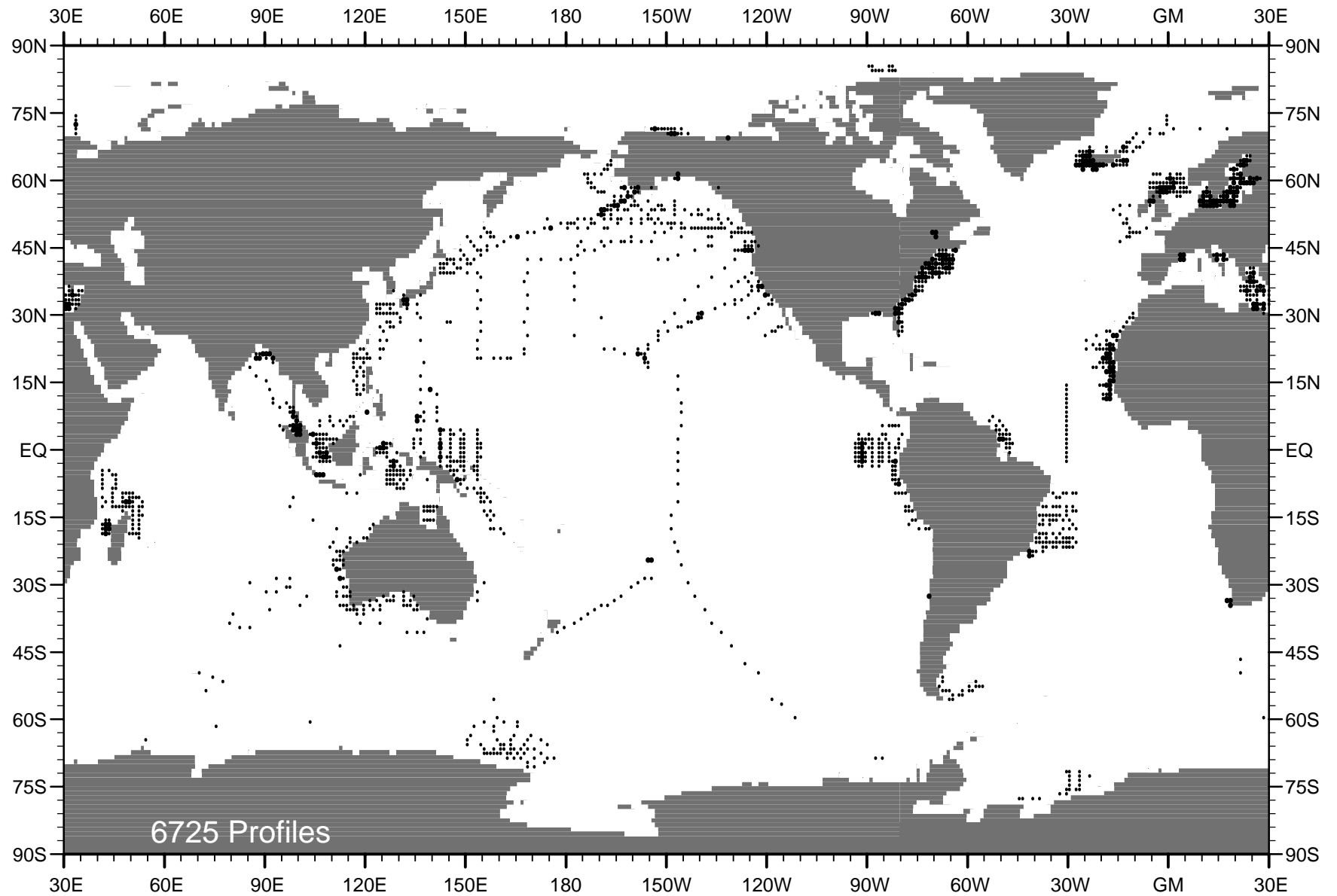


Fig. C43 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1971 .

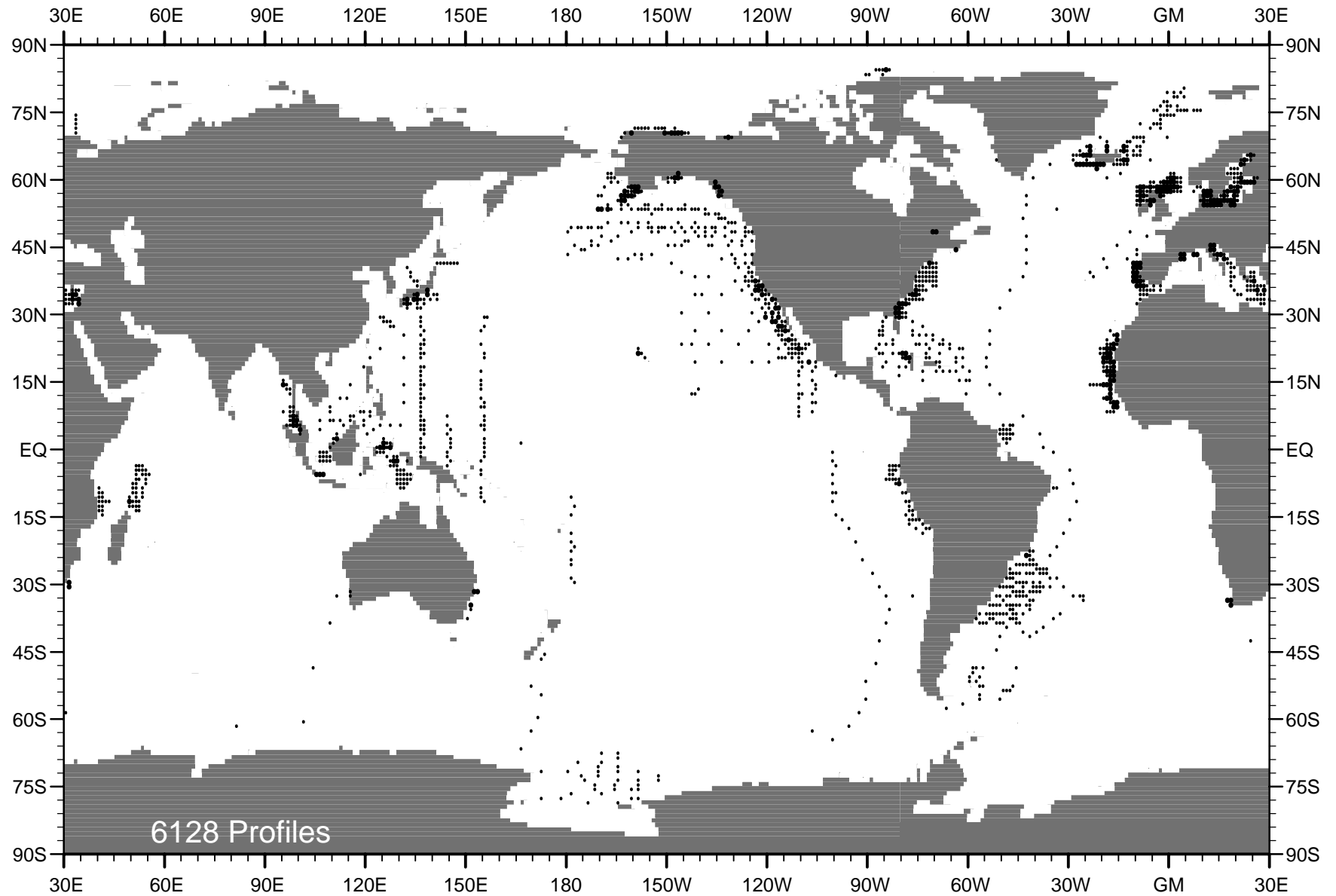


Fig. C44 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1972 .

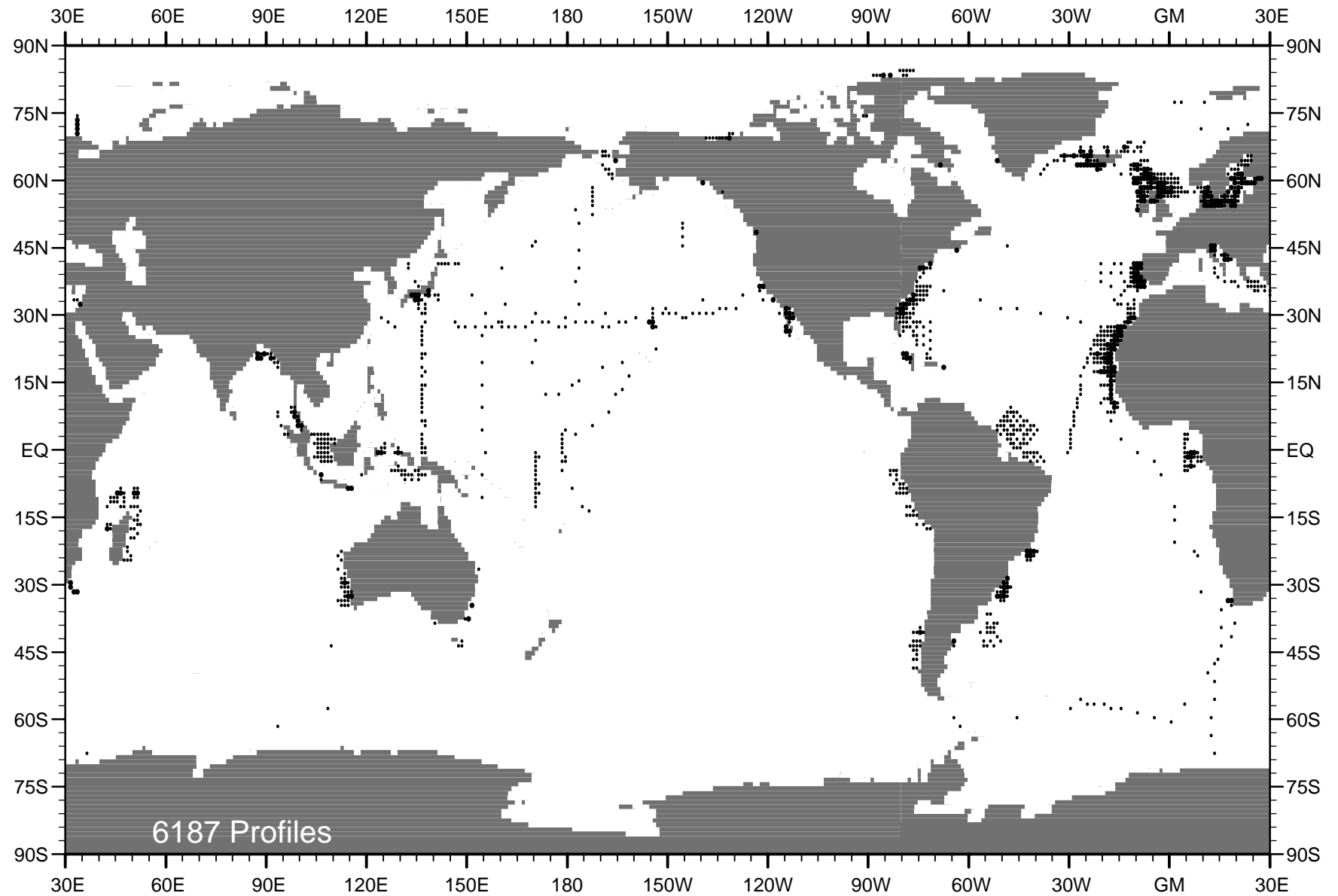


Fig. C45 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1973 .

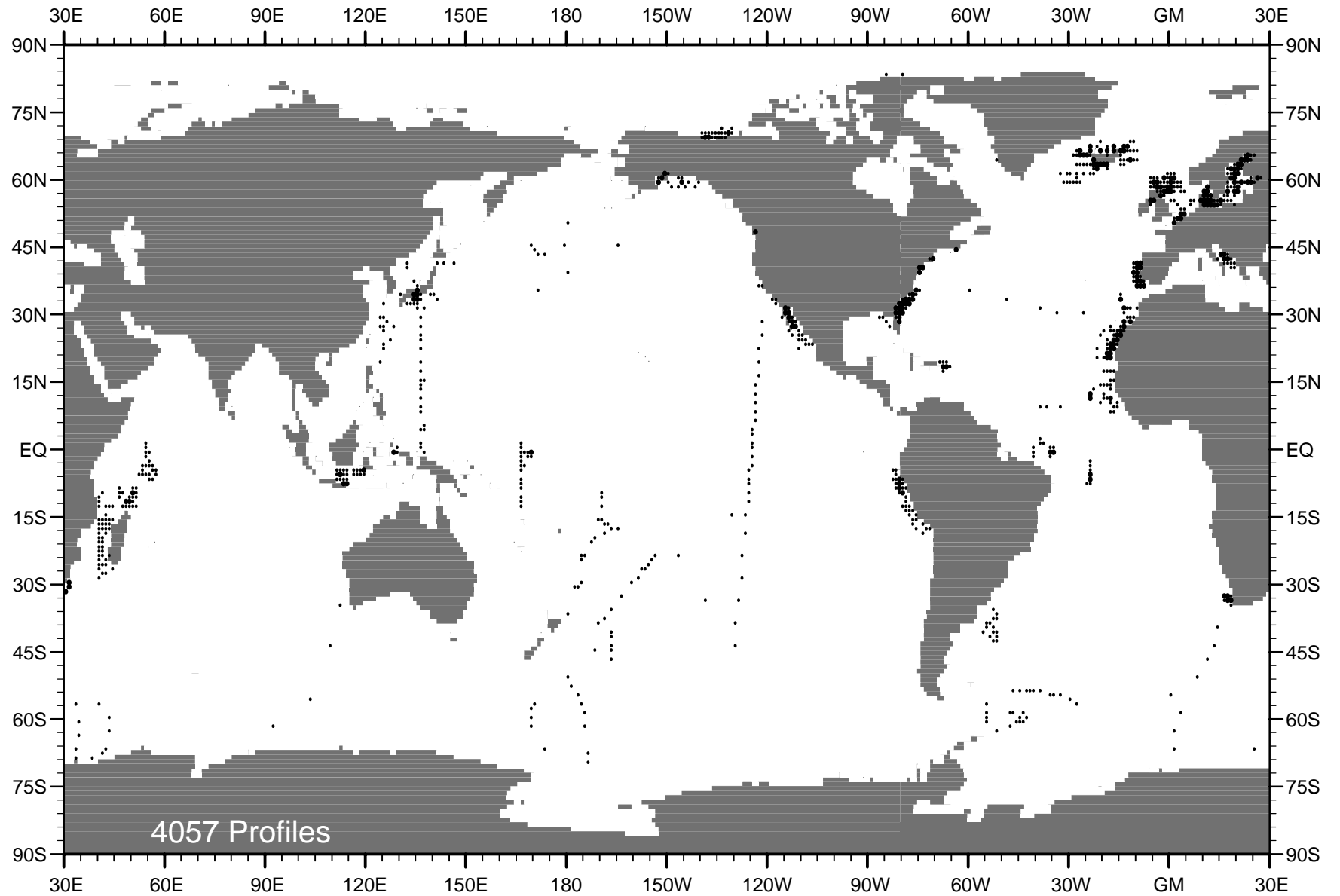


Fig. C46 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1974 .

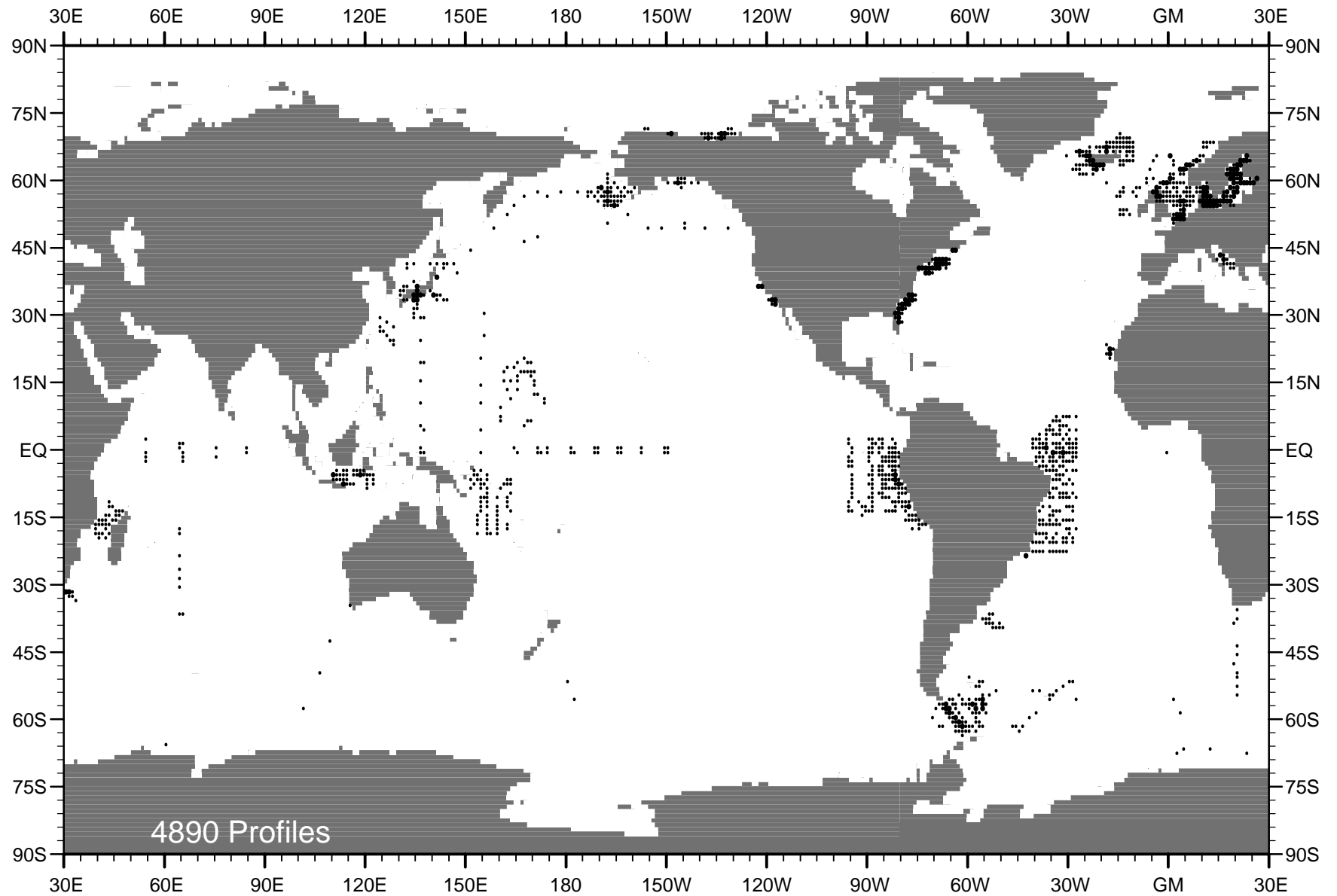


Fig. C47 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1975 .

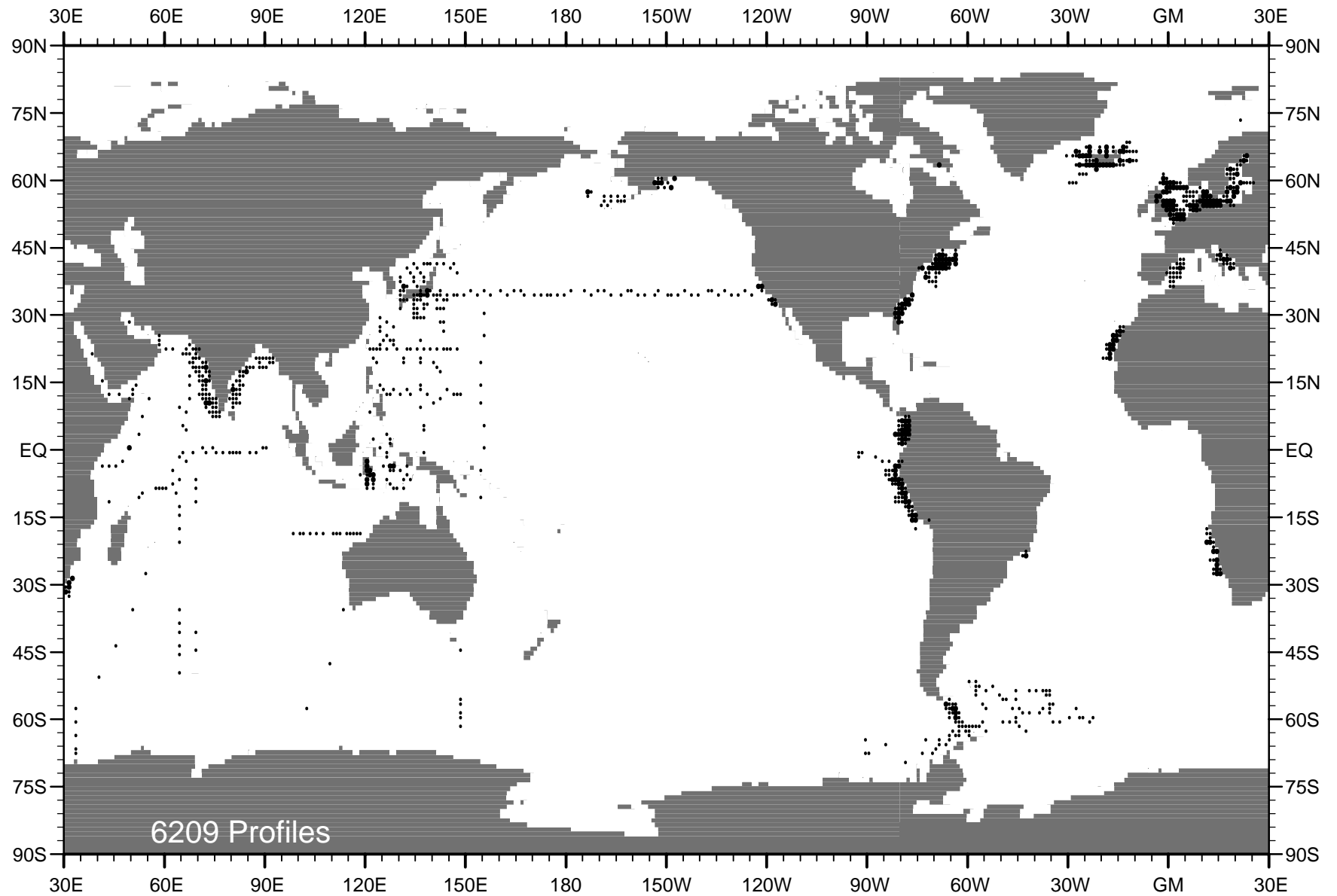


Fig. C48 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1976 .

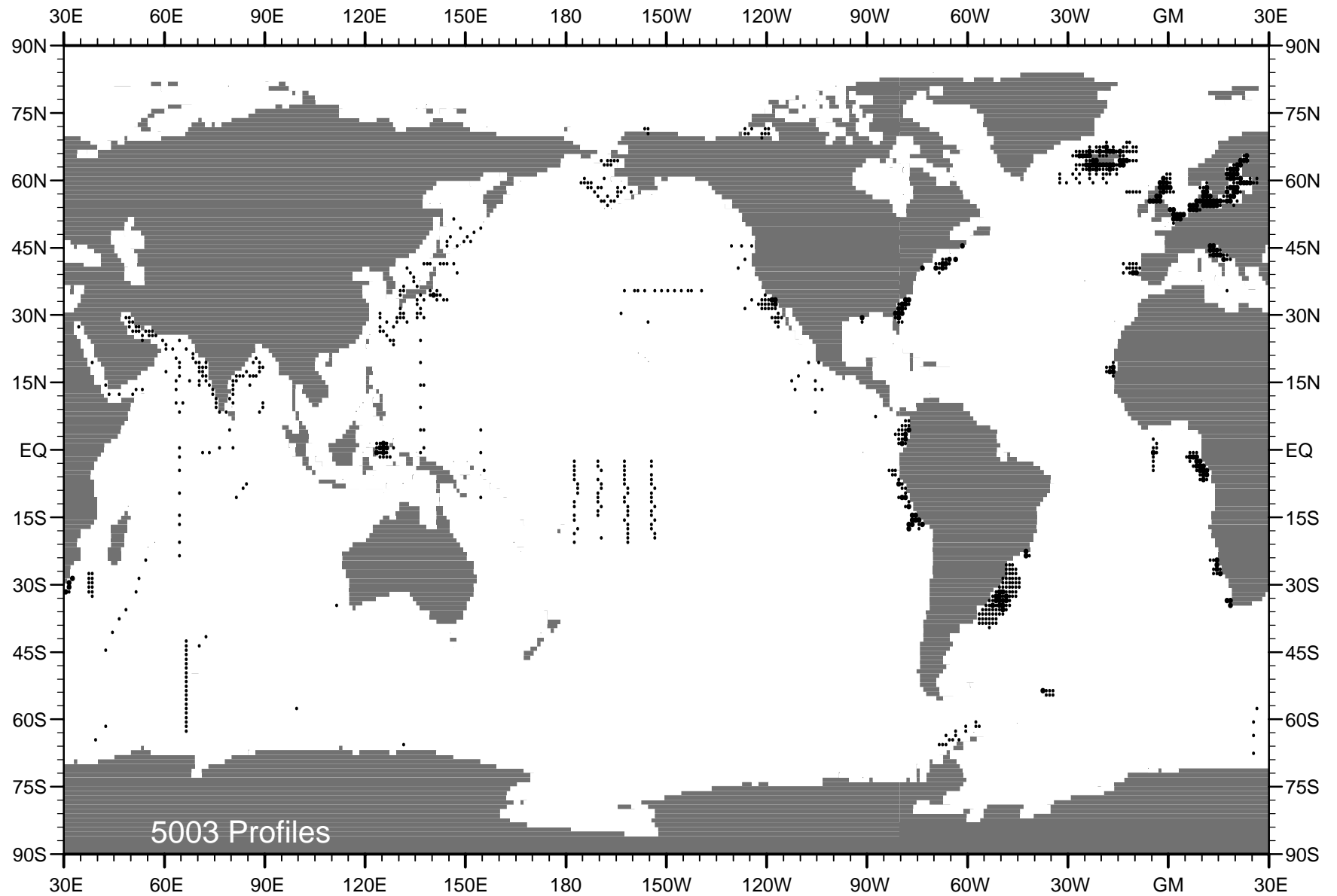


Fig. C49 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1977 .

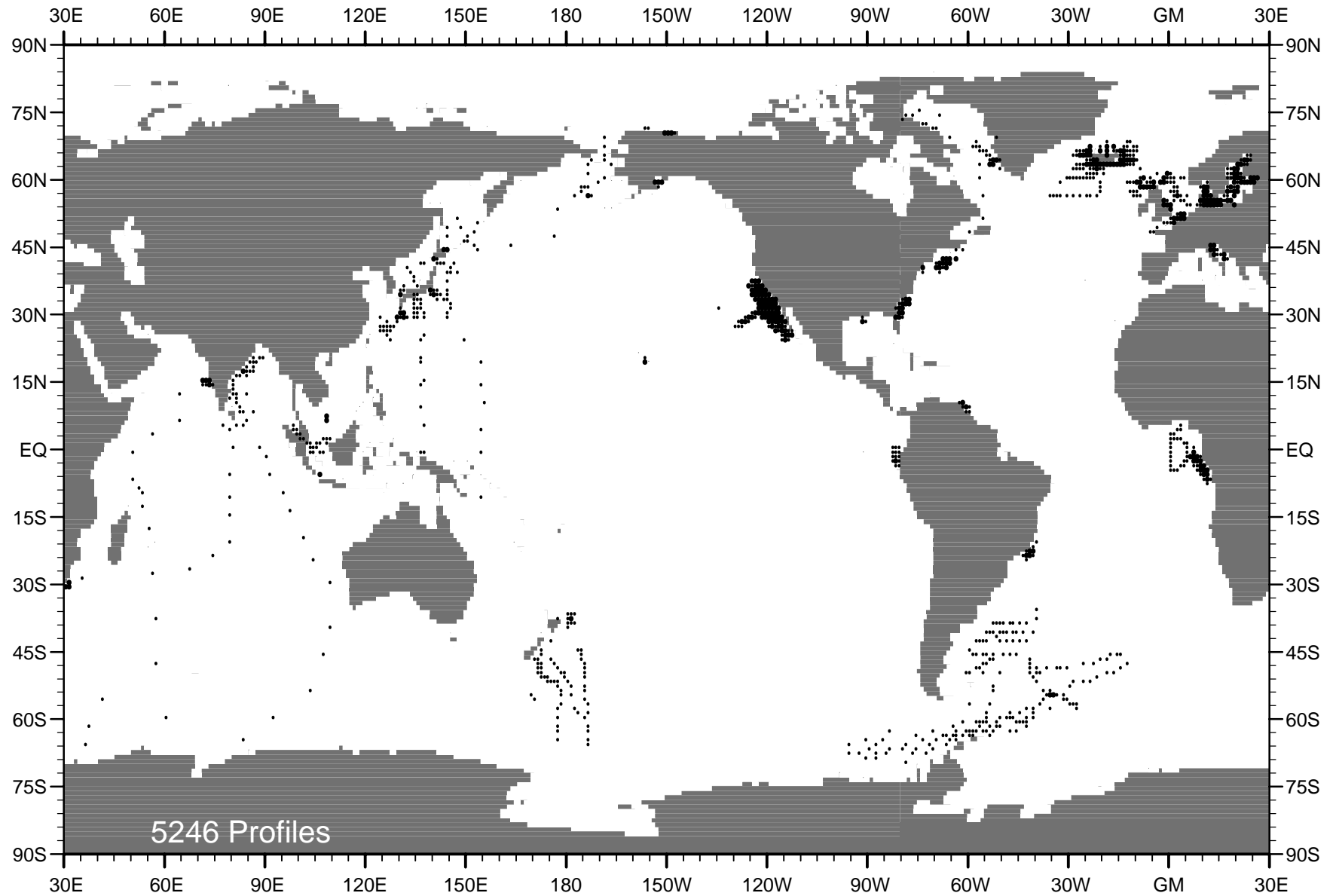


Fig. C50 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1978 .



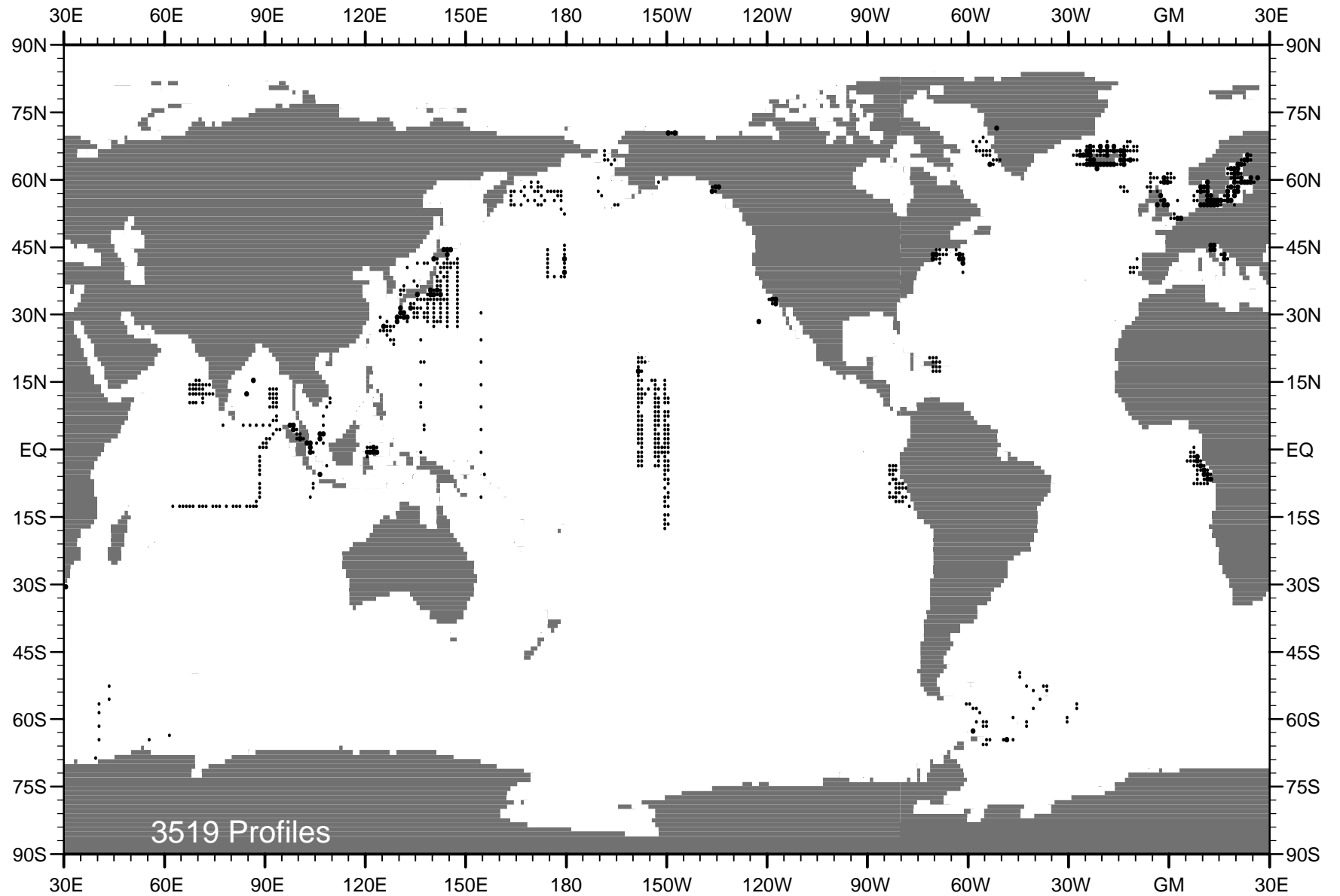


Fig. C51 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1979 .

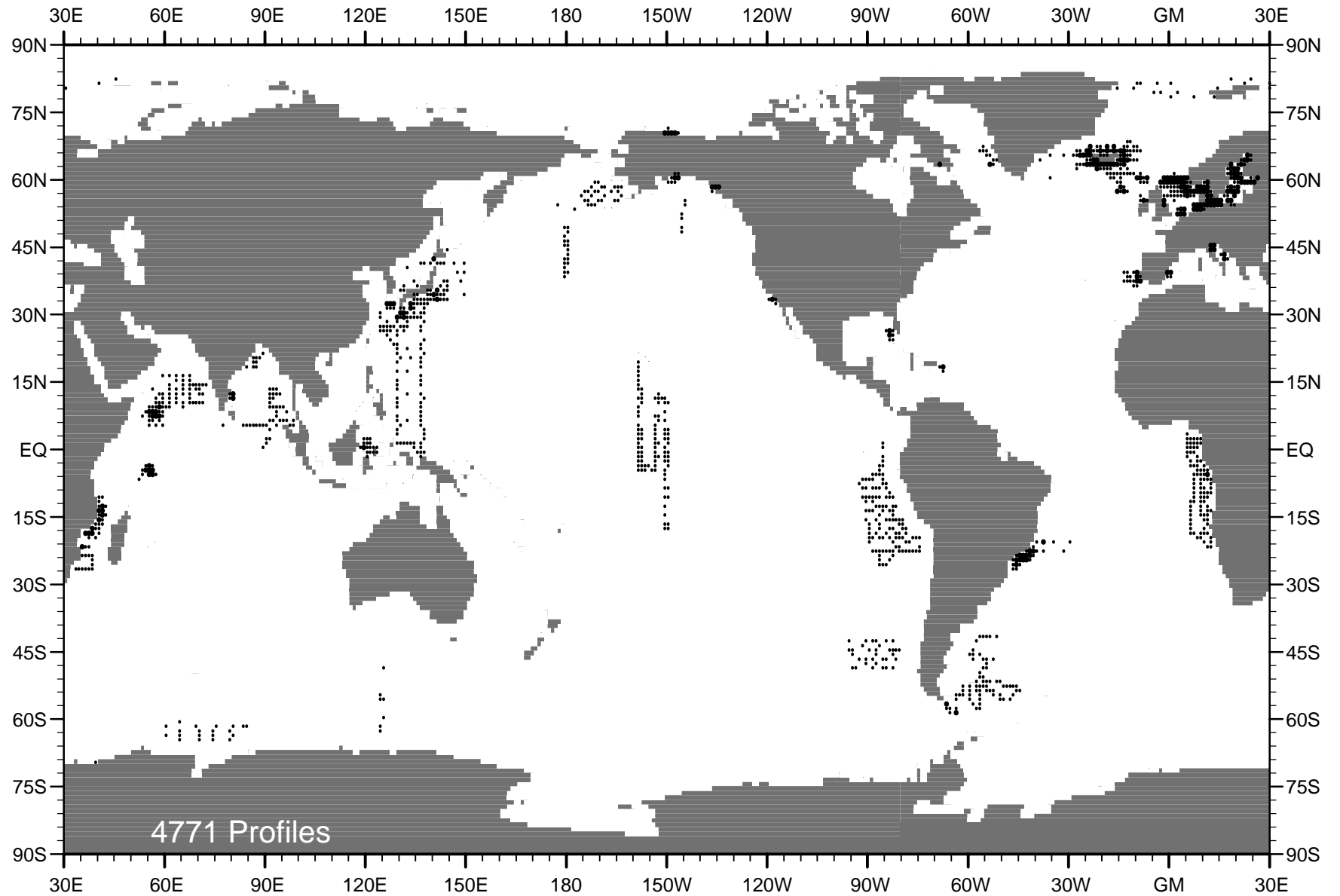


Fig. C52 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1980 .

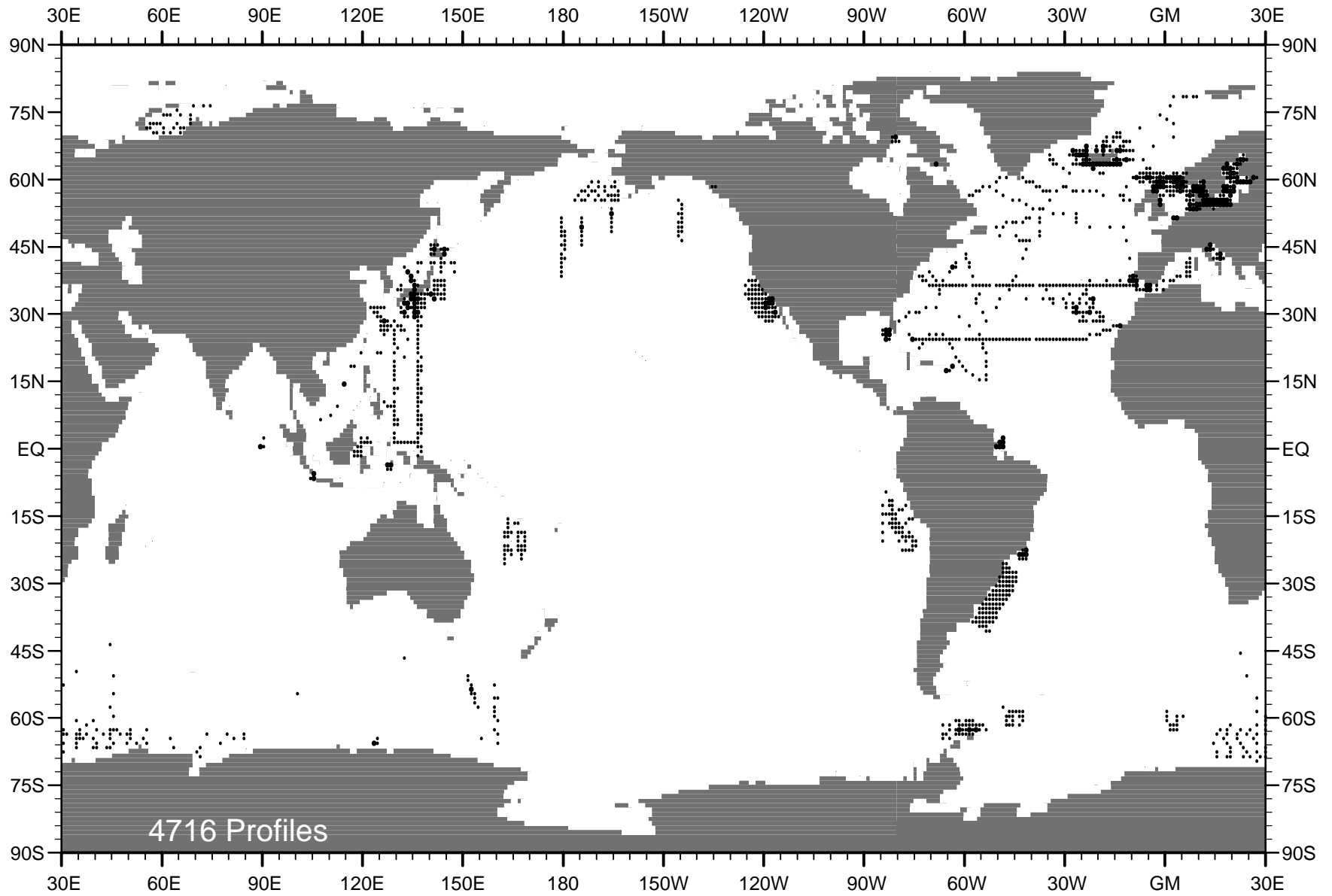


Fig. C53 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1981 .

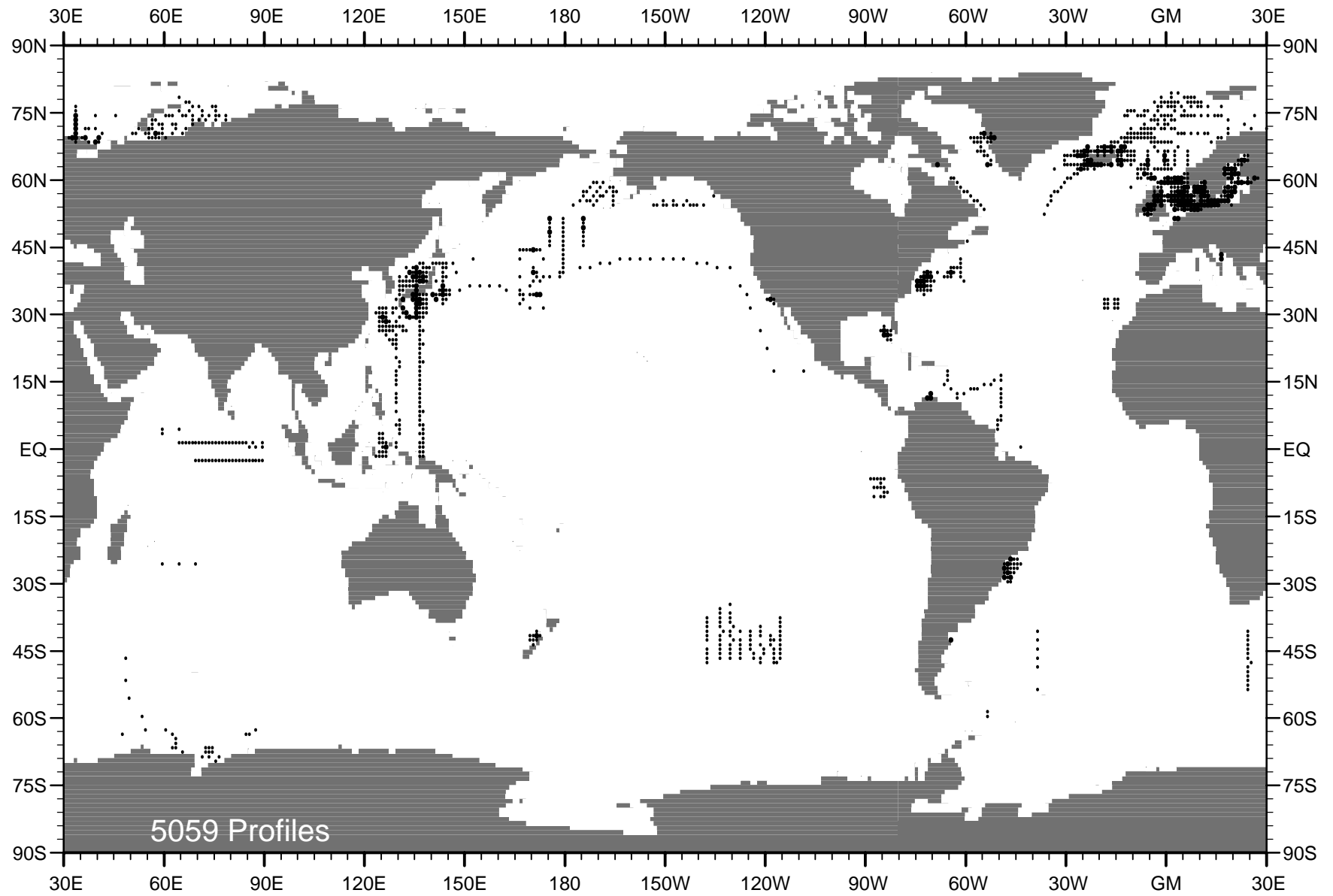


Fig. C54 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1982 .

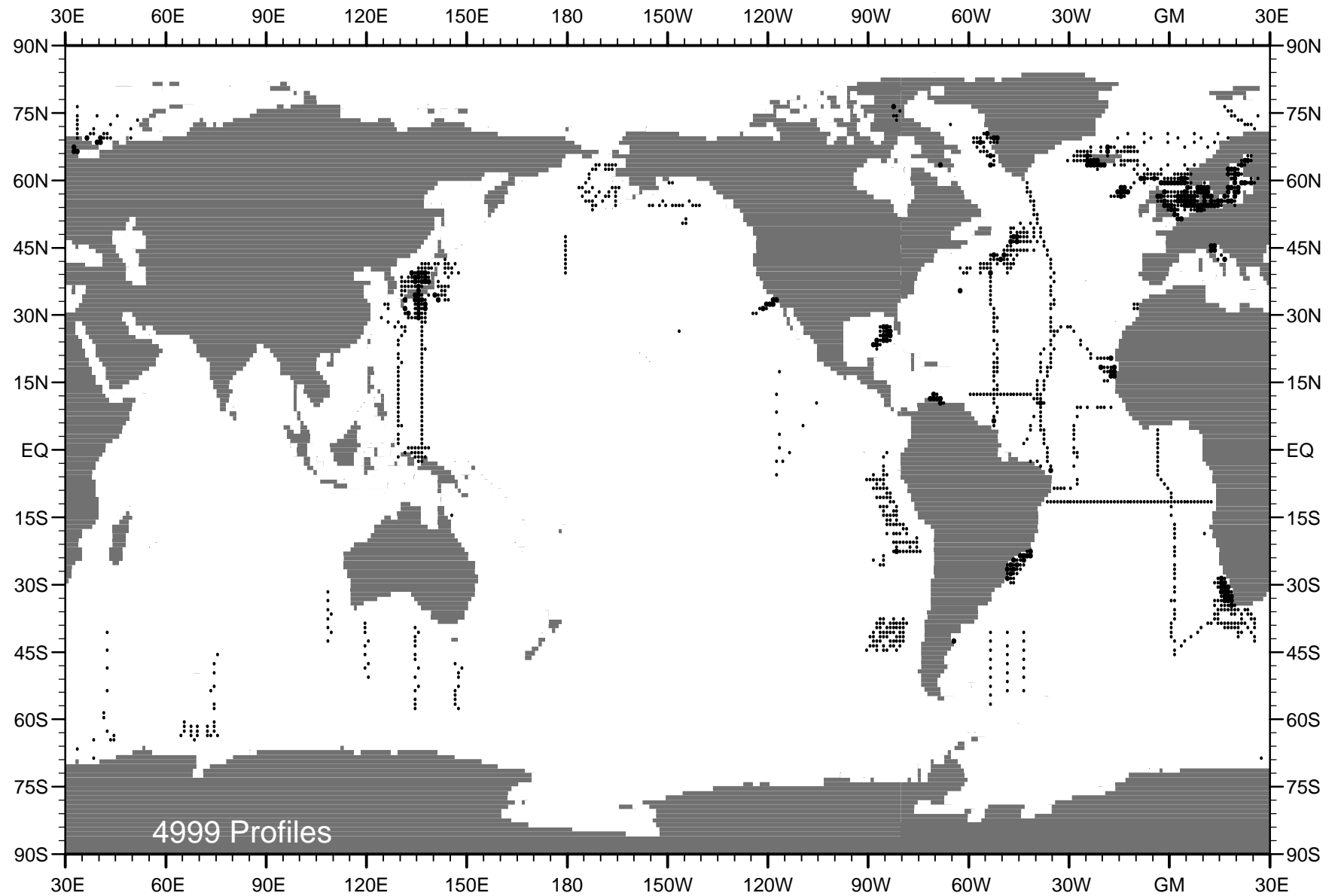


Fig. C55 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1983 .

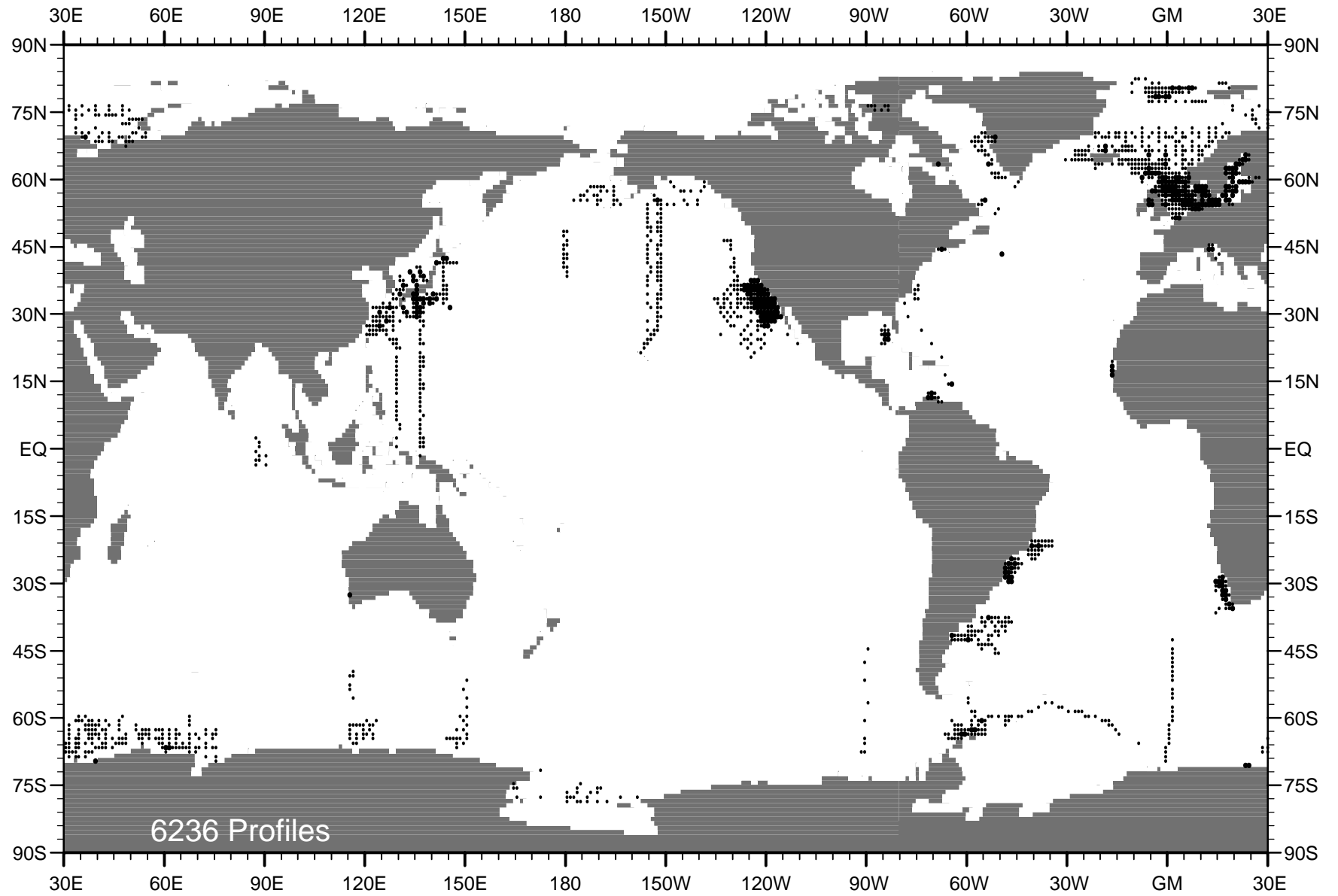


Fig. C56 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1984 .

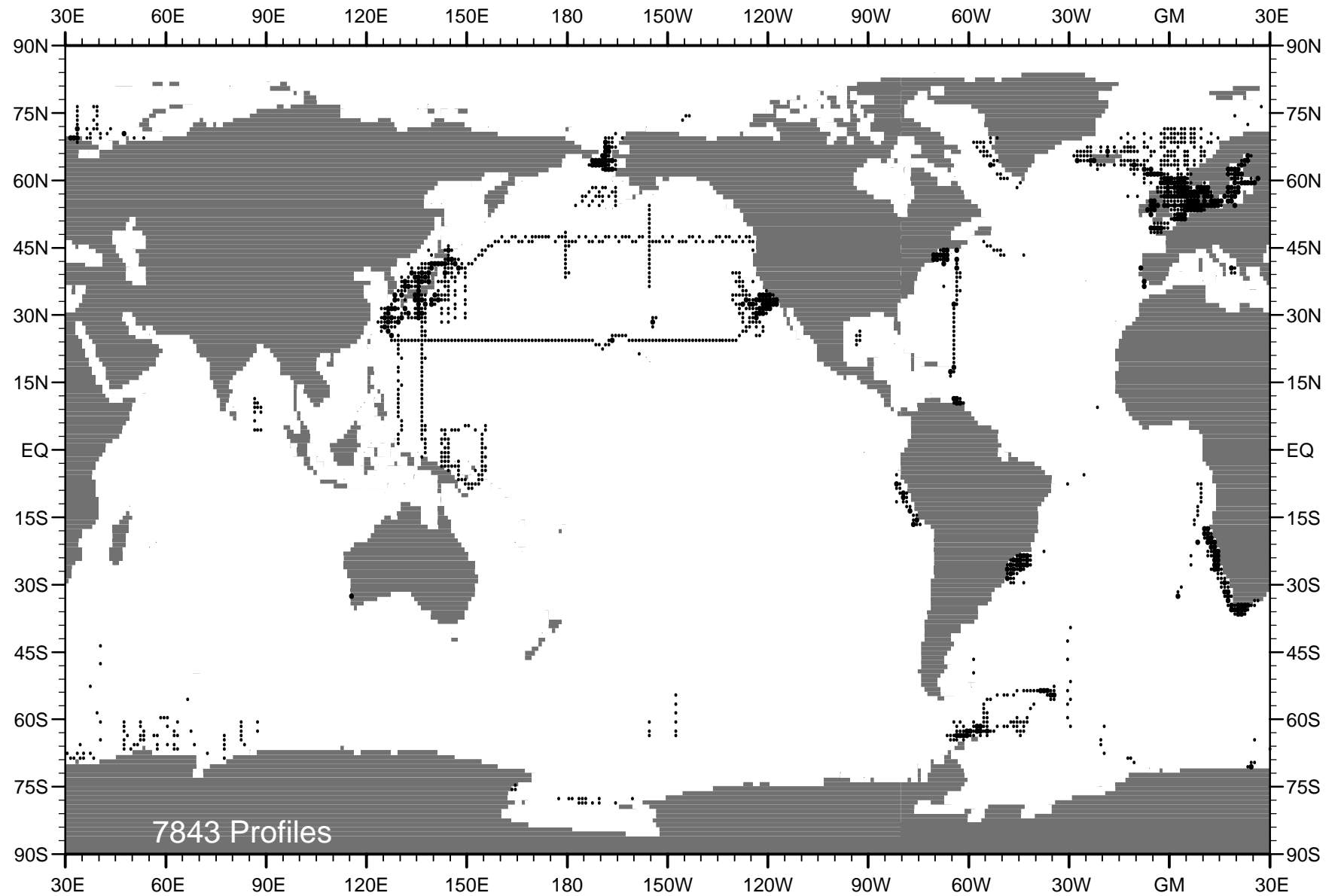


Fig. C57 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1985 .

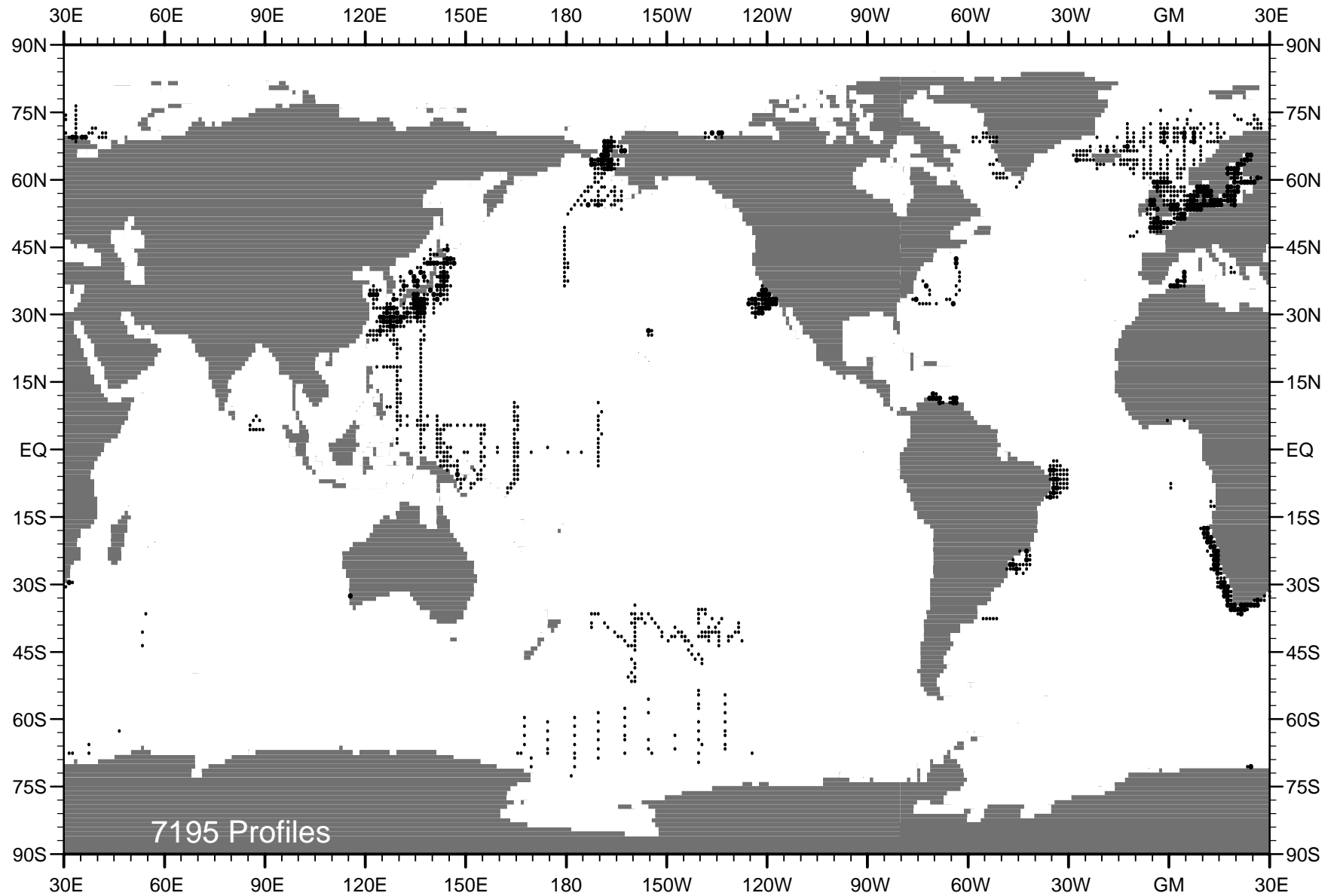


Fig. C58 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1986 .



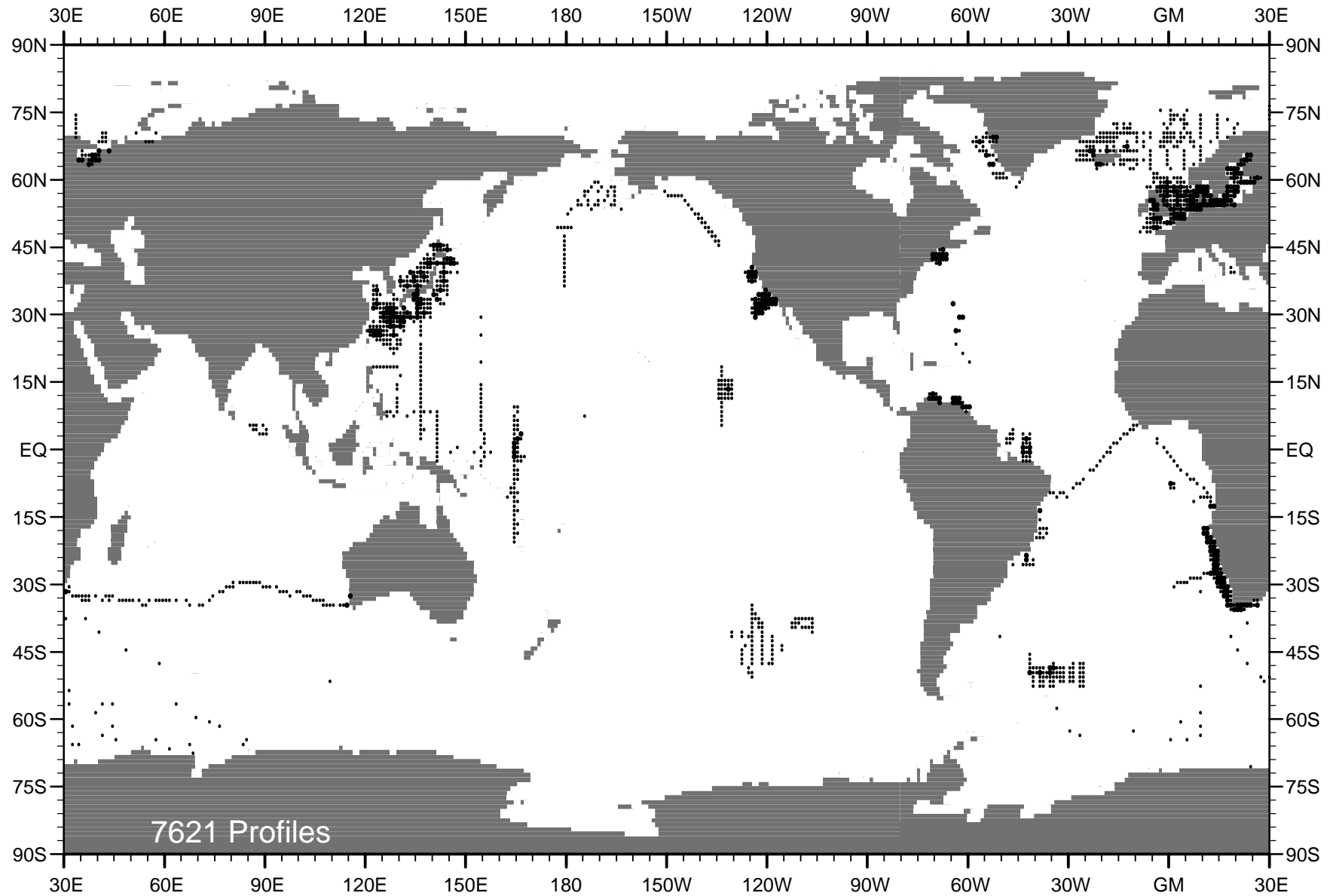


Fig. C59 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1987 .

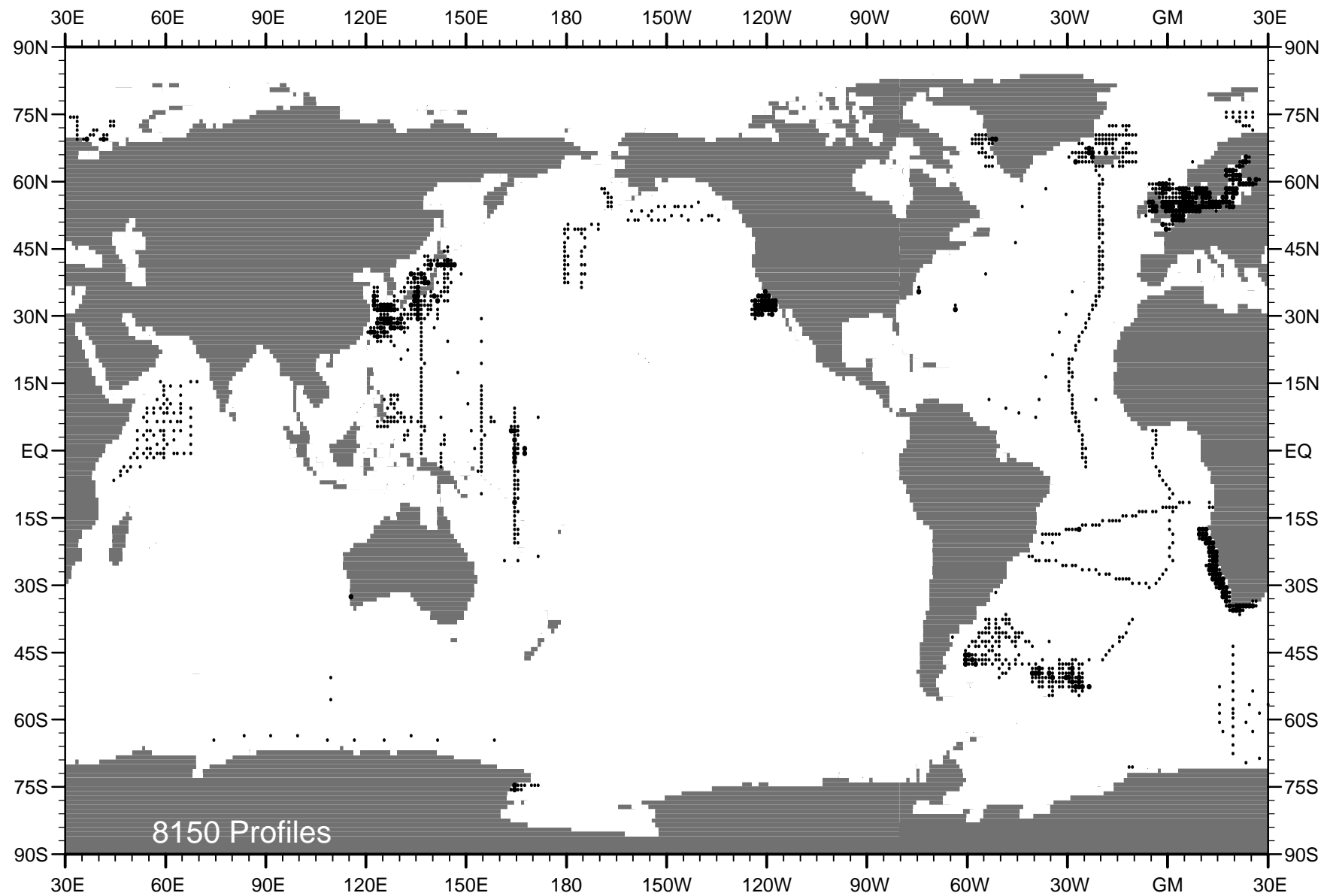


Fig. C60 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1988 .

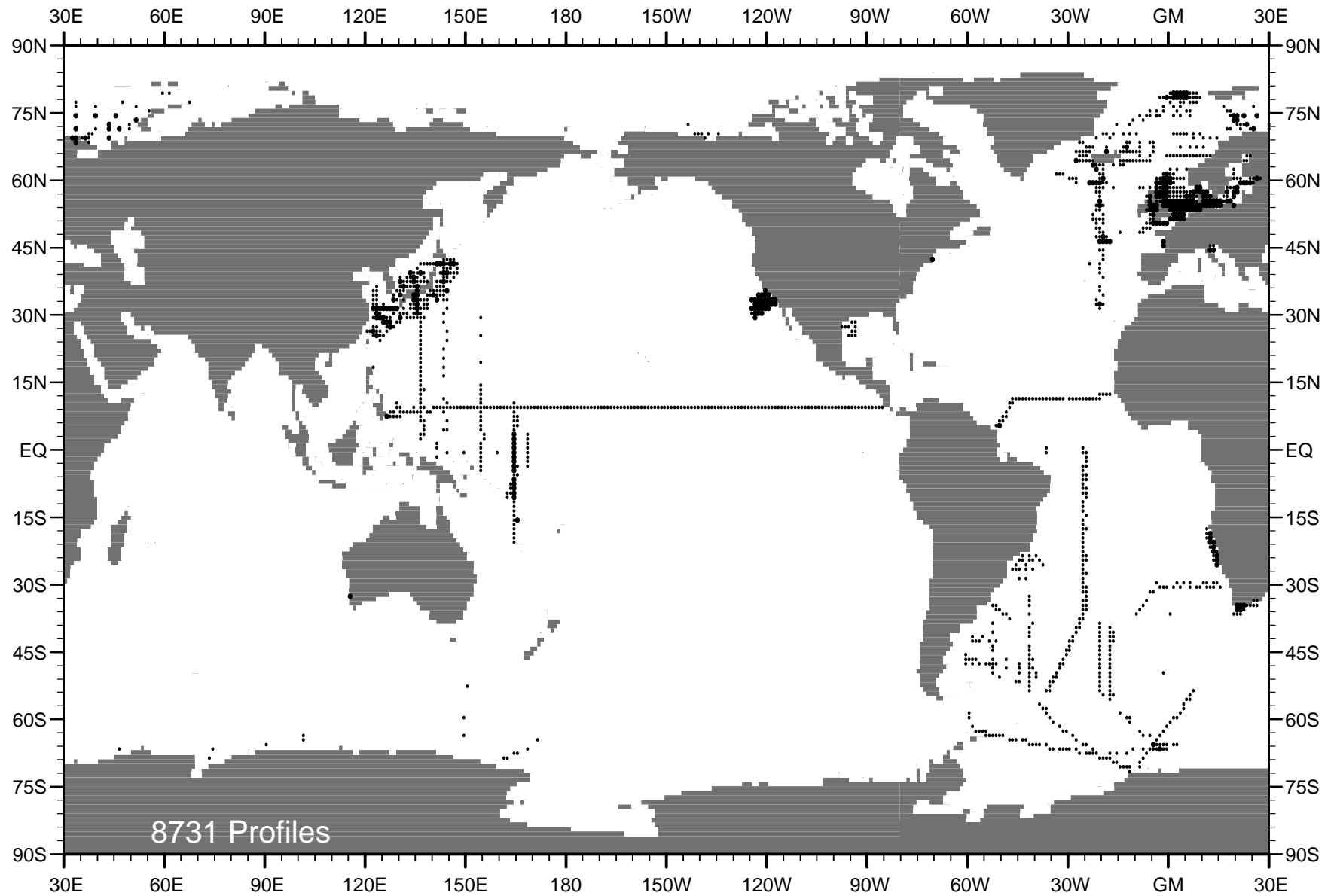


Fig. C61 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1989 .

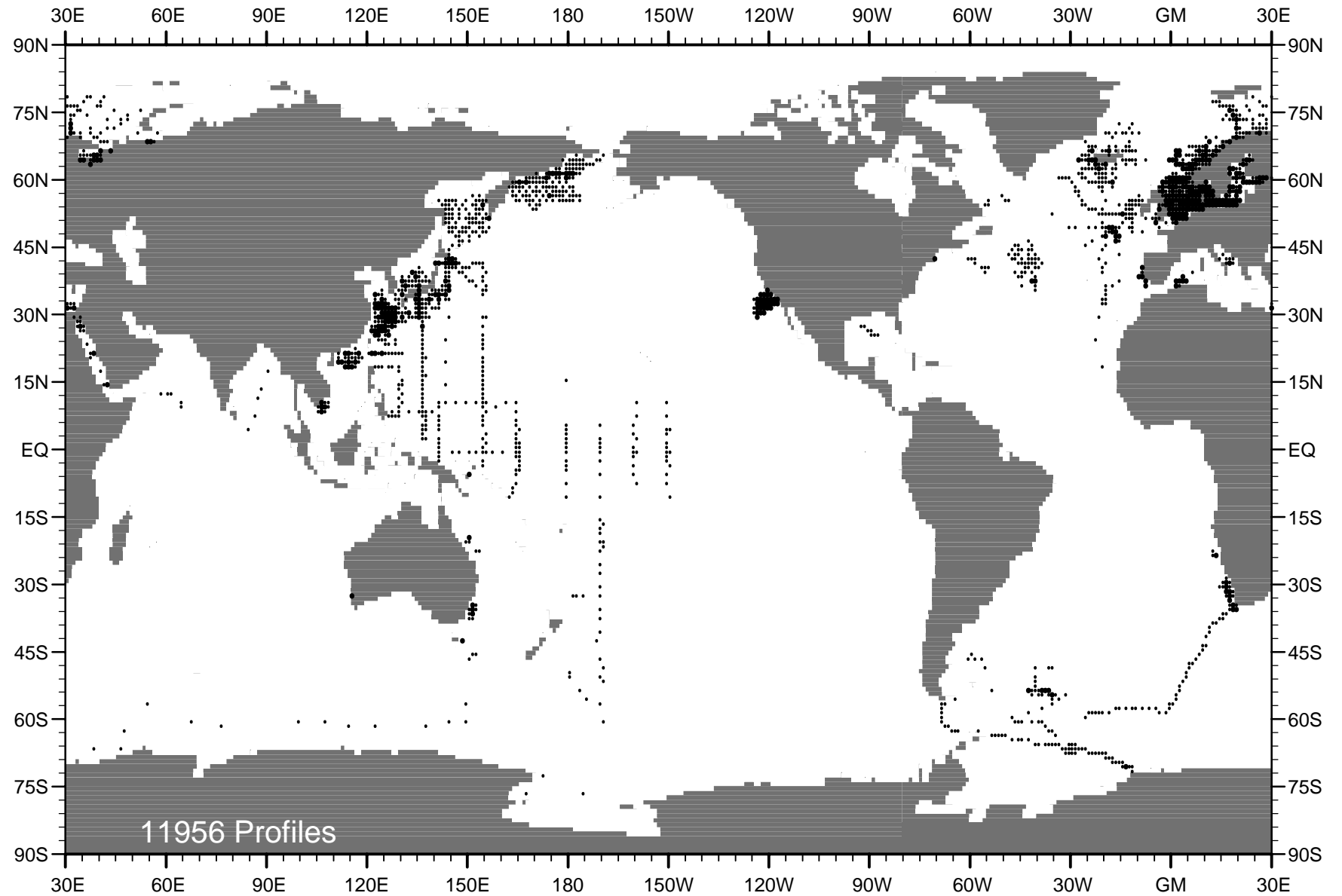


Fig. C62 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1990 .

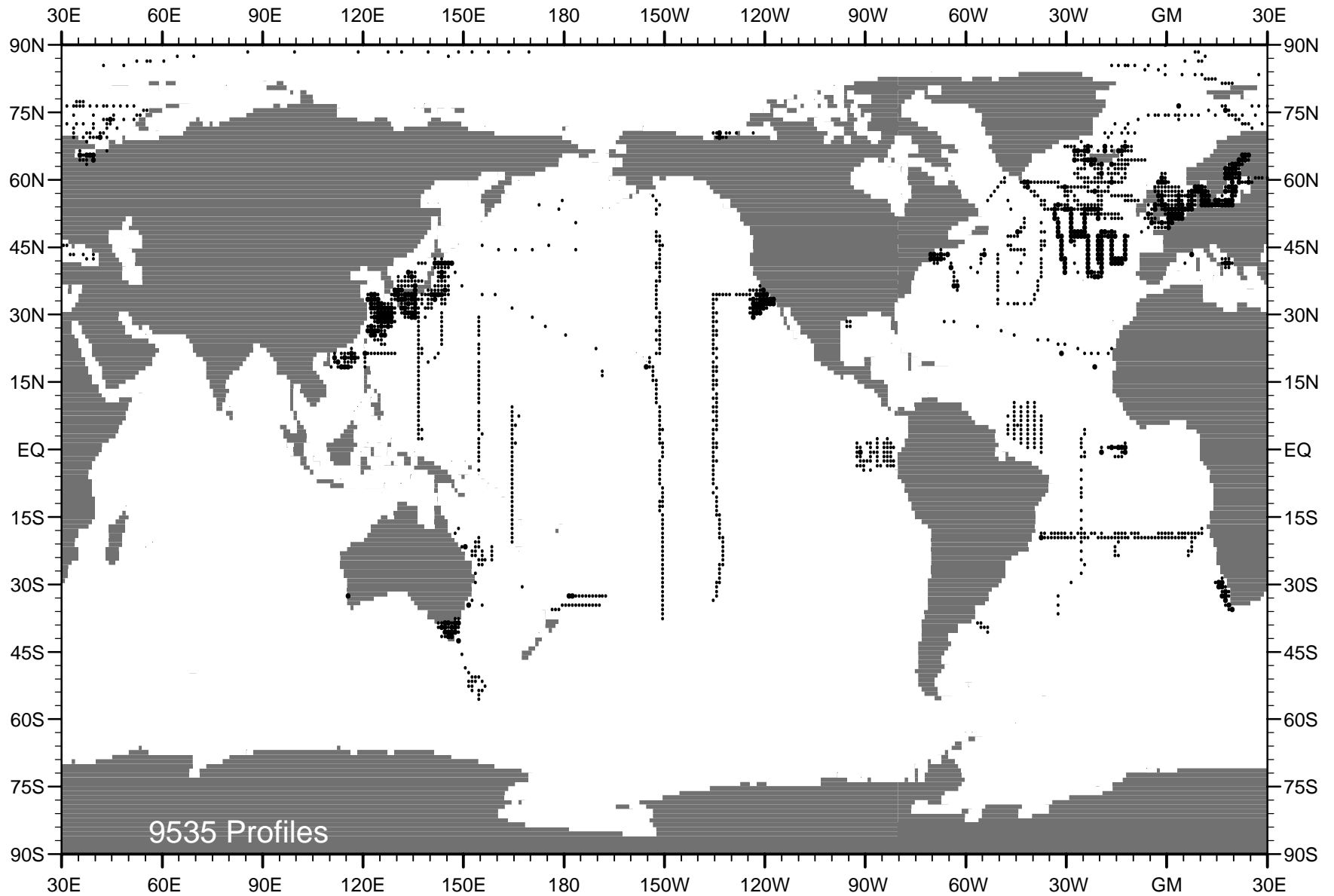


Fig. C63 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1991 .

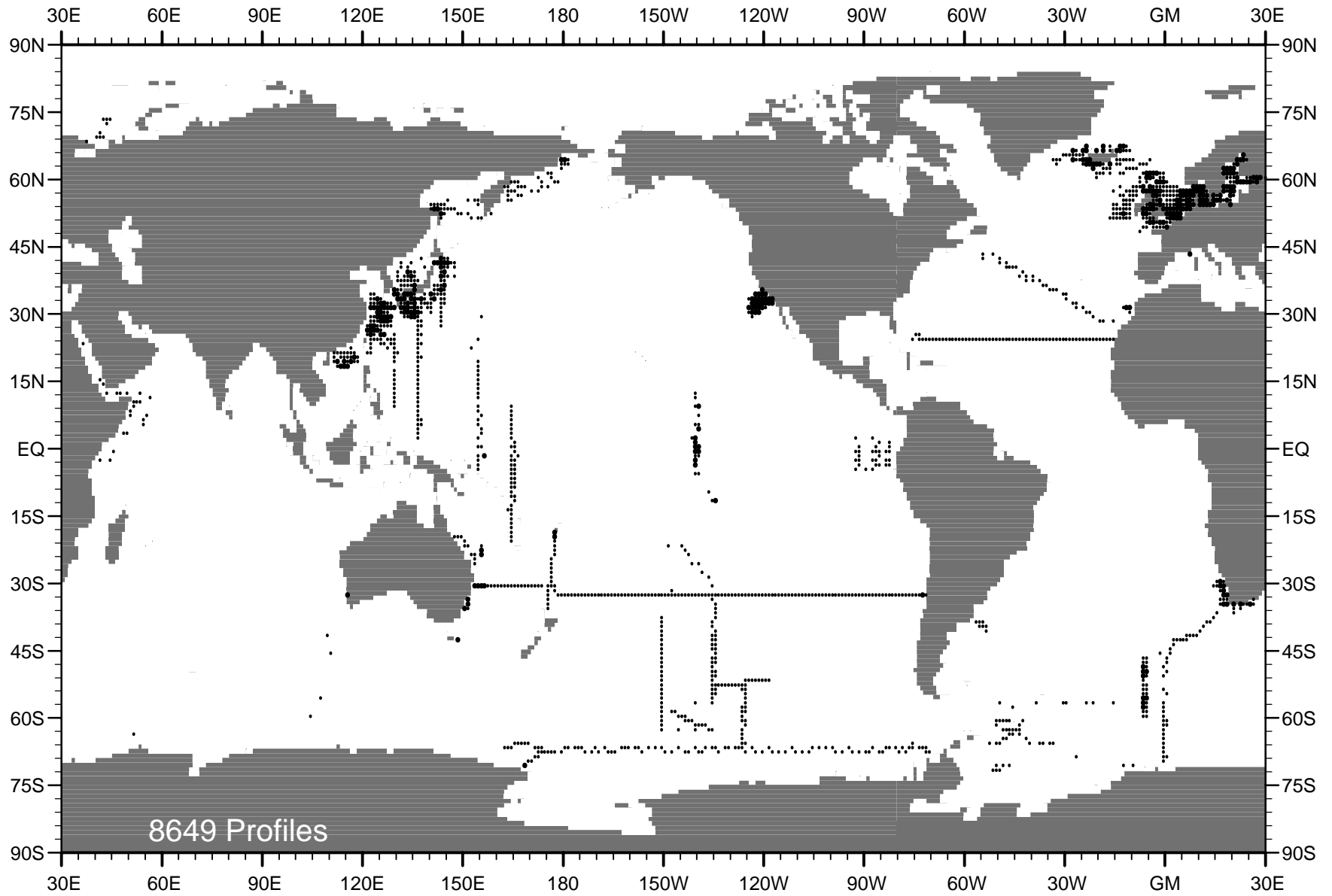


Fig. C64 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1992 .

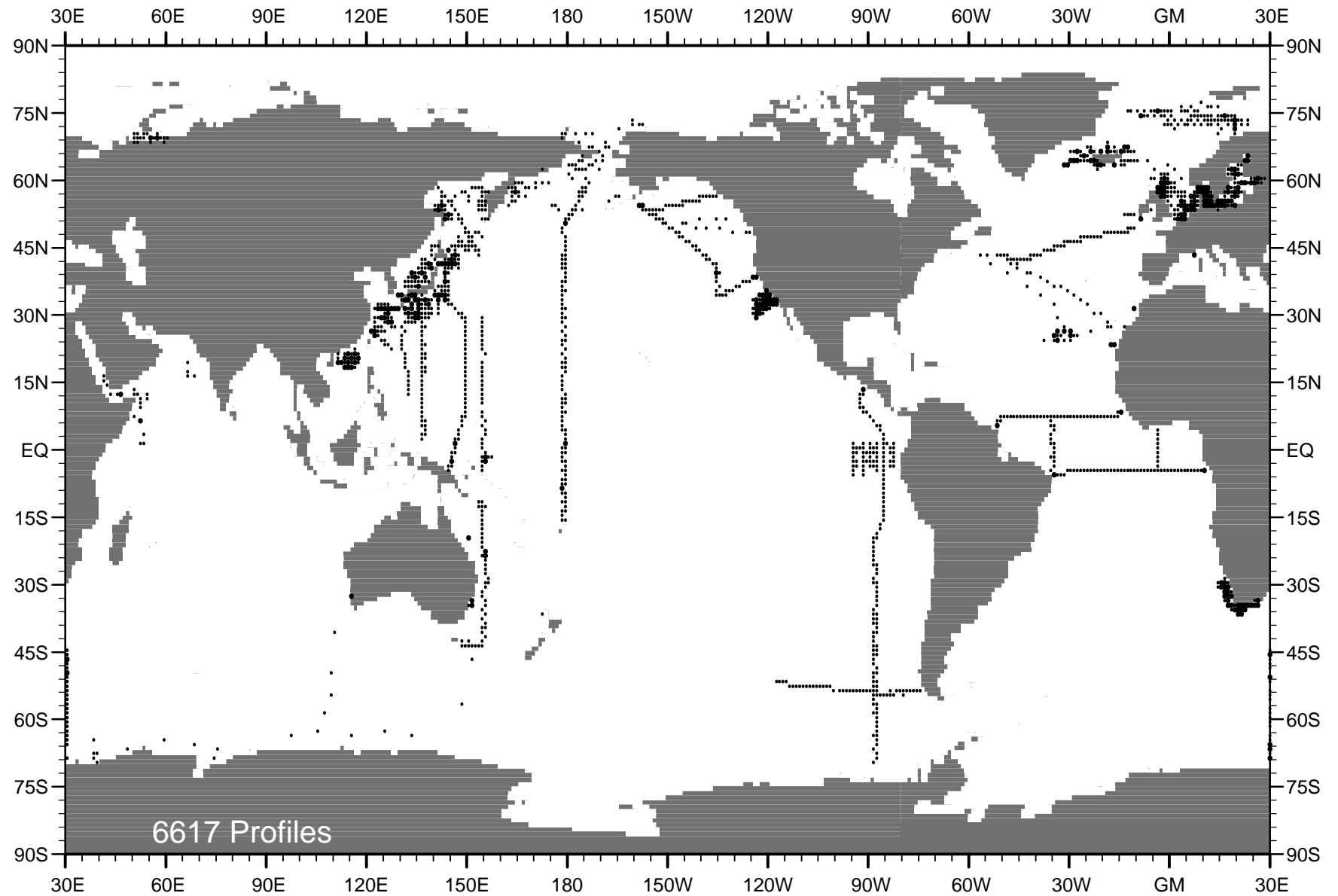


Fig. C65 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1993 .

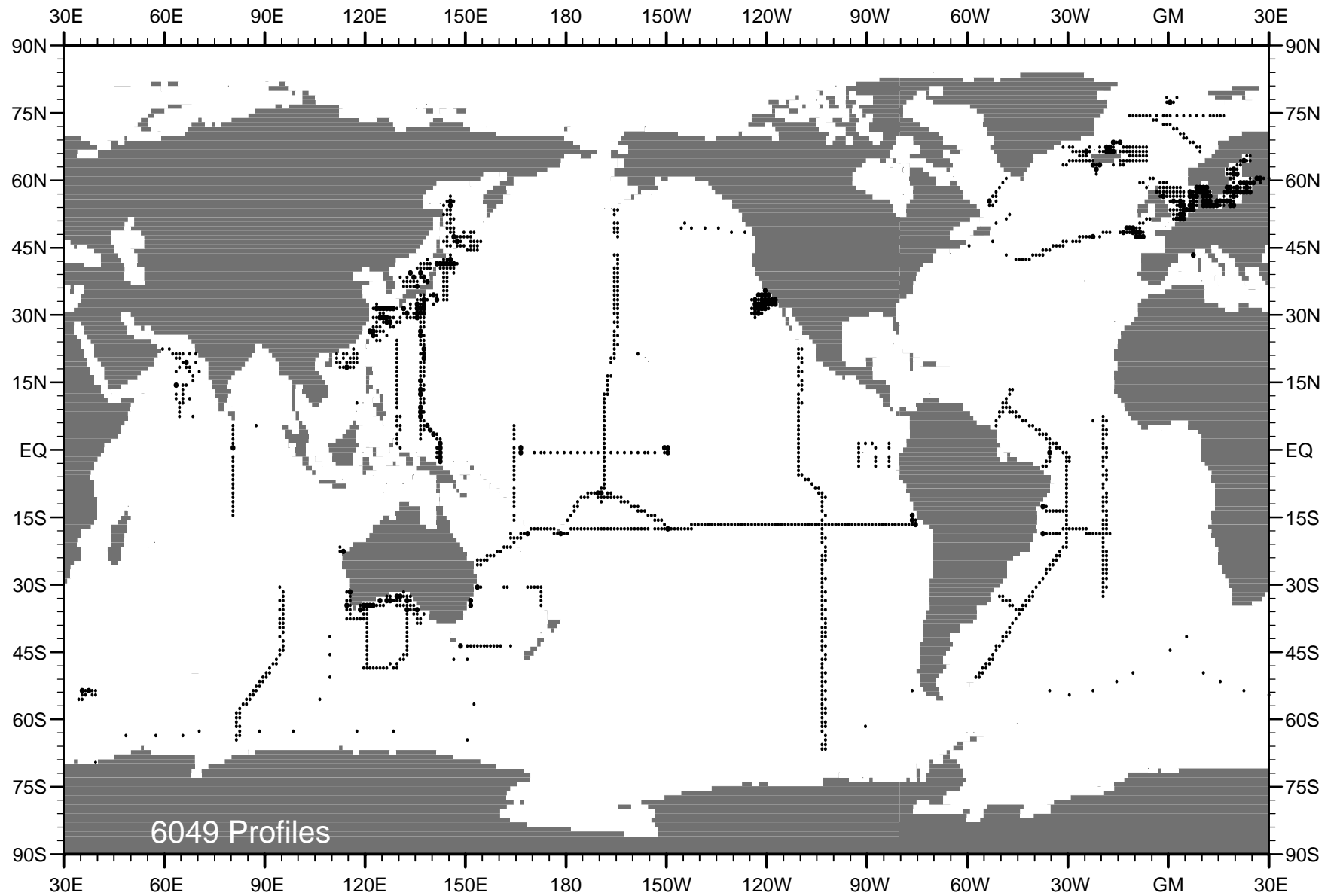


Fig. C66 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1994 .



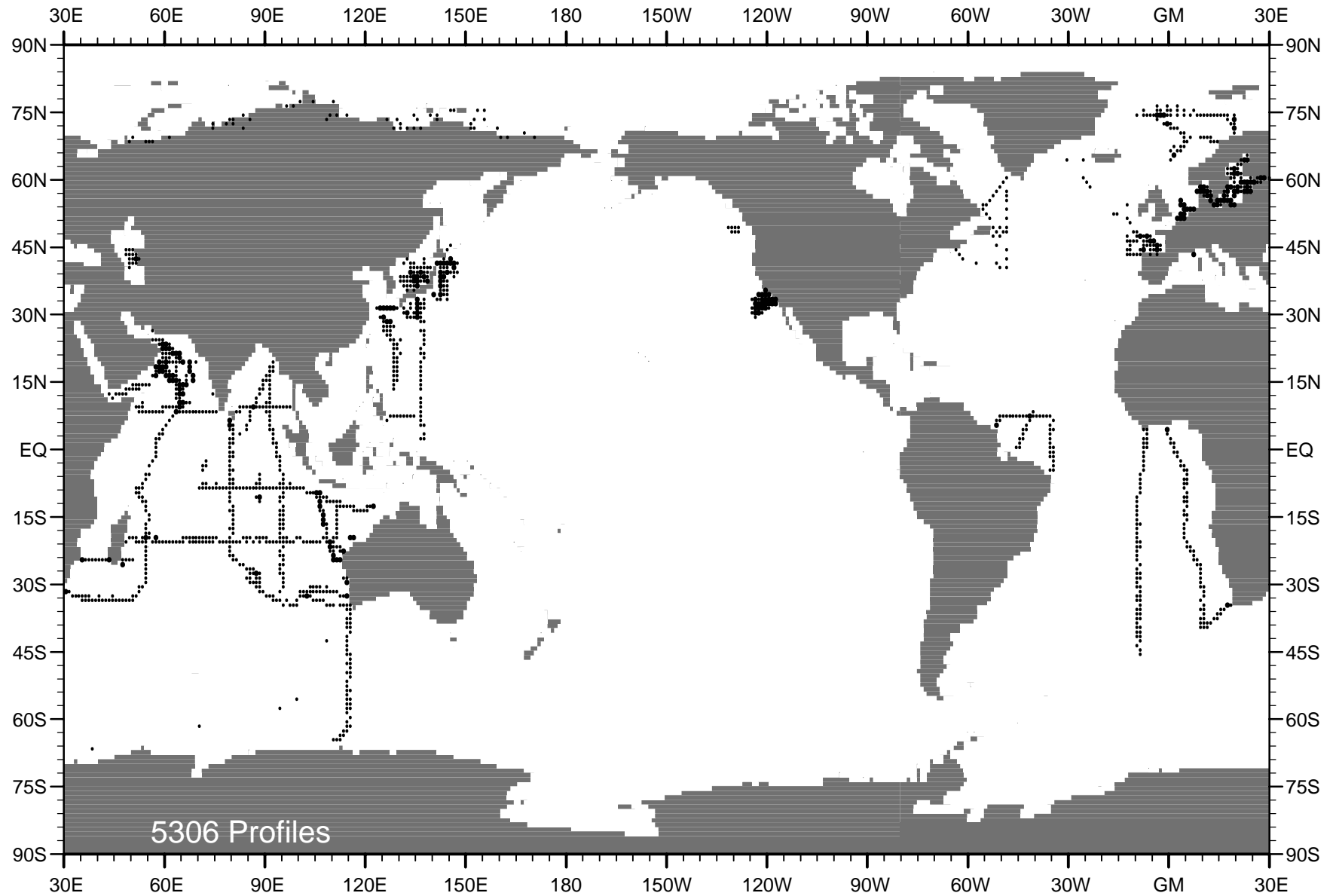


Fig. C67 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1995 .

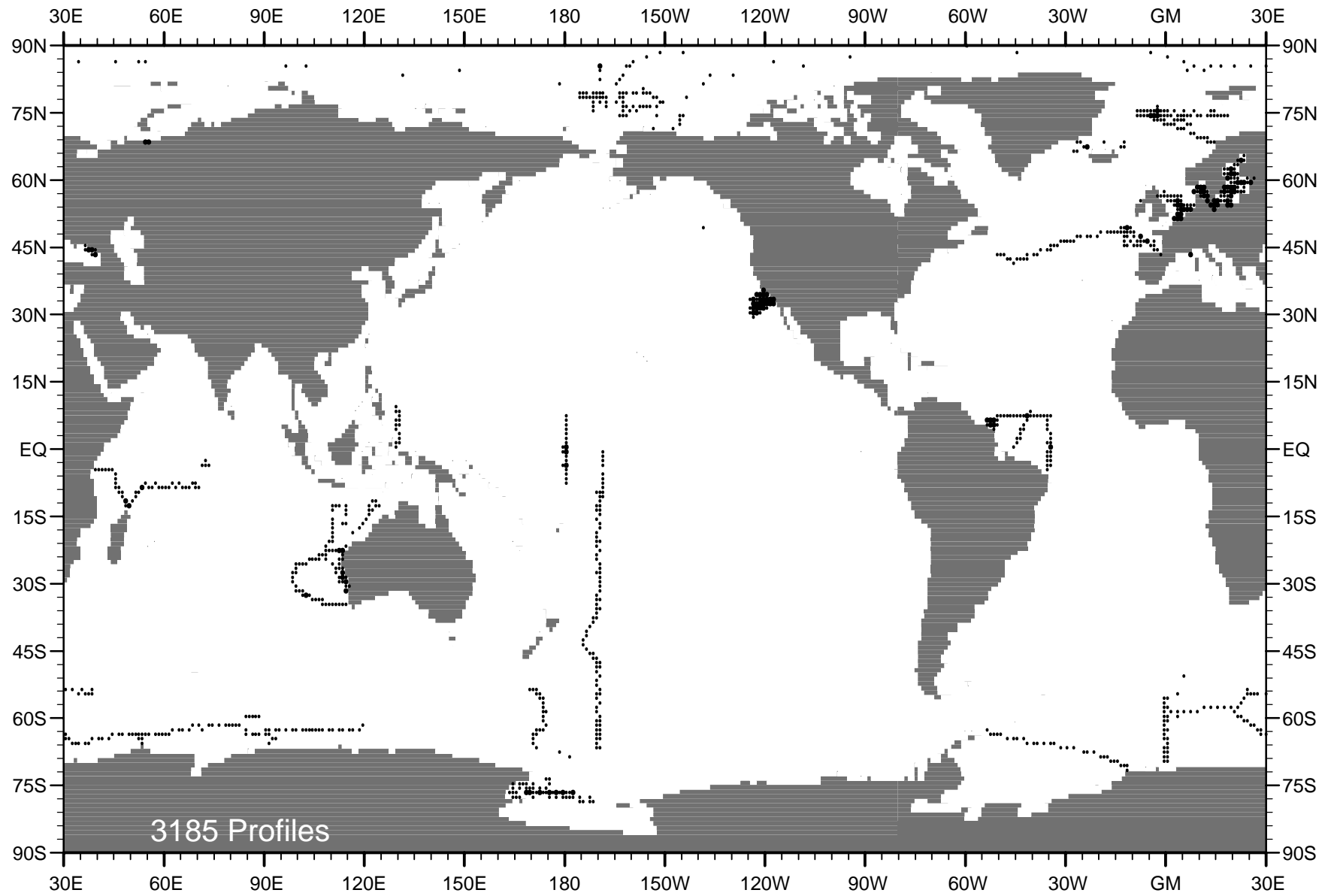


Fig. C68 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1996 .

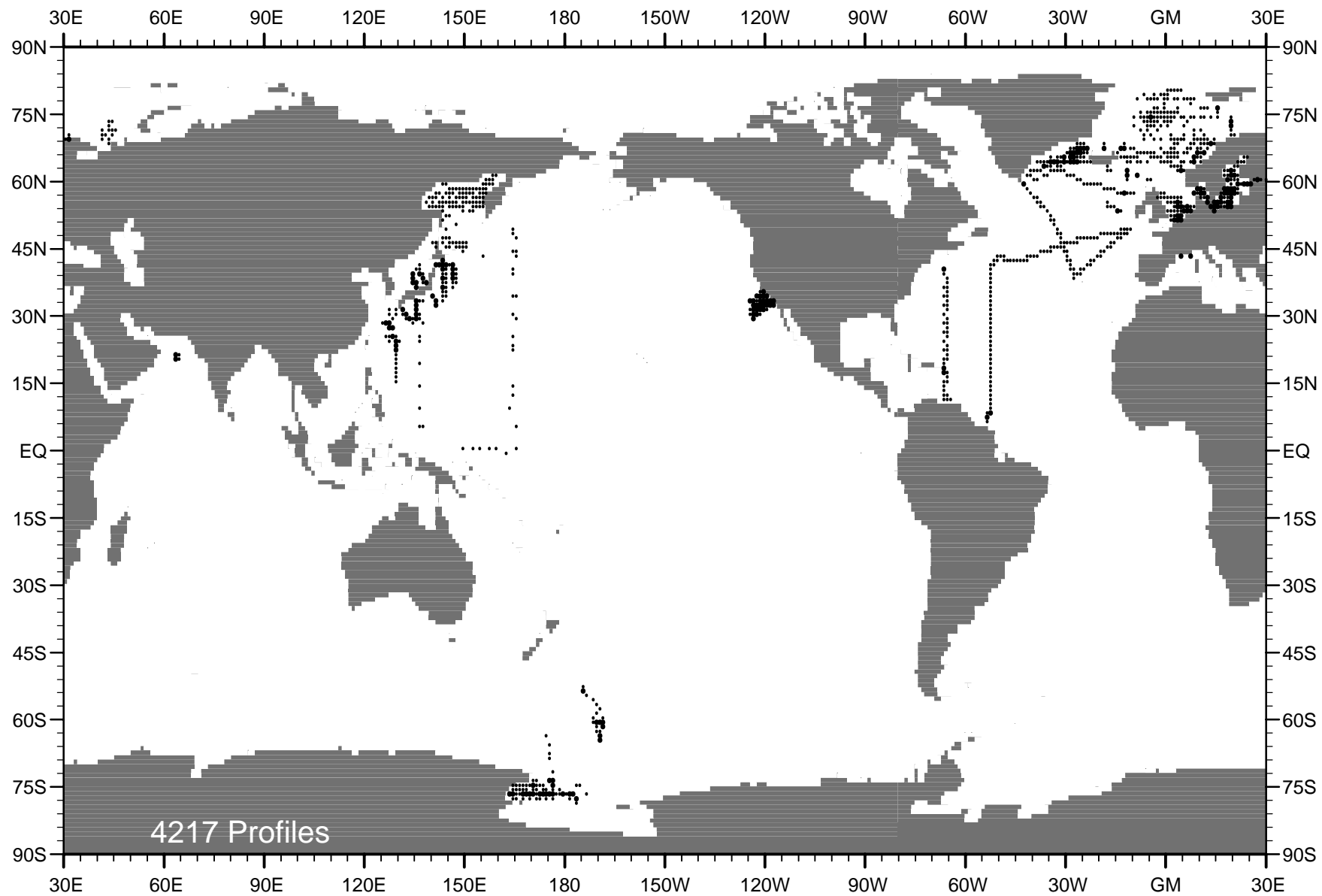


Fig. C69 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1997 .

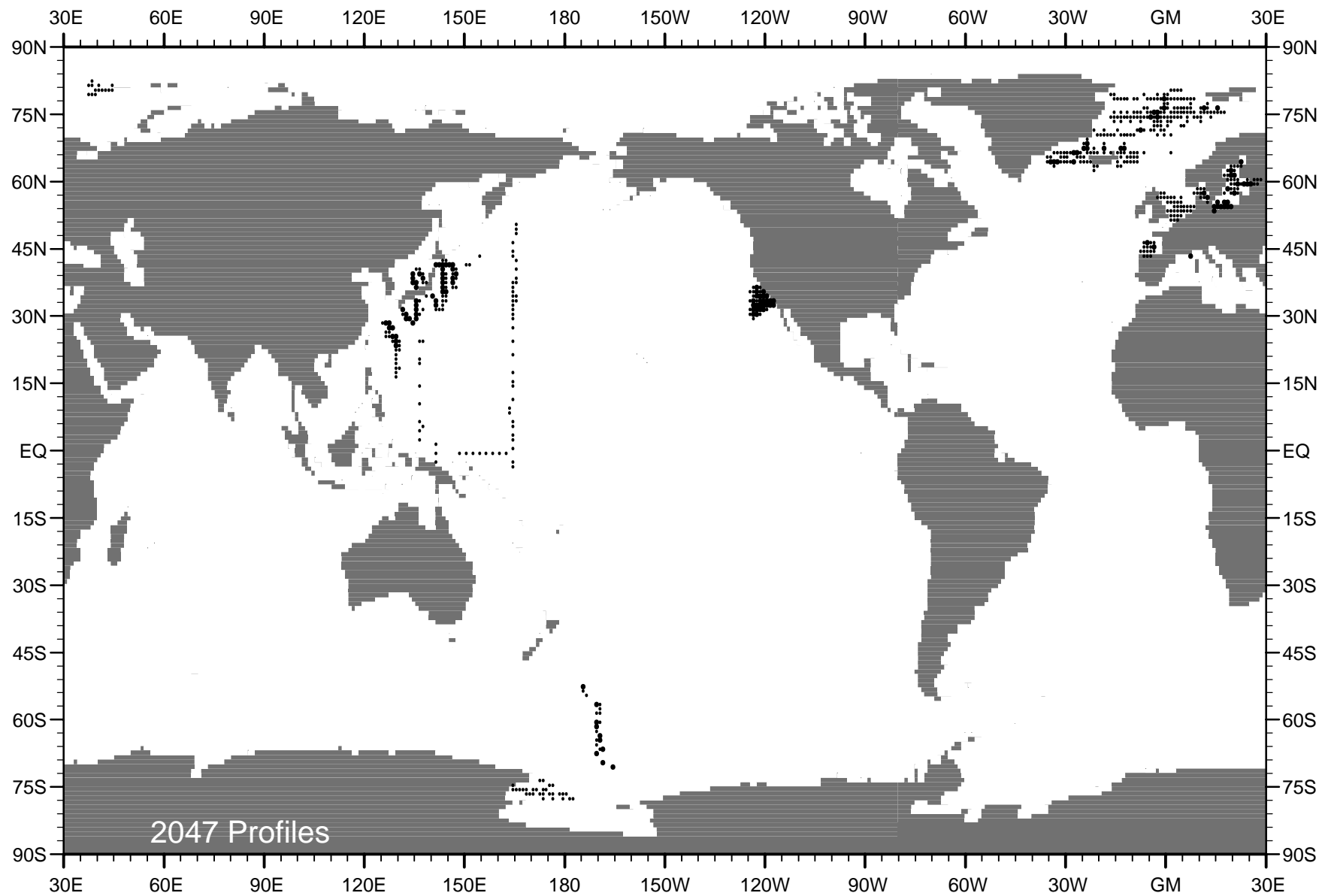


Fig. C70 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1998 .

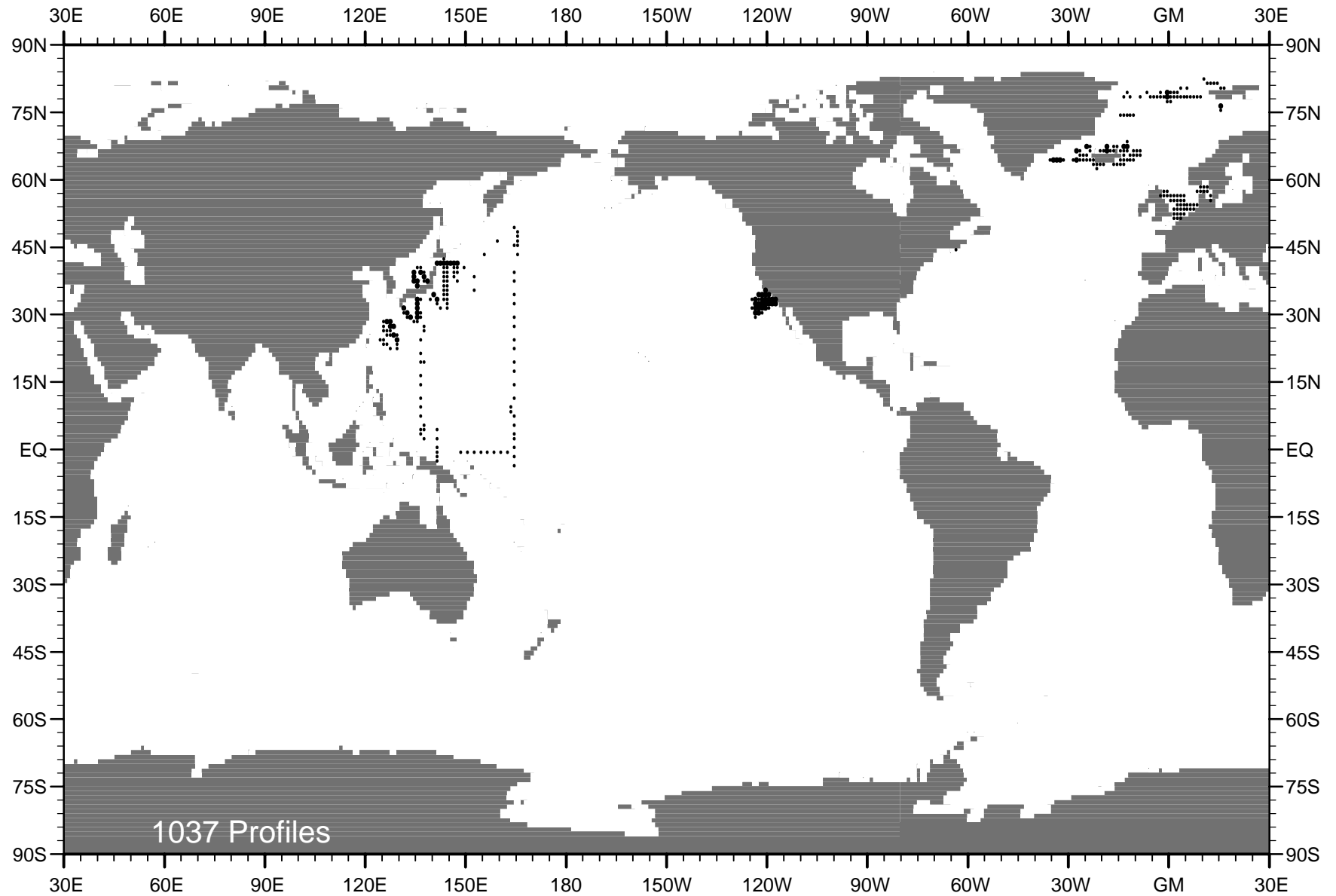


Fig. C71 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 1999 .

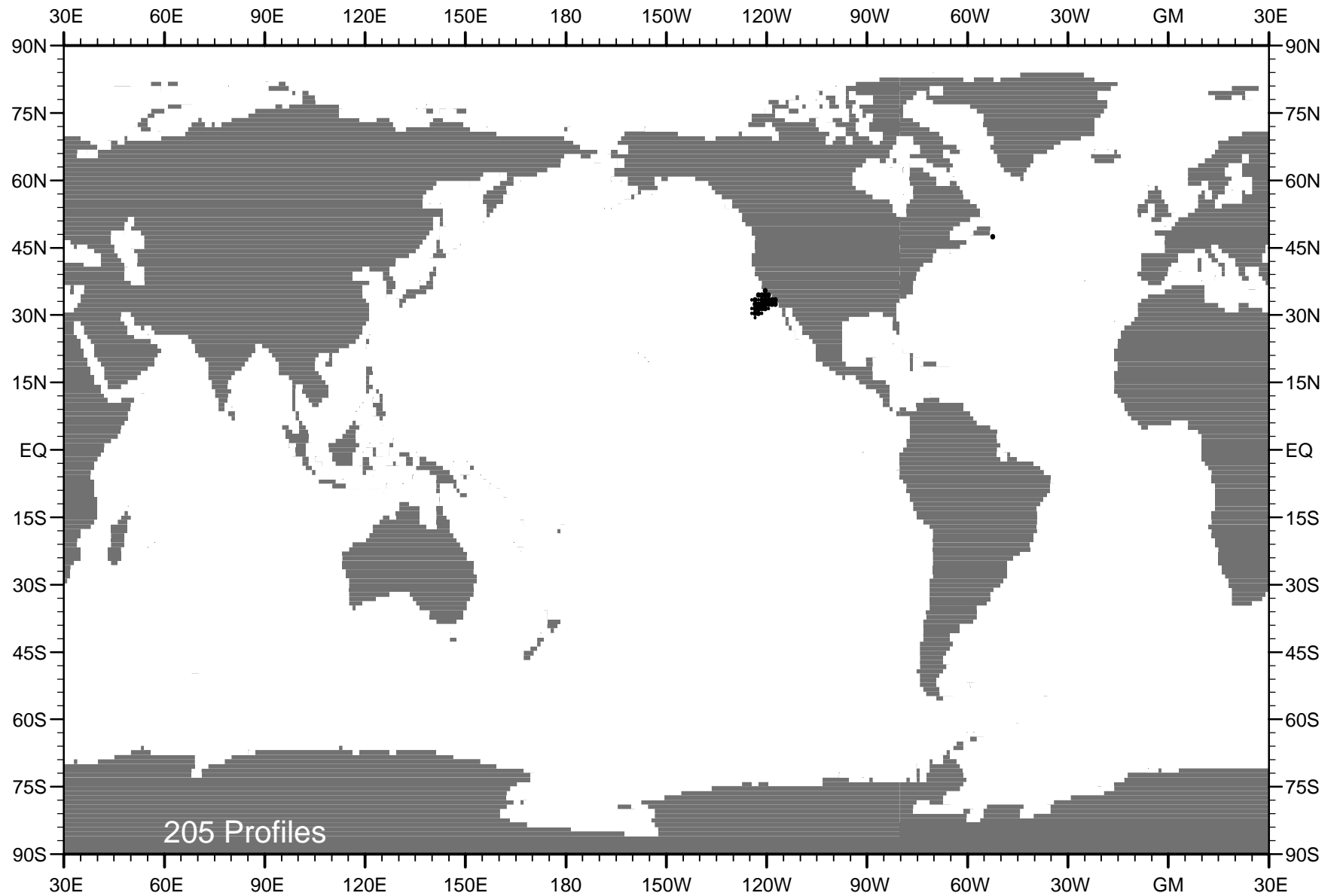


Fig. C72 Distribution of all Ocean Station Data (OSD) nitrate profiles in WOD01 for year 2000 .

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.

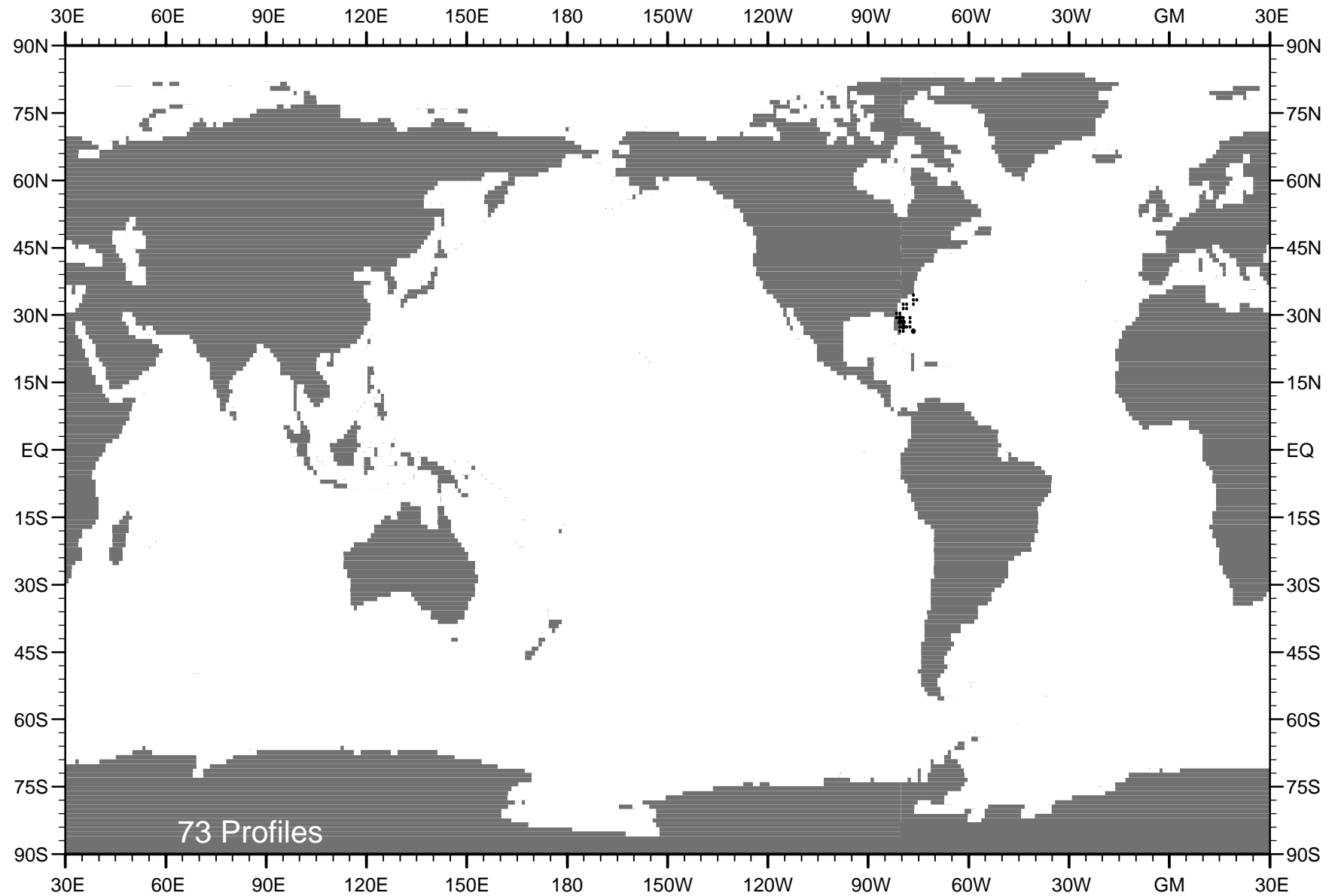


Fig. D2 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1954 .



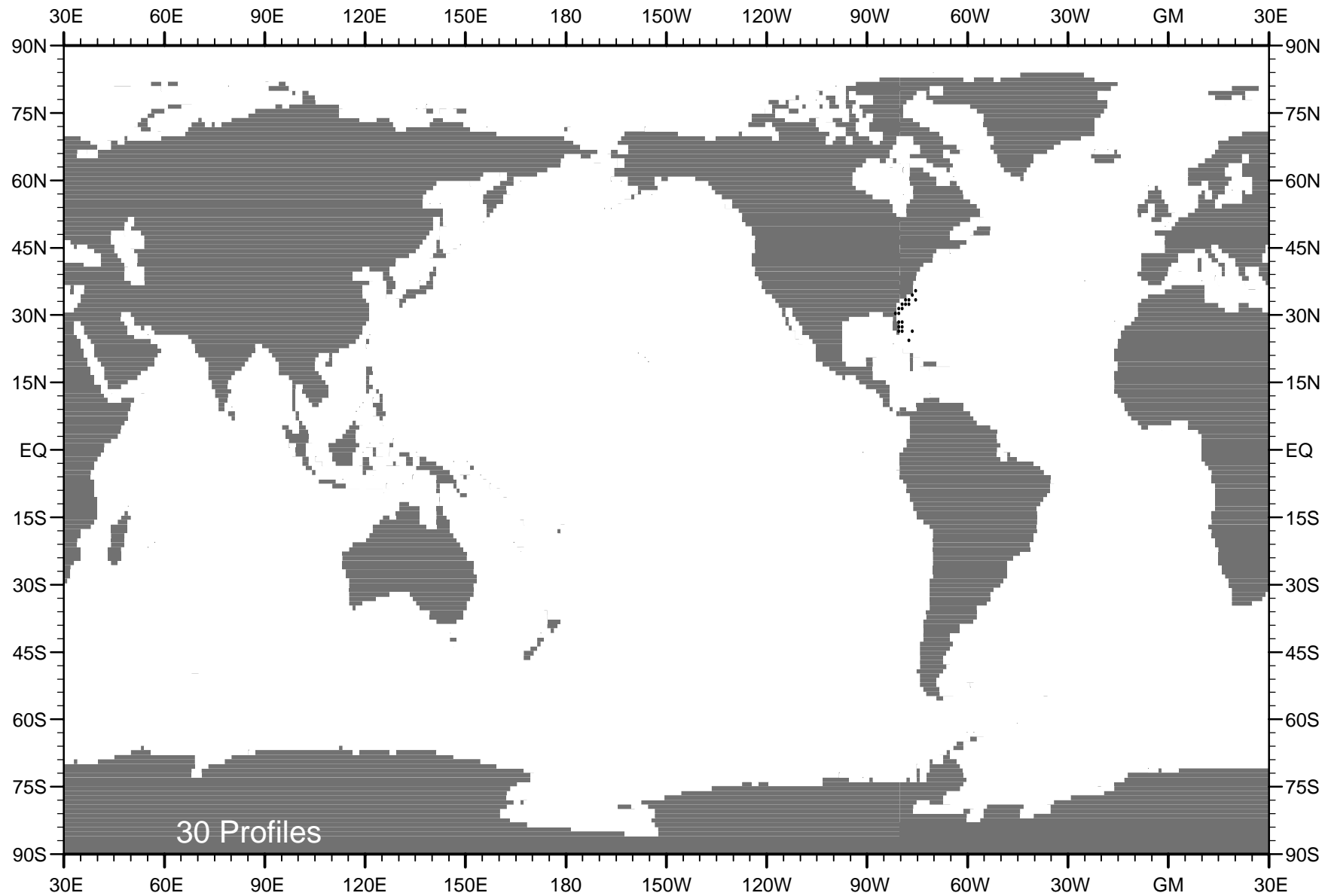


Fig. D1 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1953 .

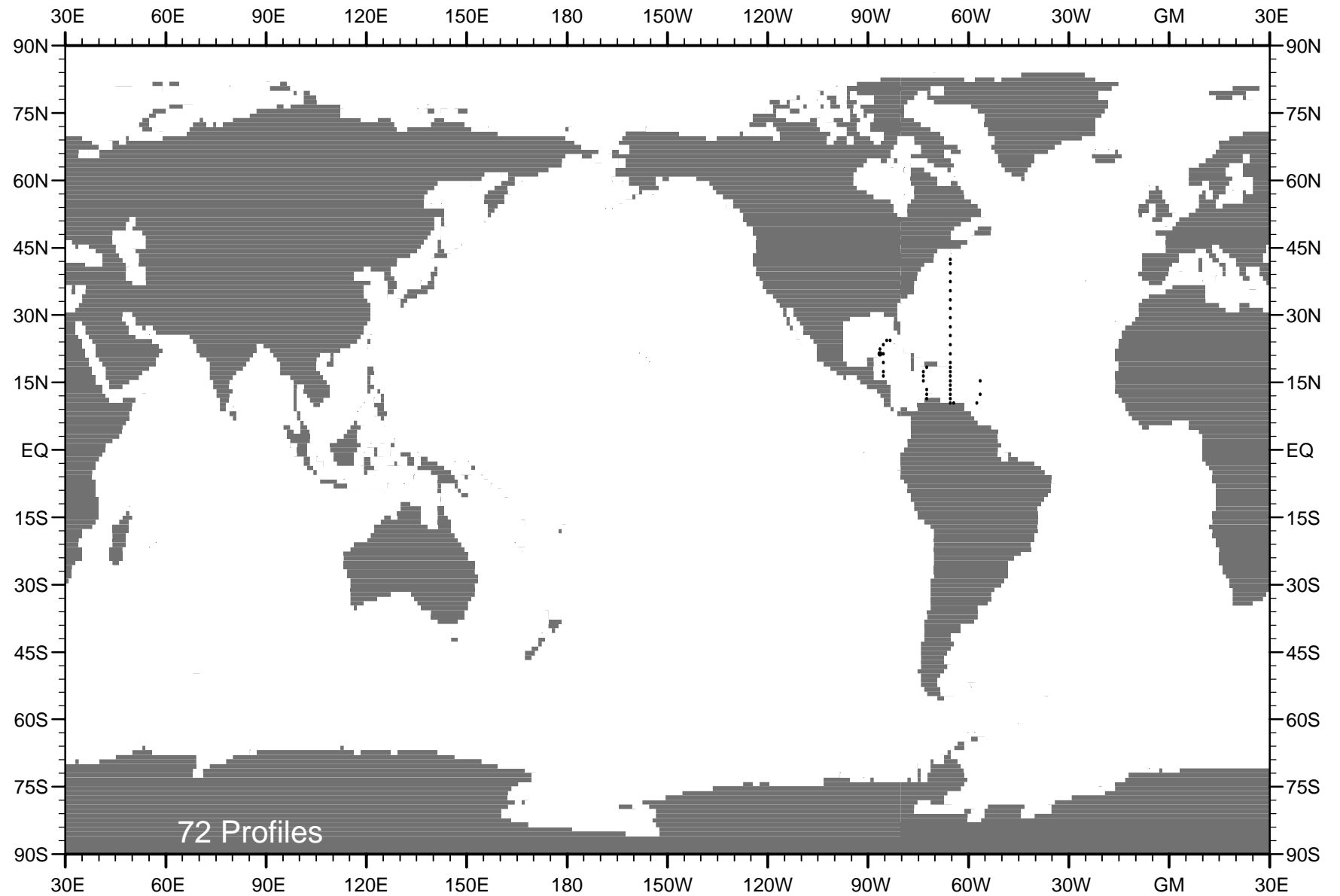


Fig. D3 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1962 .

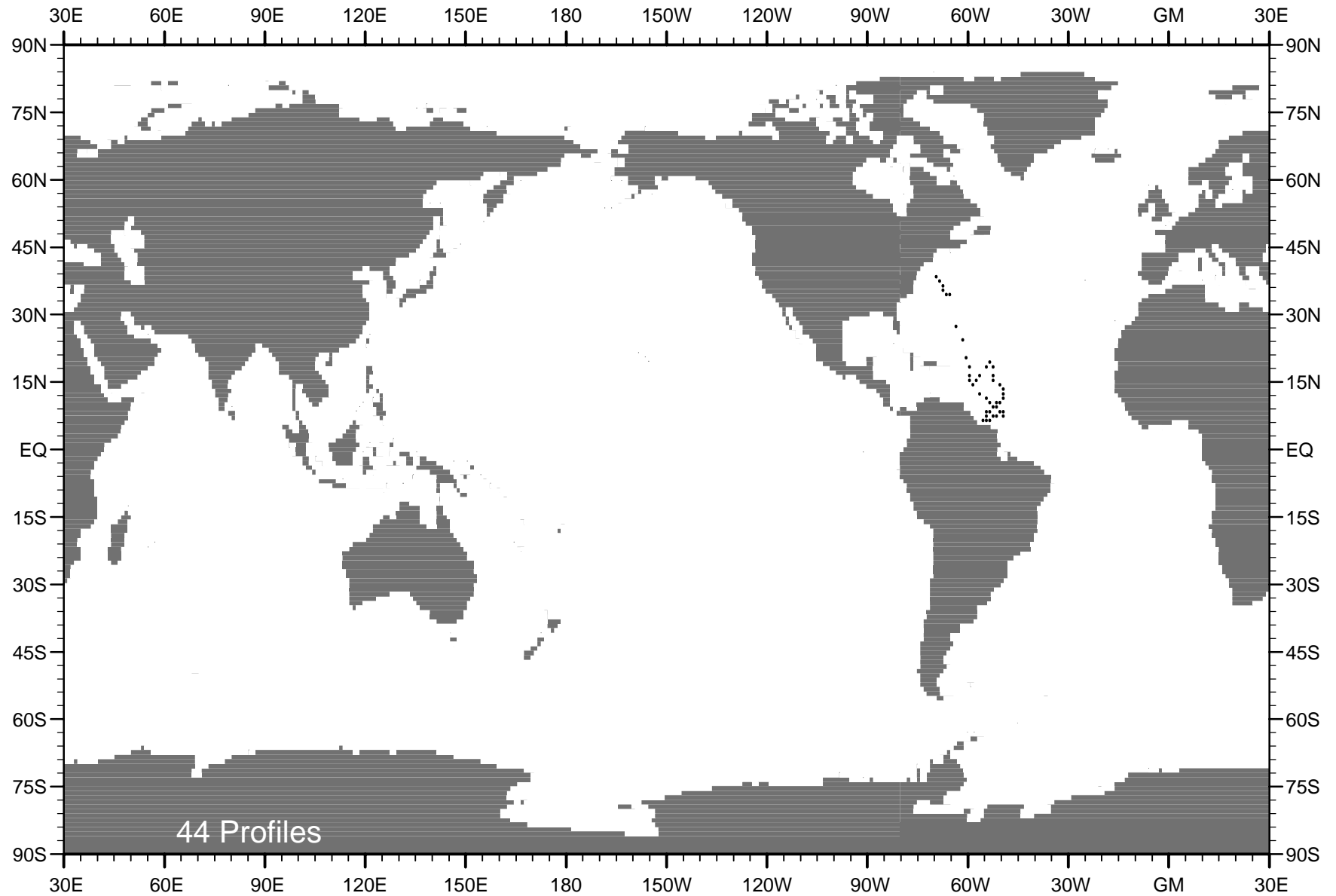


Fig. D4 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1965 .

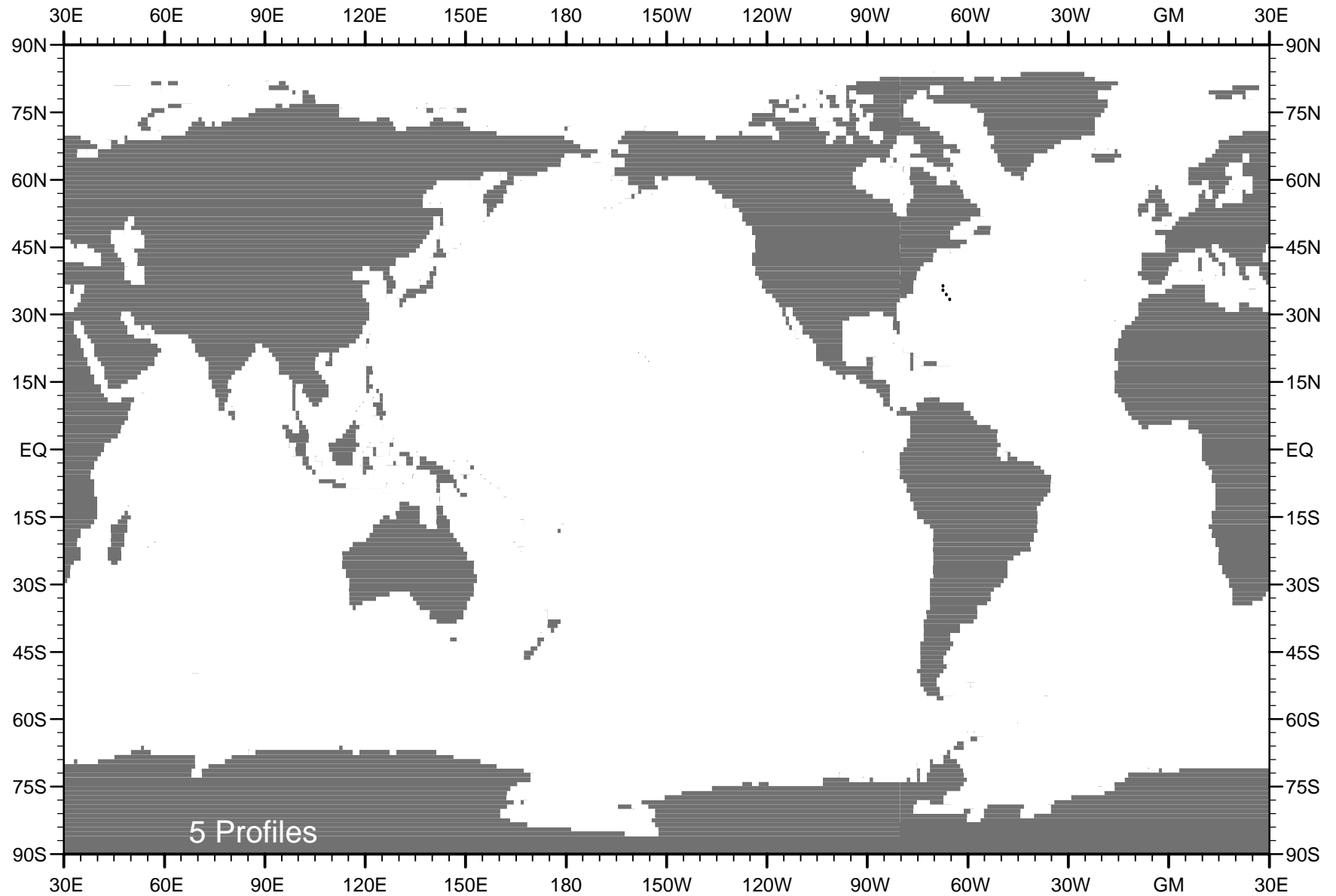


Fig. D5 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1966 .

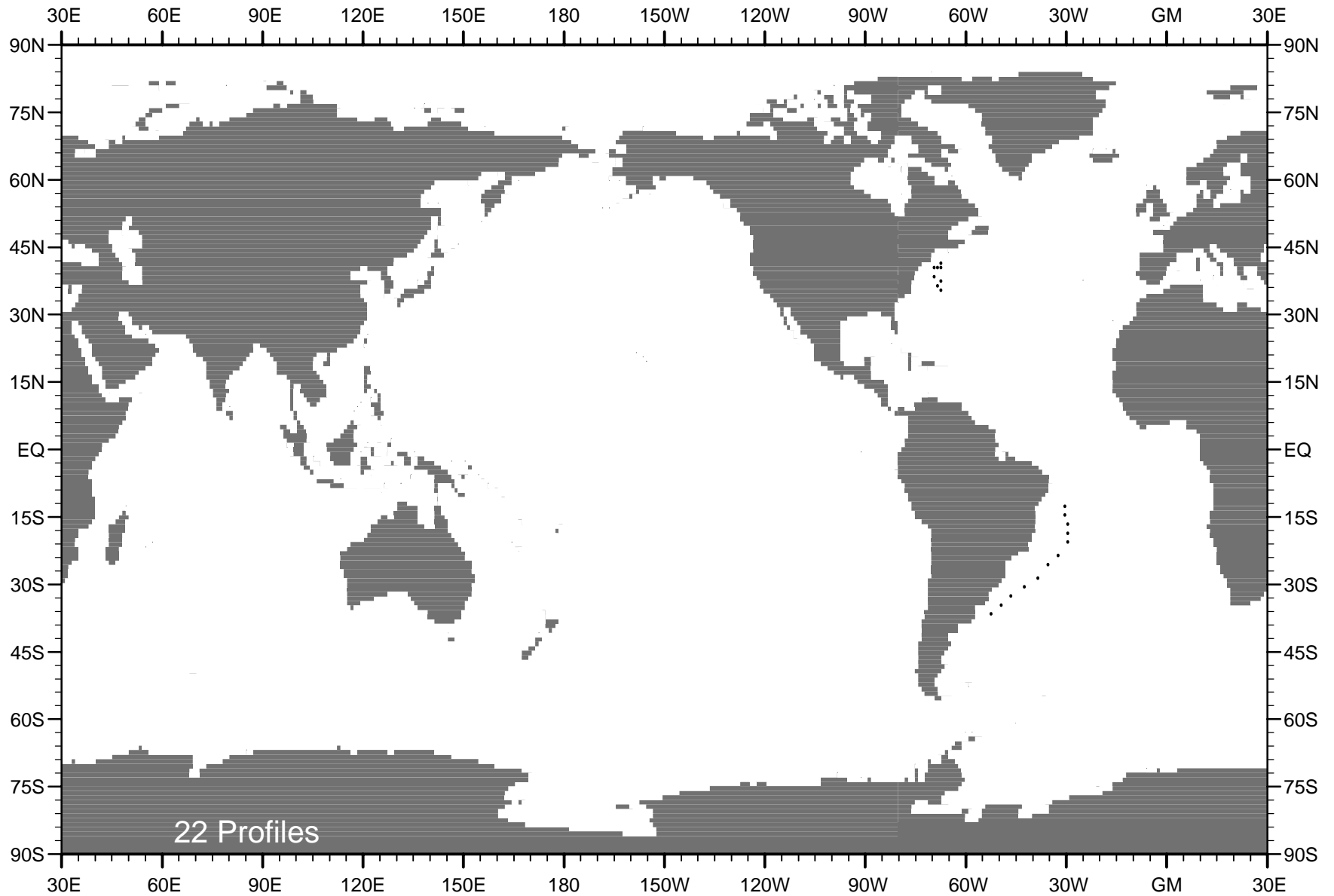


Fig. D6 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1967 .

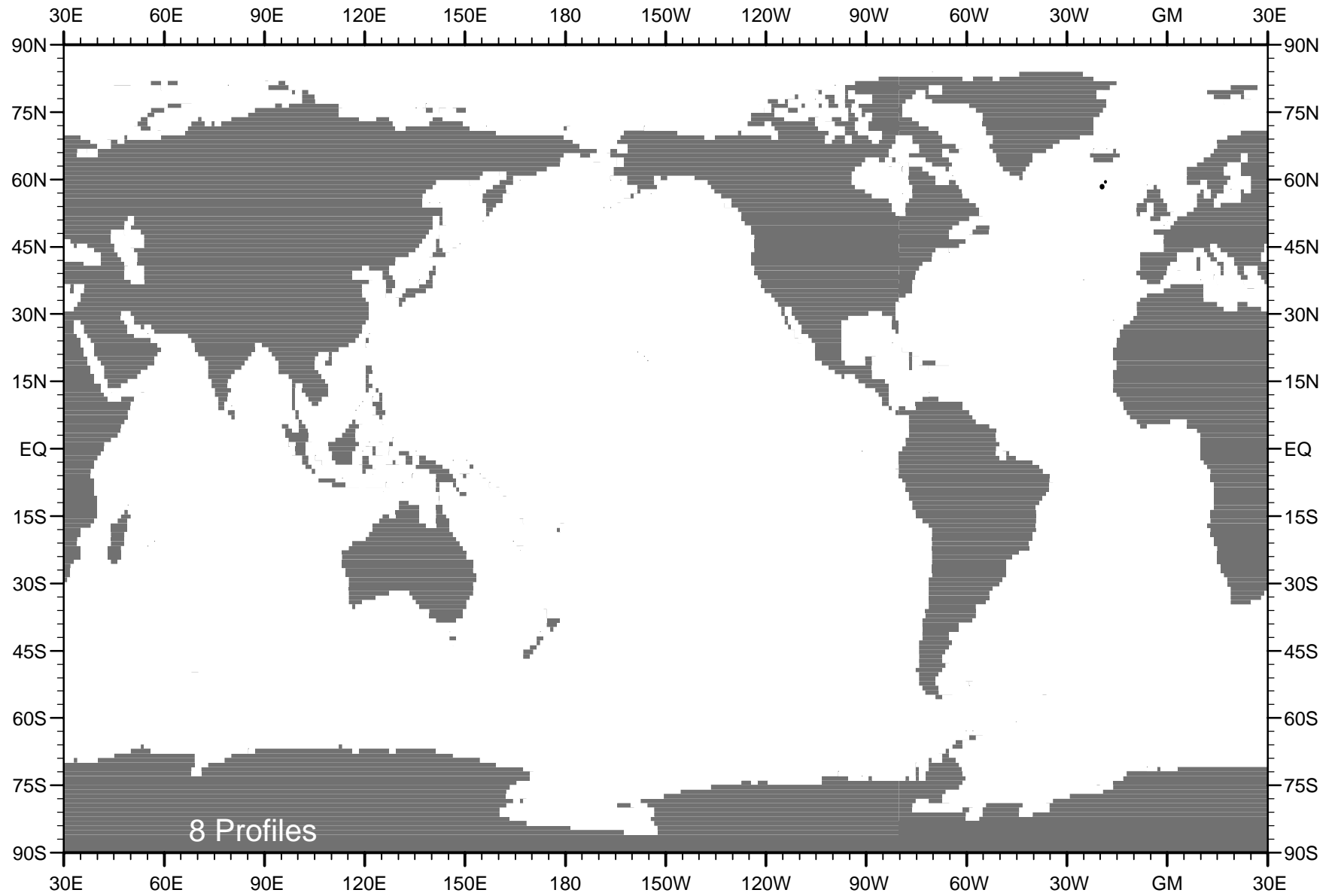


Fig. D7 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1971 .

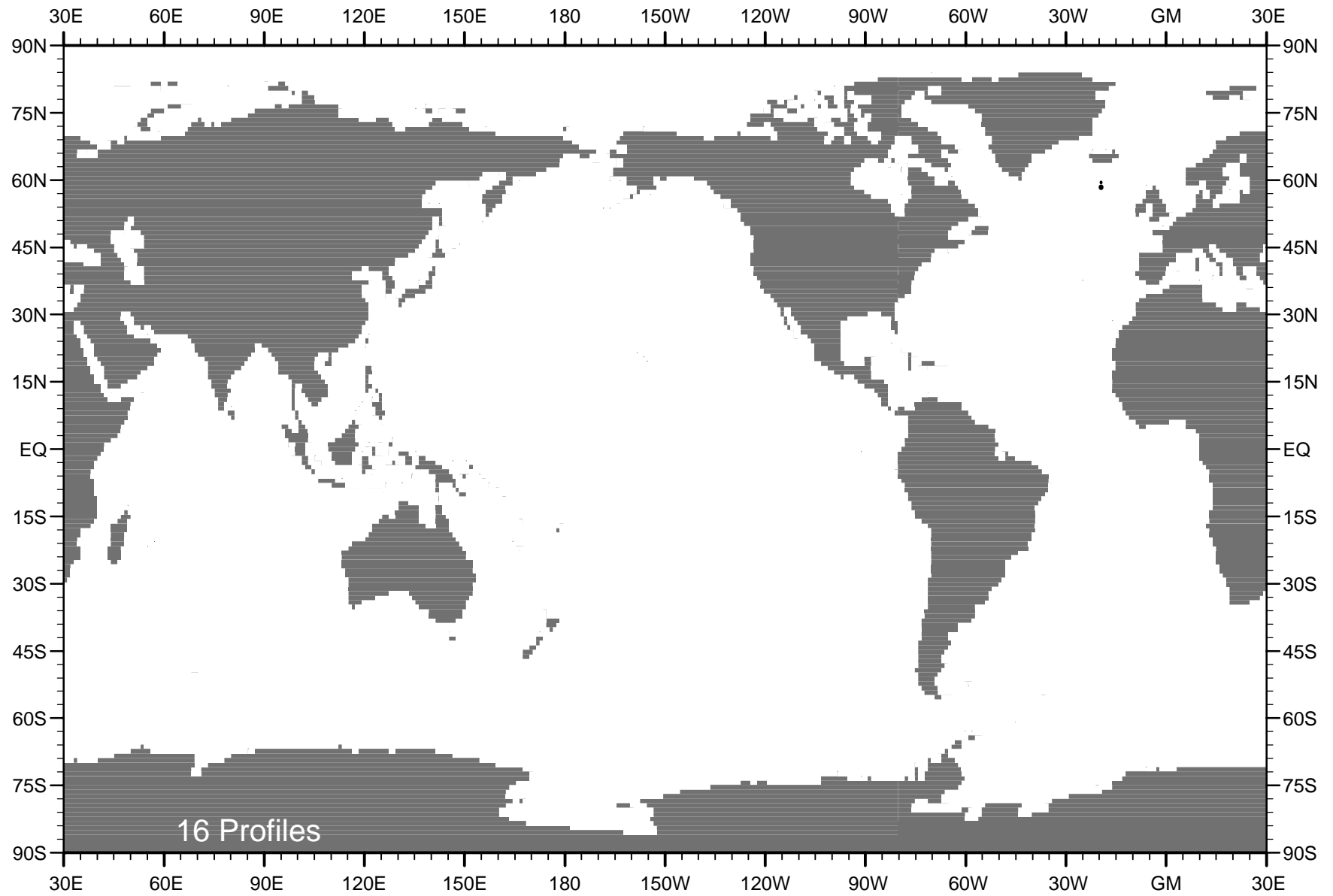


Fig. D8 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1972 .

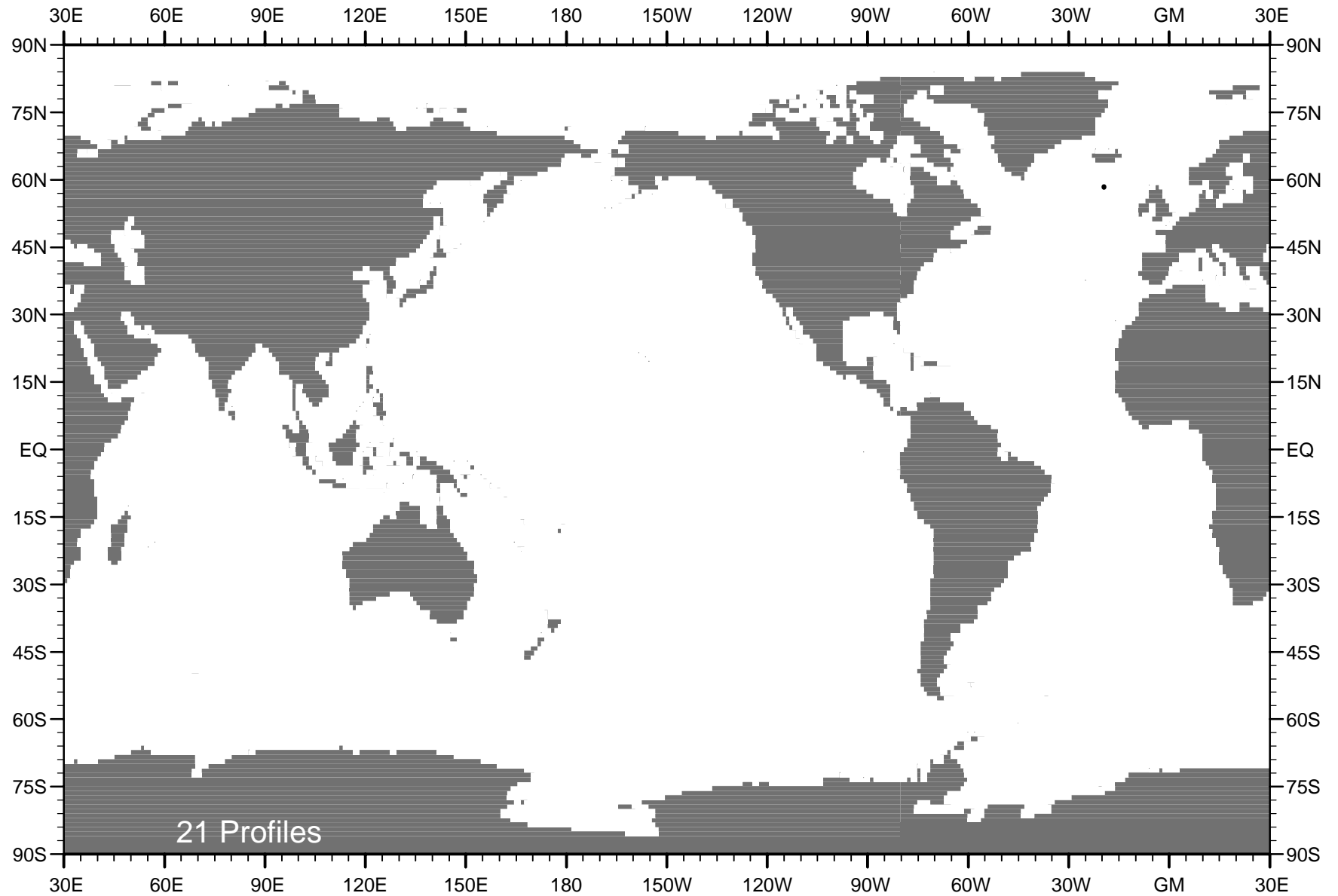


Fig. D9 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1973 .



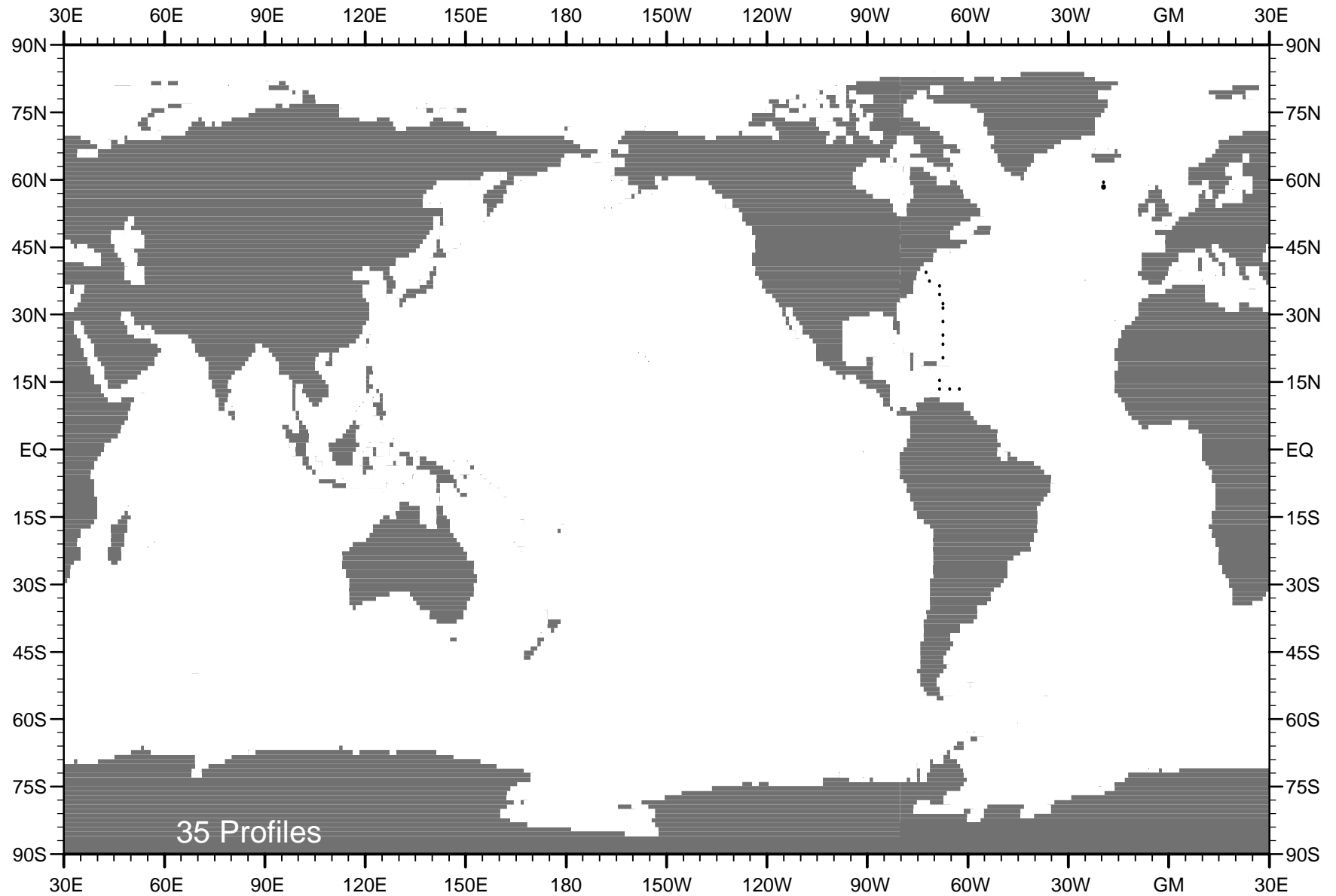


Fig. D10 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1974 .

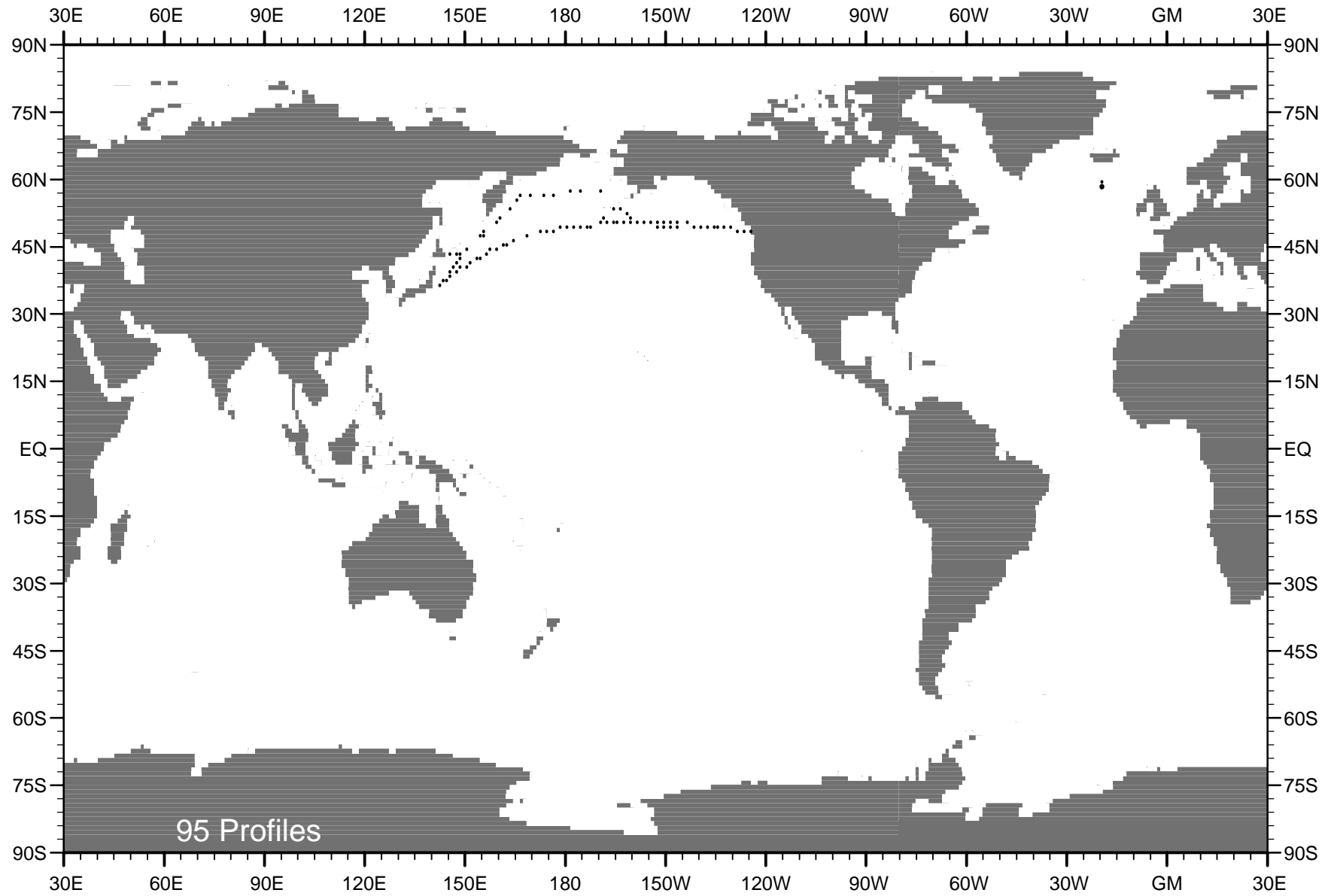


Fig. D11 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1975 .

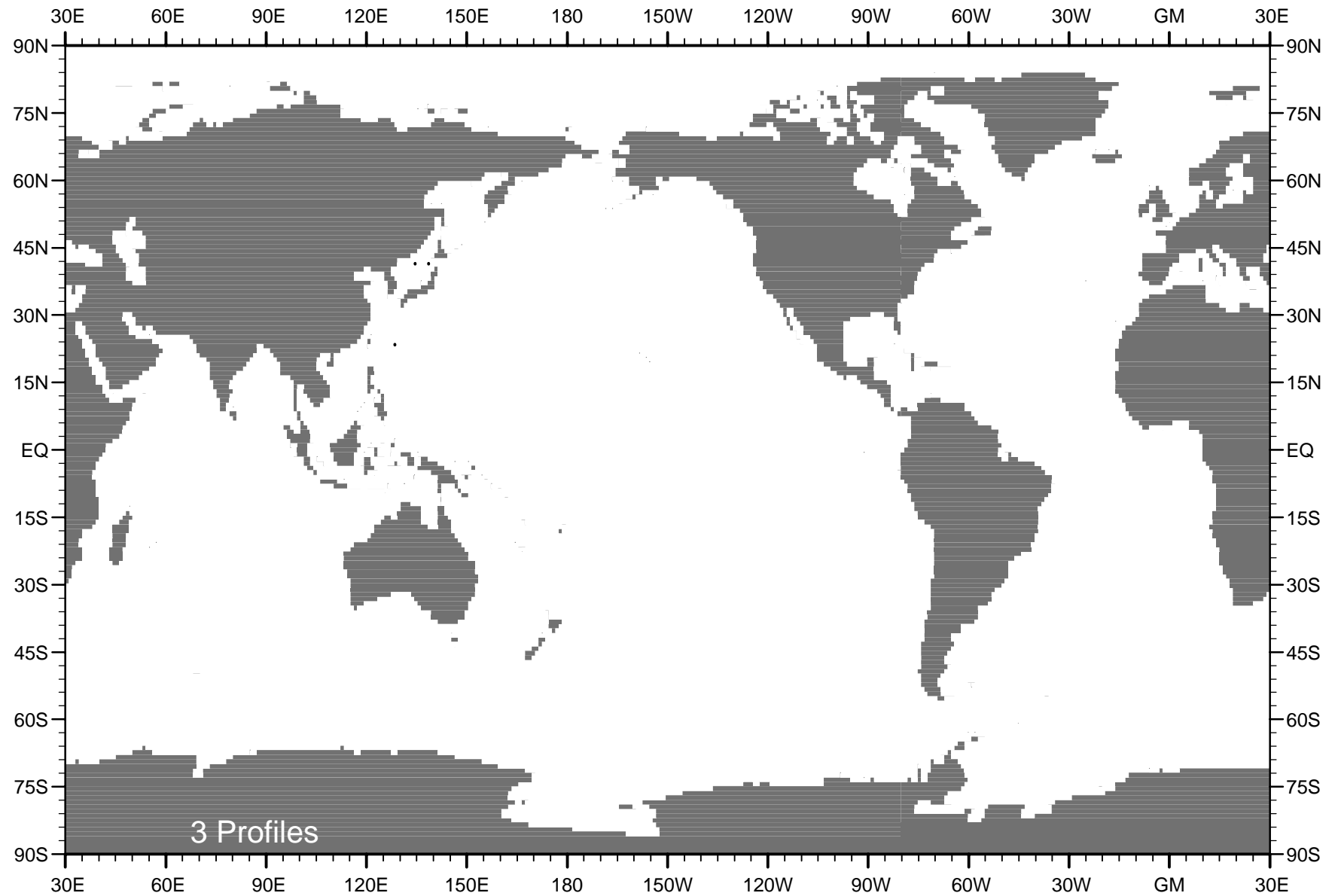


Fig. D12 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1976 .

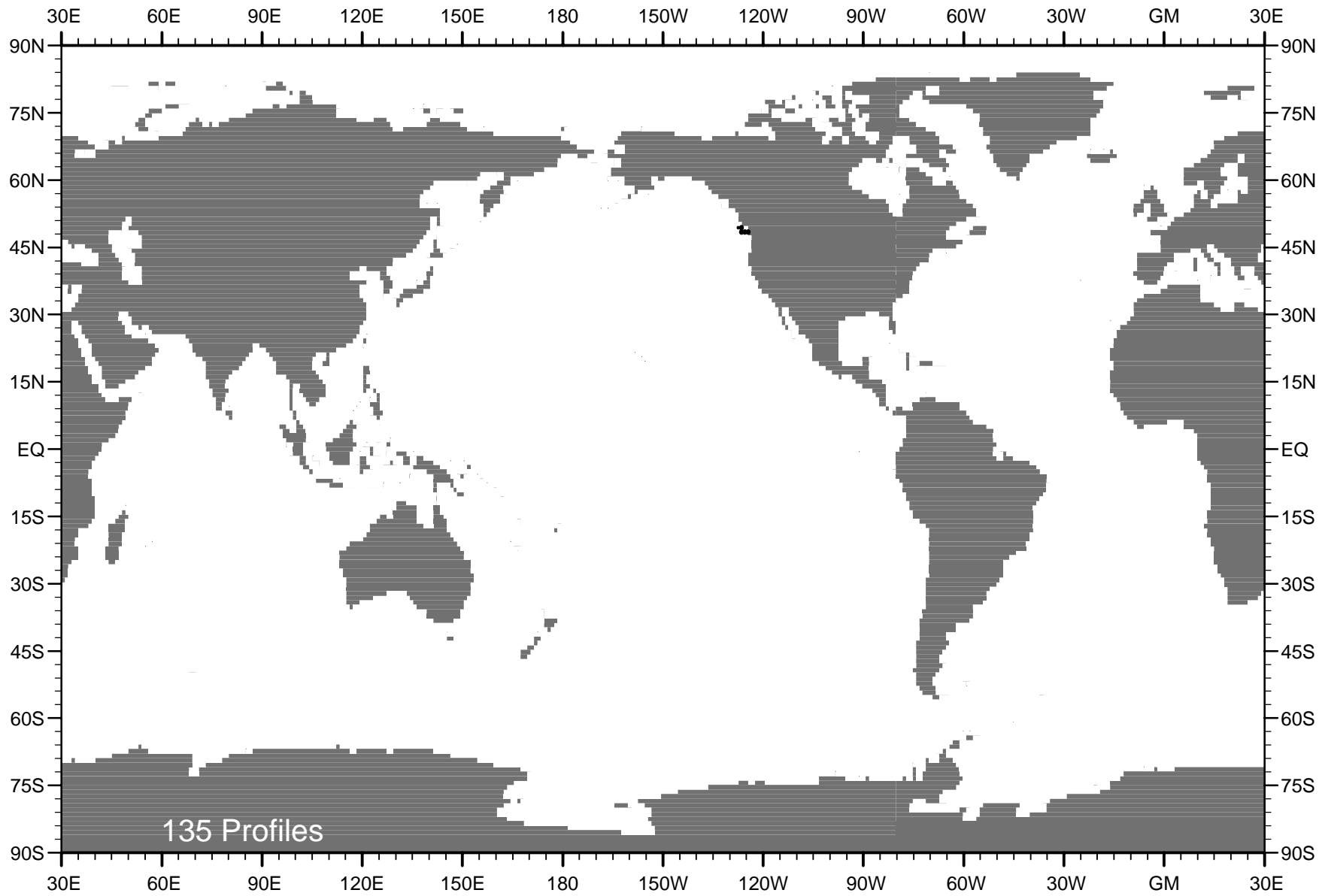


Fig. D13 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1979 .

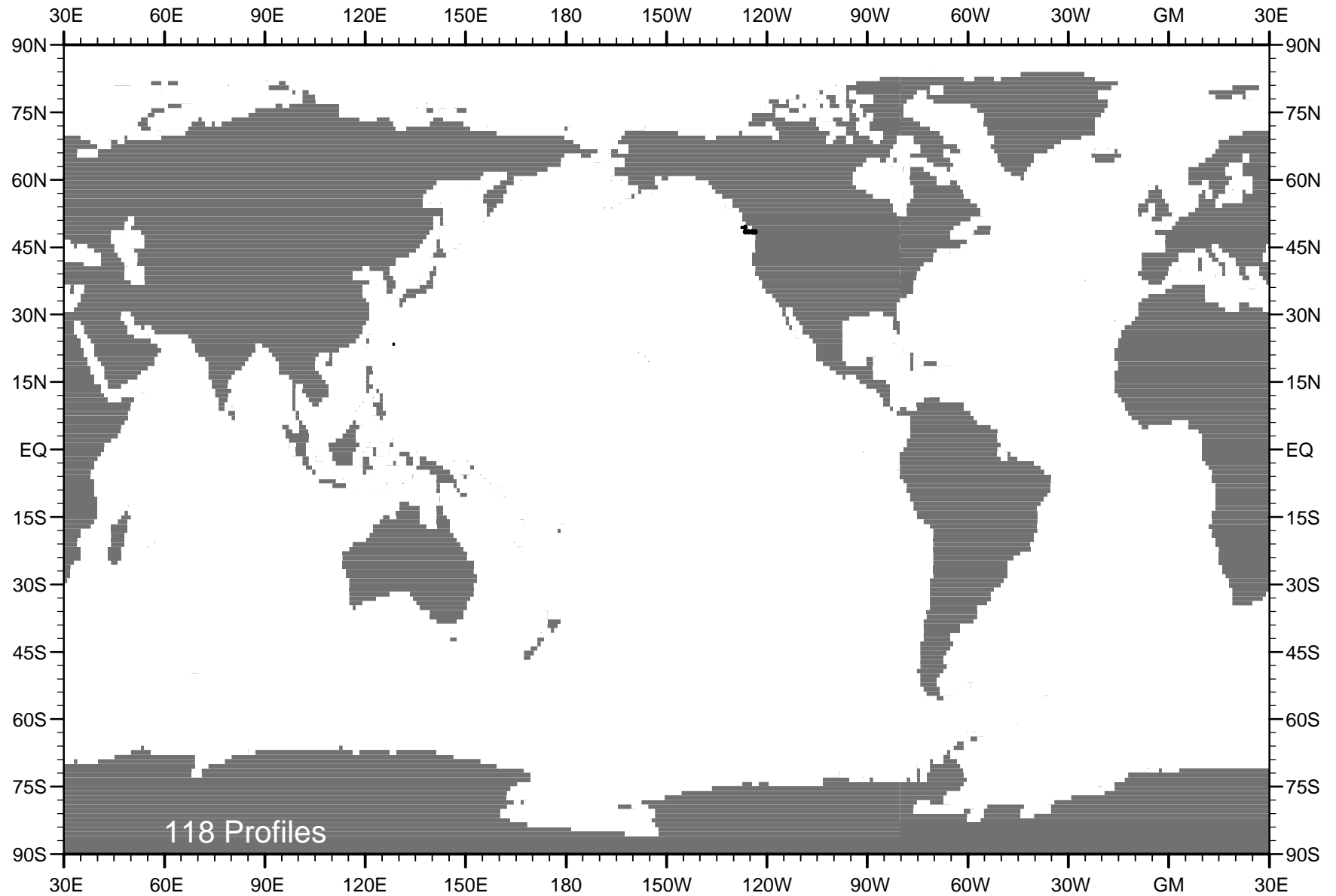


Fig. D14 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1980 .

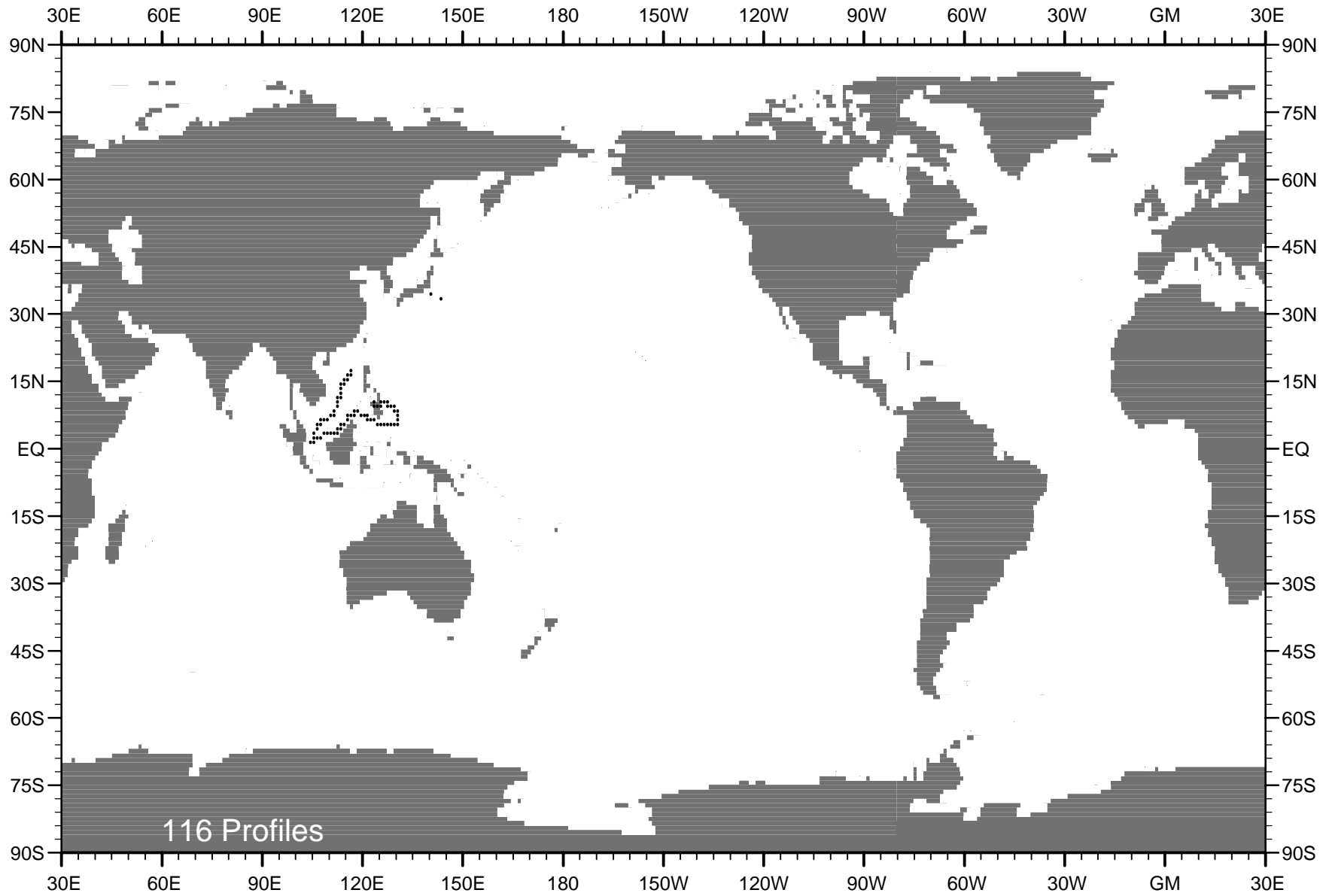


Fig. D15 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1981 .

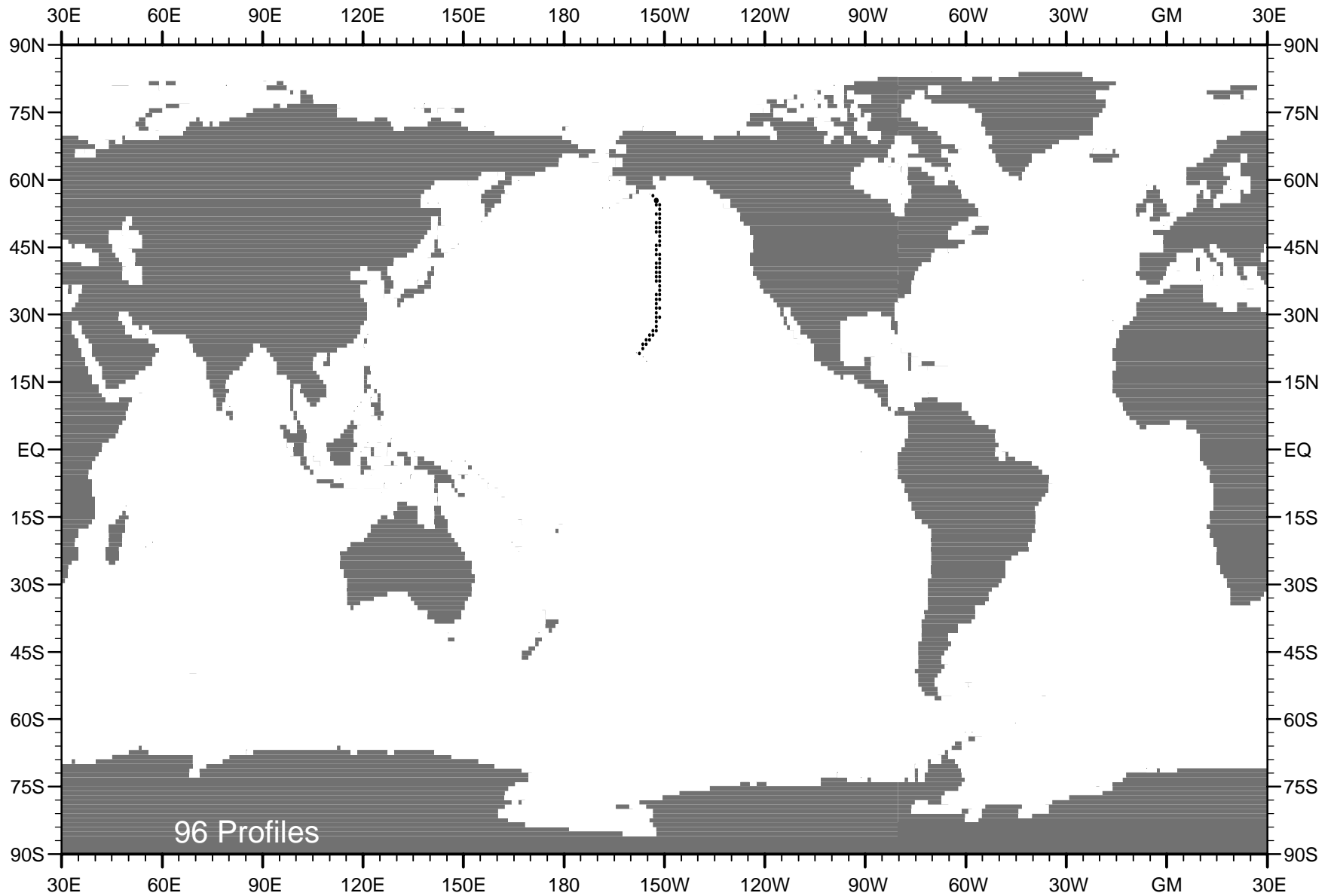


Fig. D16 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1984 .

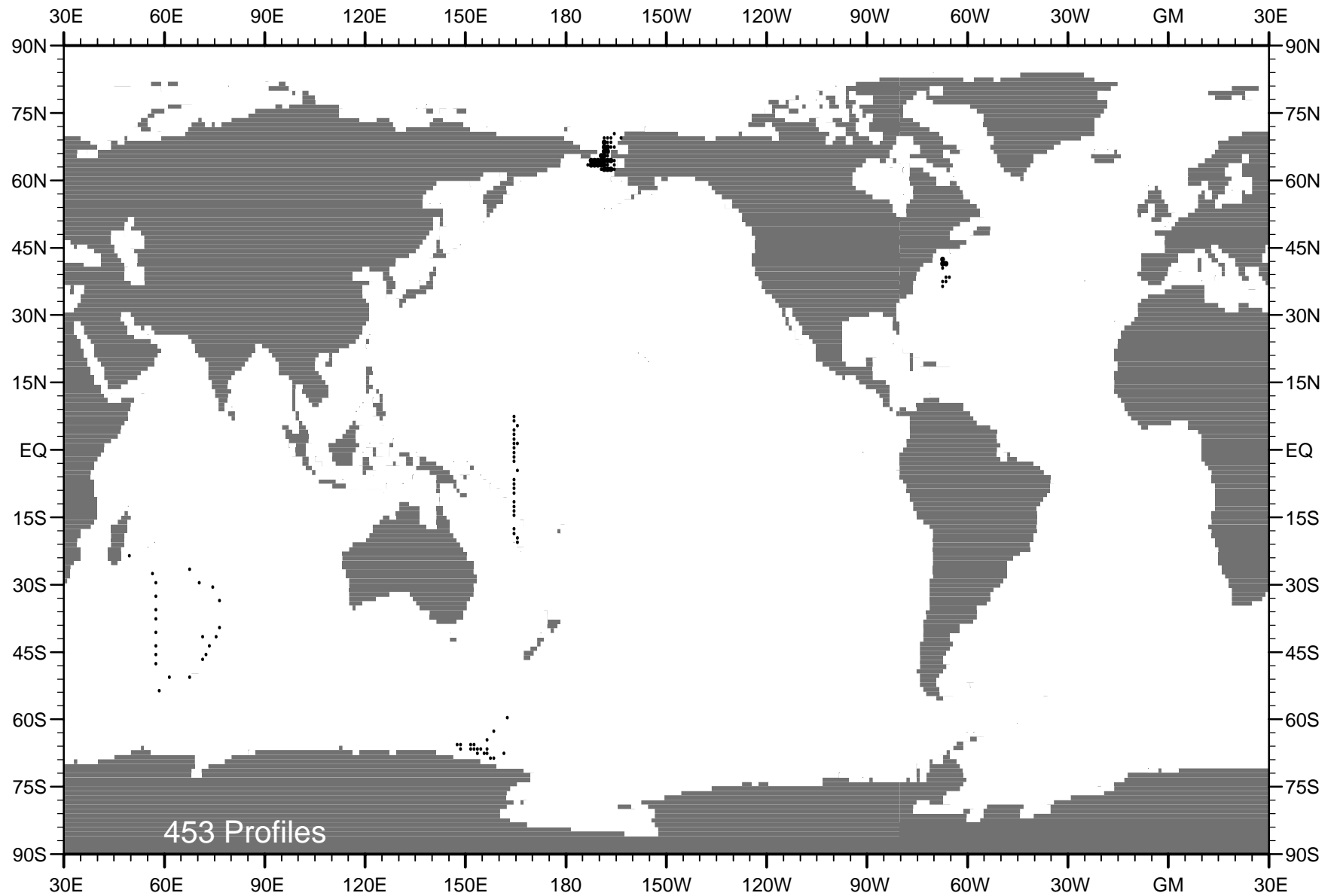


Fig. D17 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1985 .



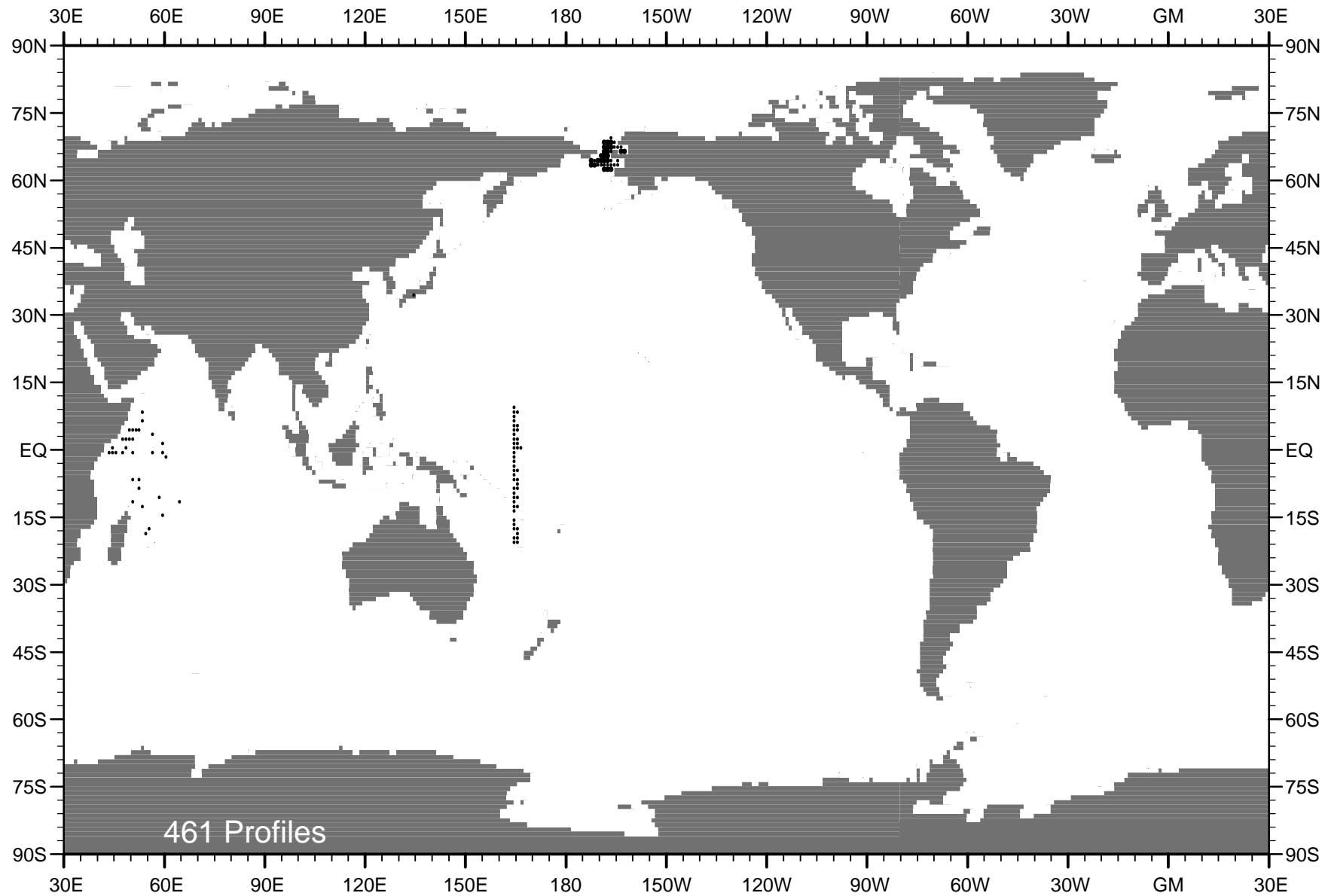


Fig. D18 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1986 .

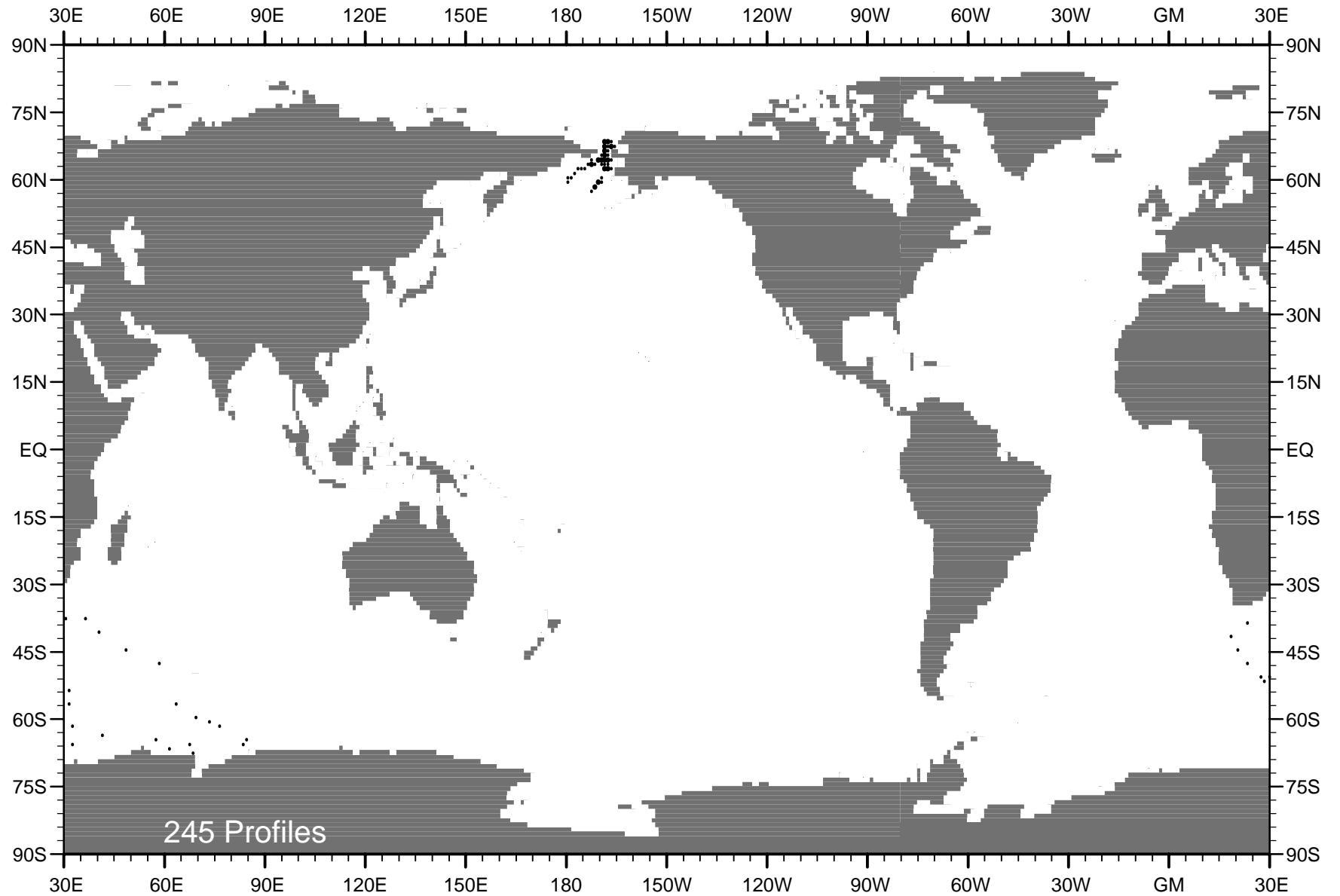


Fig. D19 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1987 .

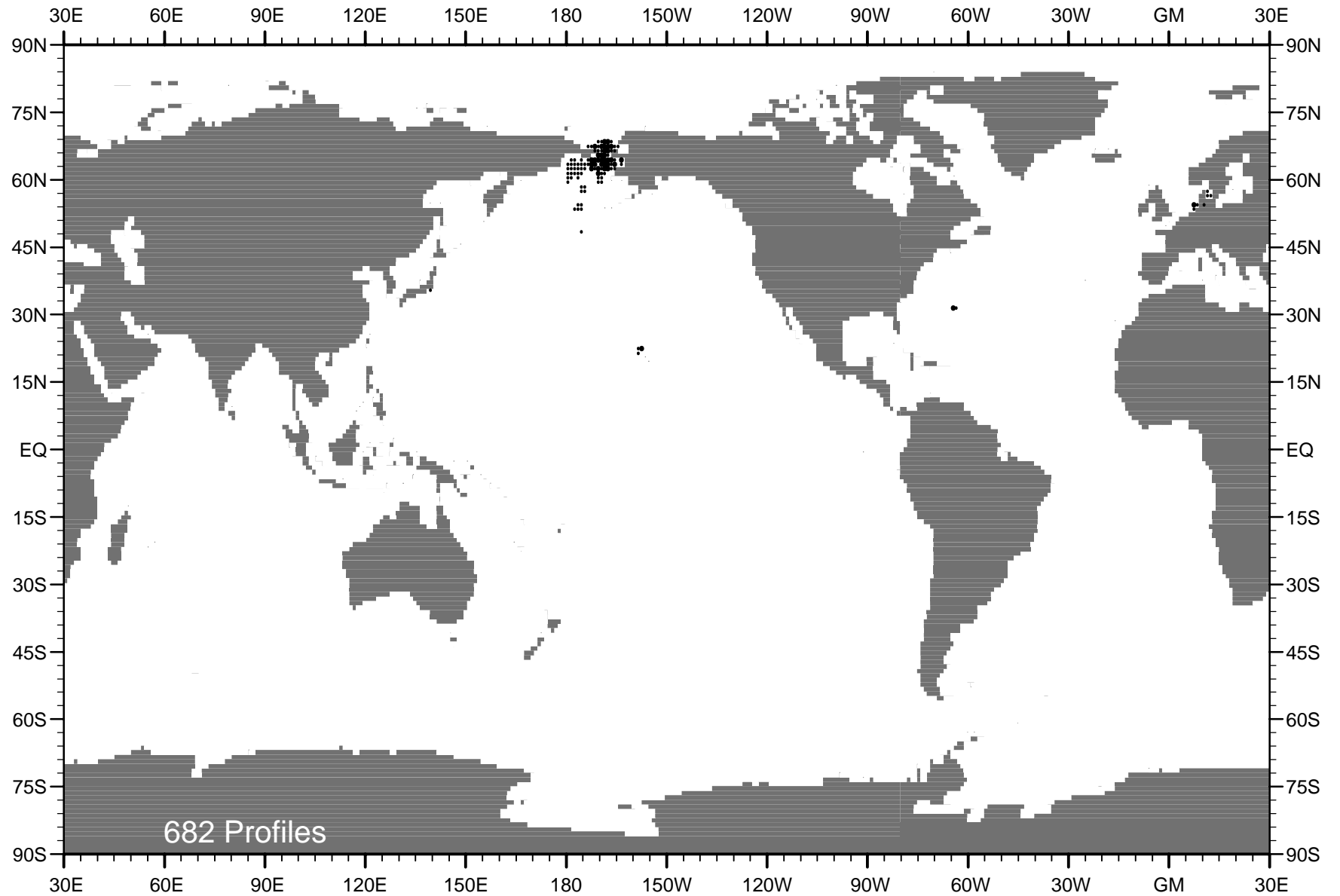


Fig. D20 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1988 .

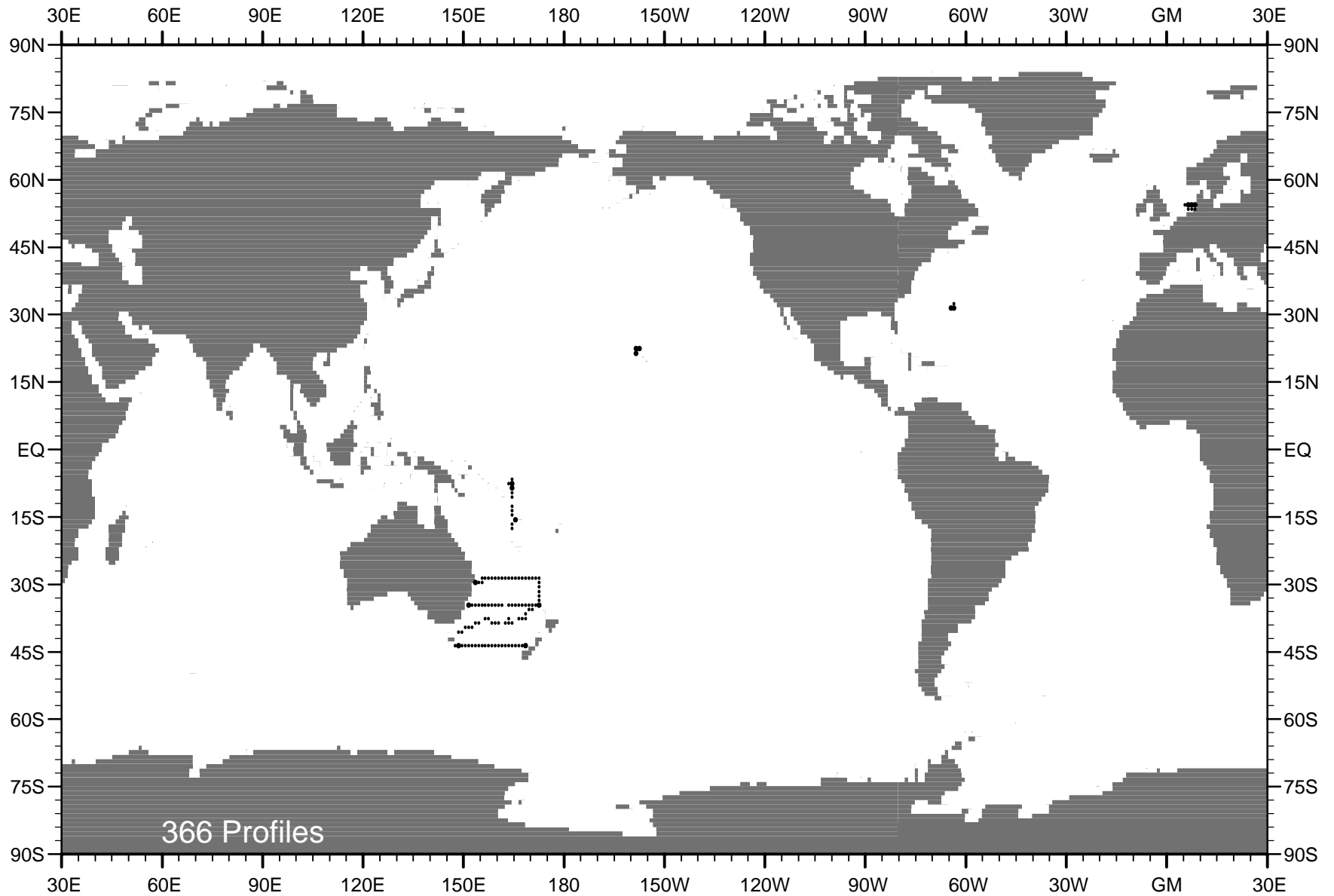


Fig. D21 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1989 .

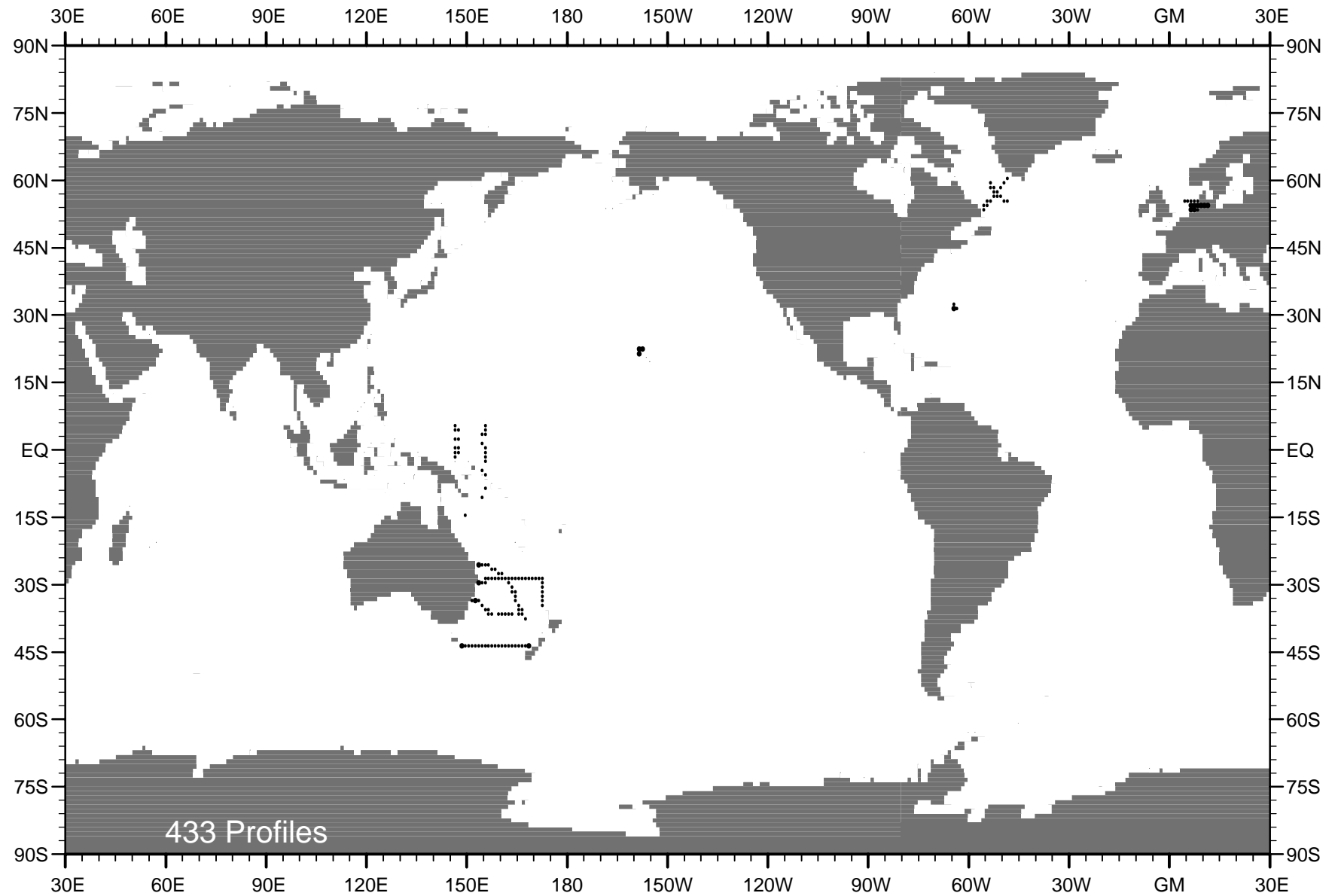


Fig. D22 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1990 .

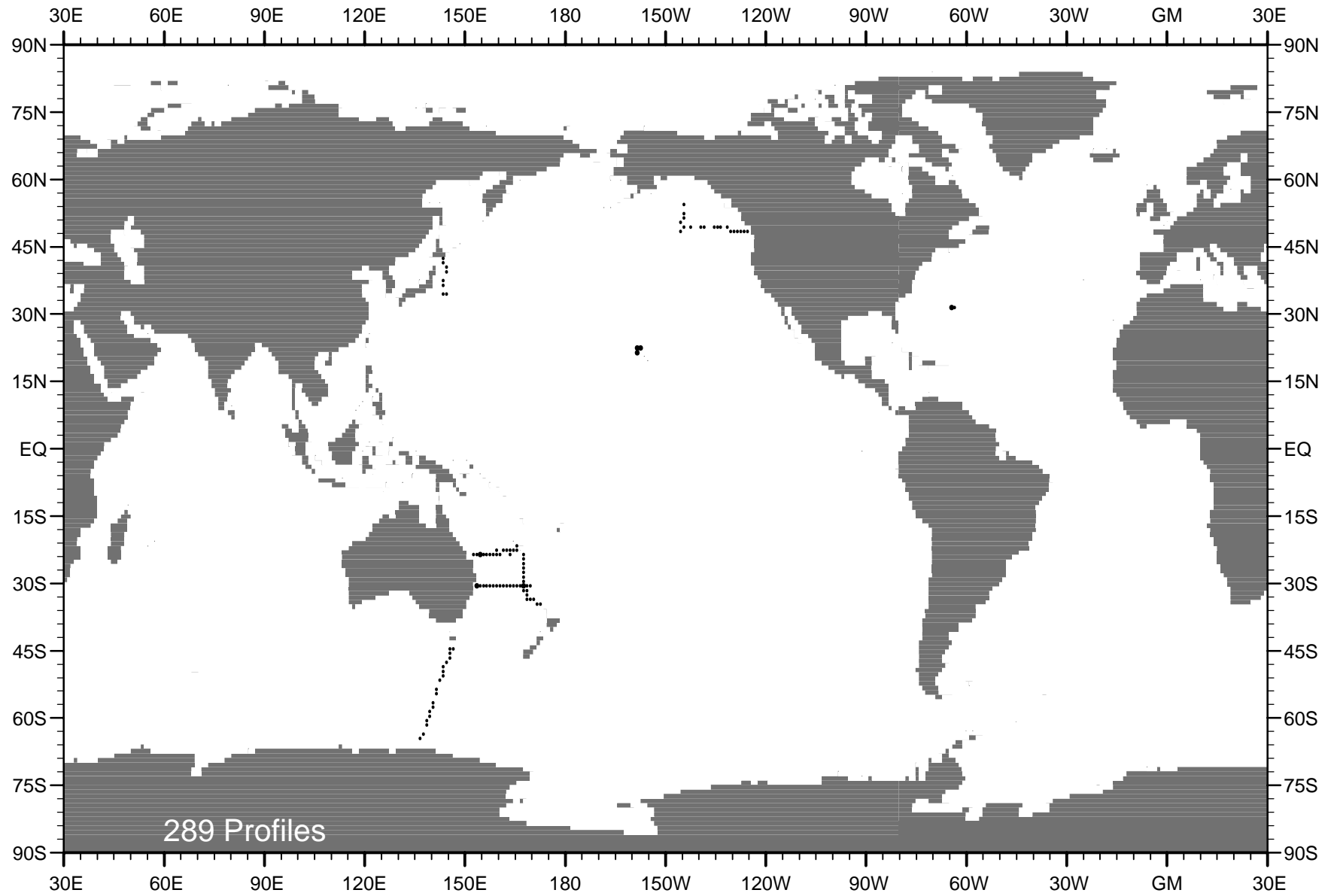


Fig. D23 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1991 .

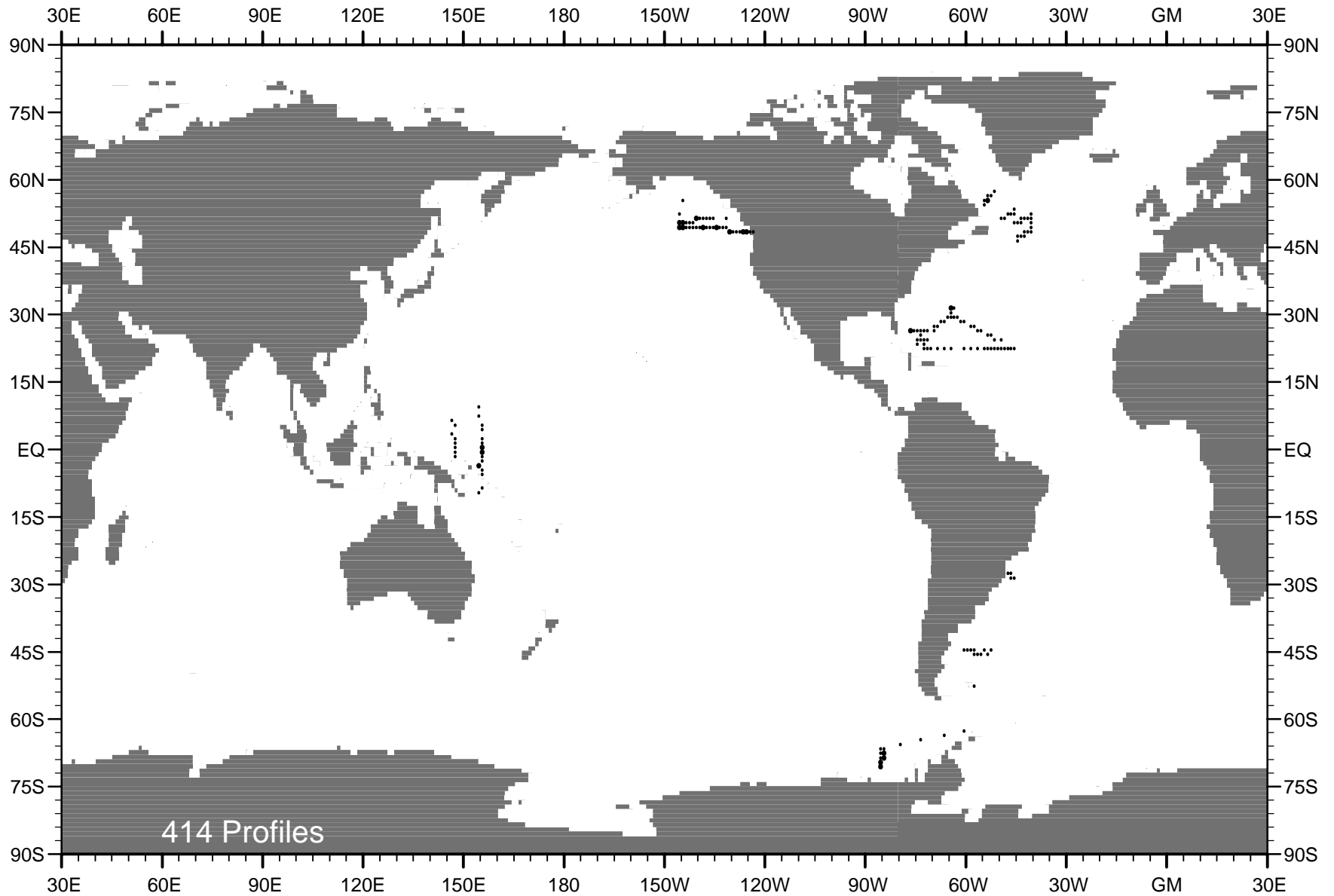


Fig. D24 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1992 .

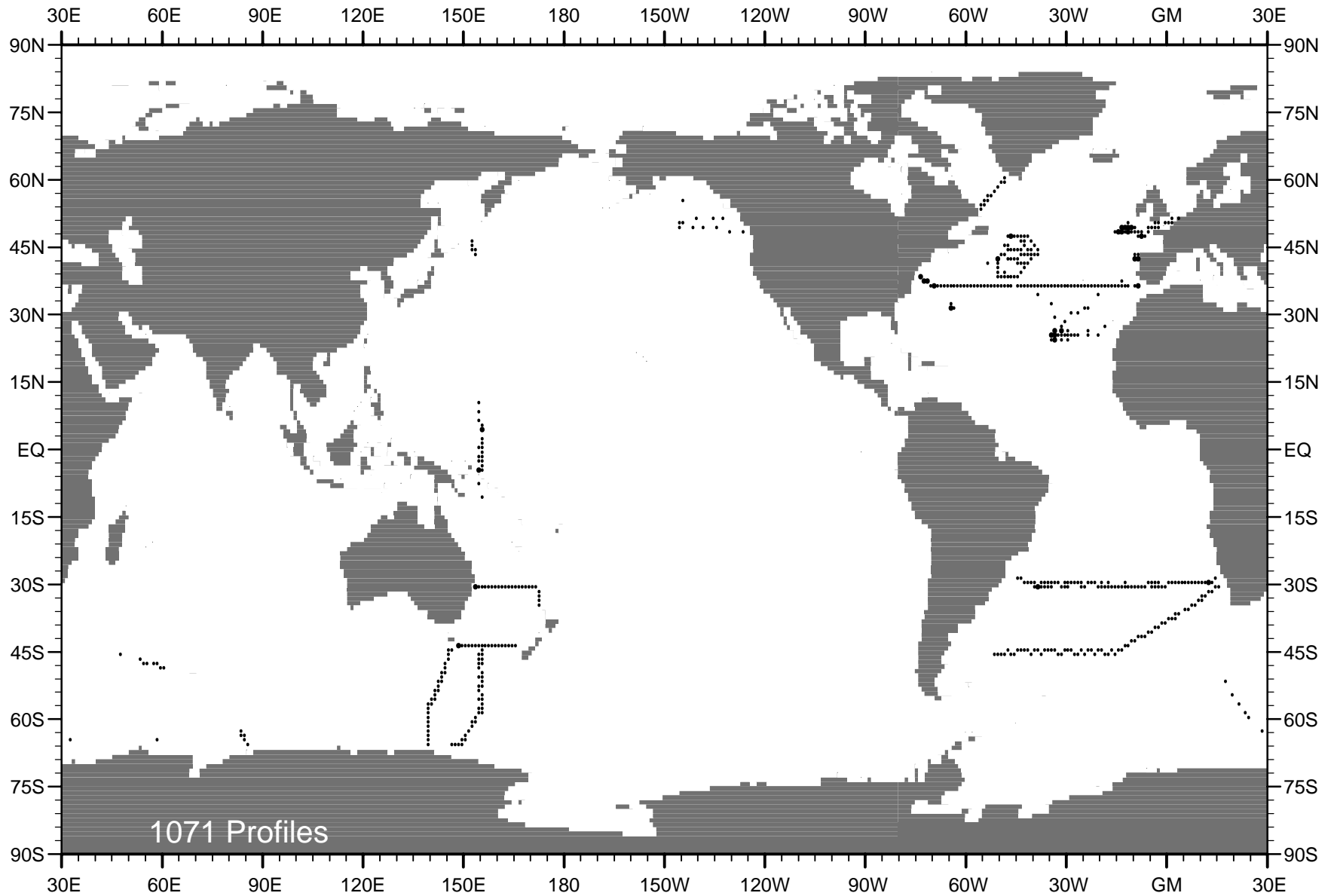


Fig. D25 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1993 .



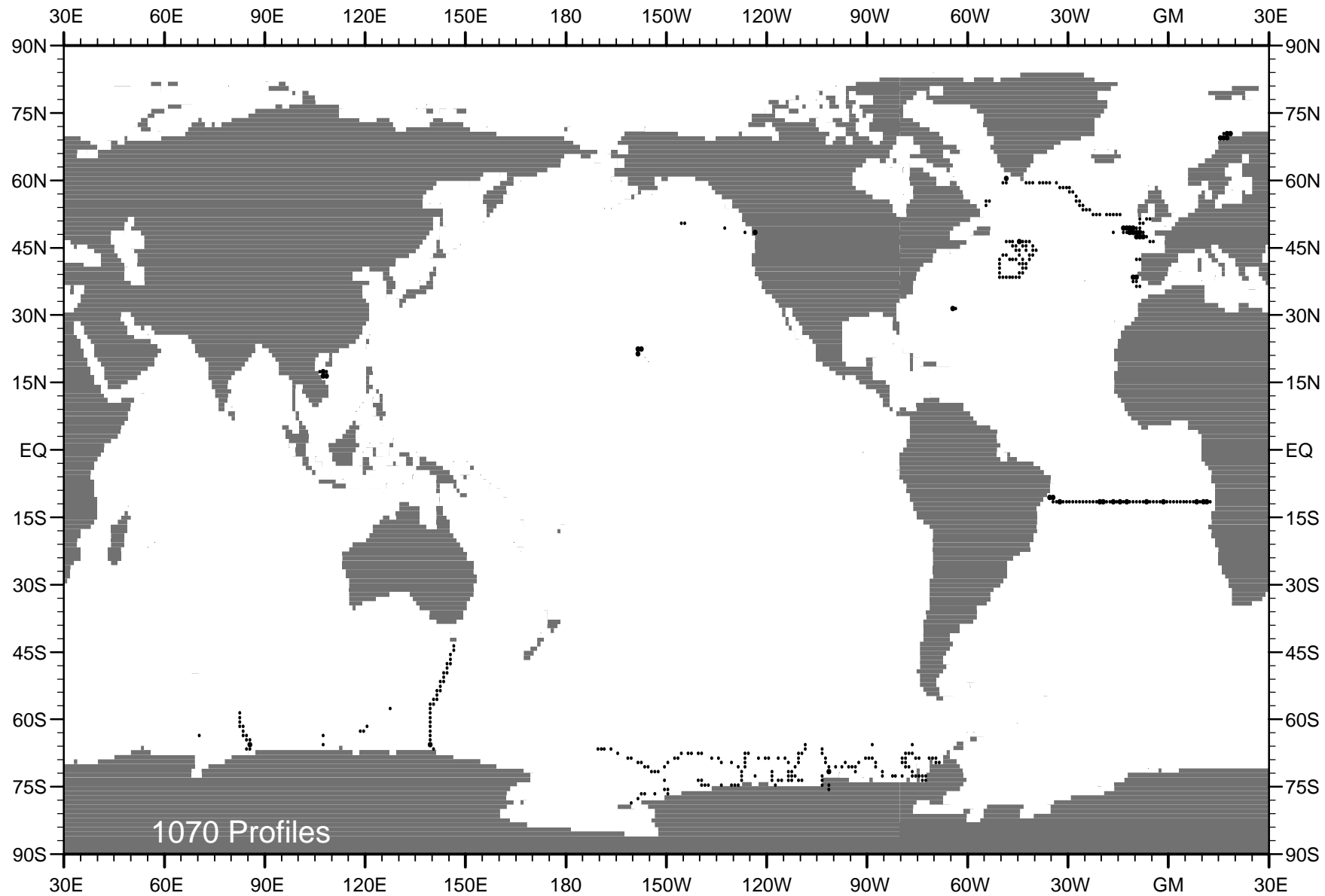


Fig. D26 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1994 .

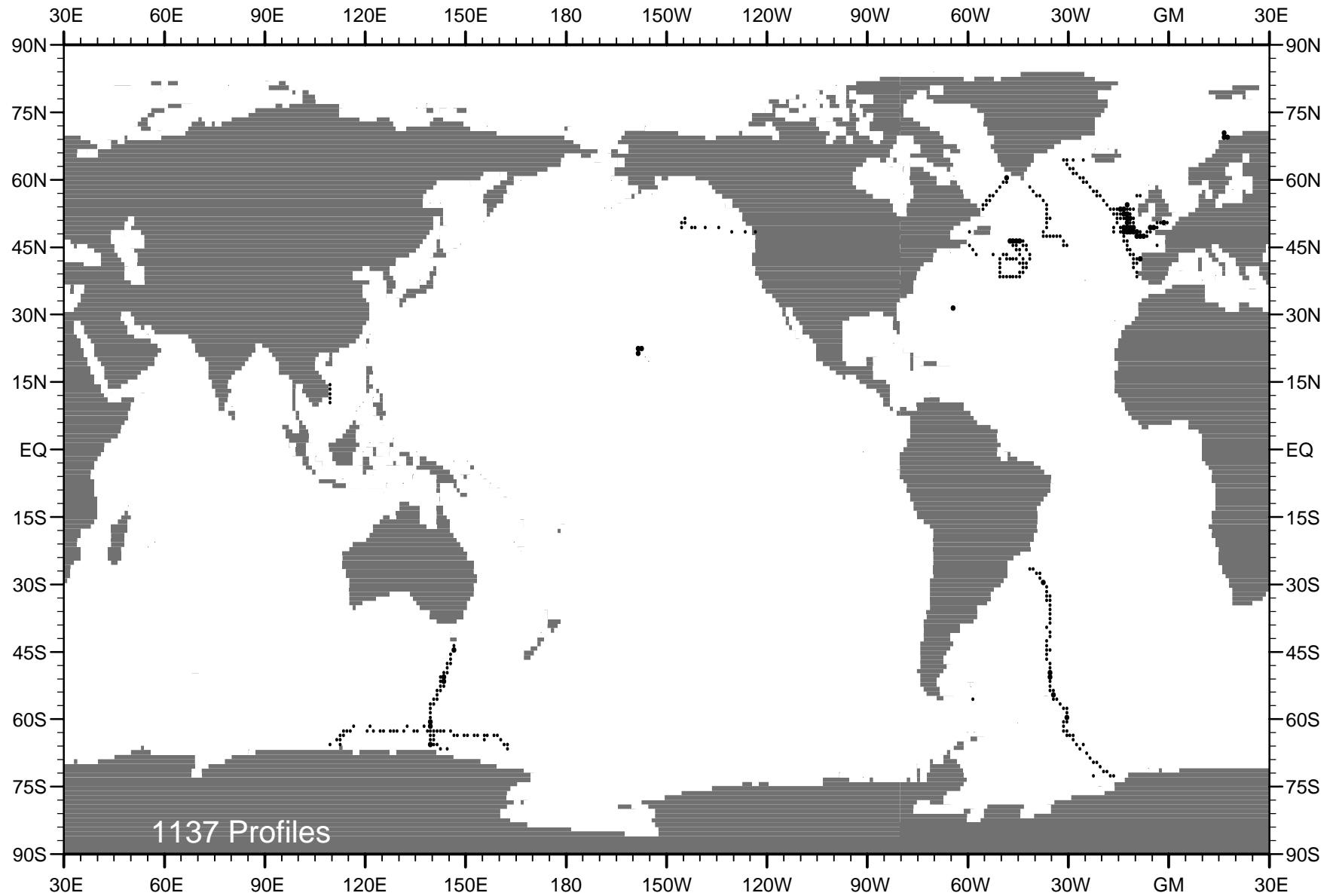


Fig. D27 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1995 .

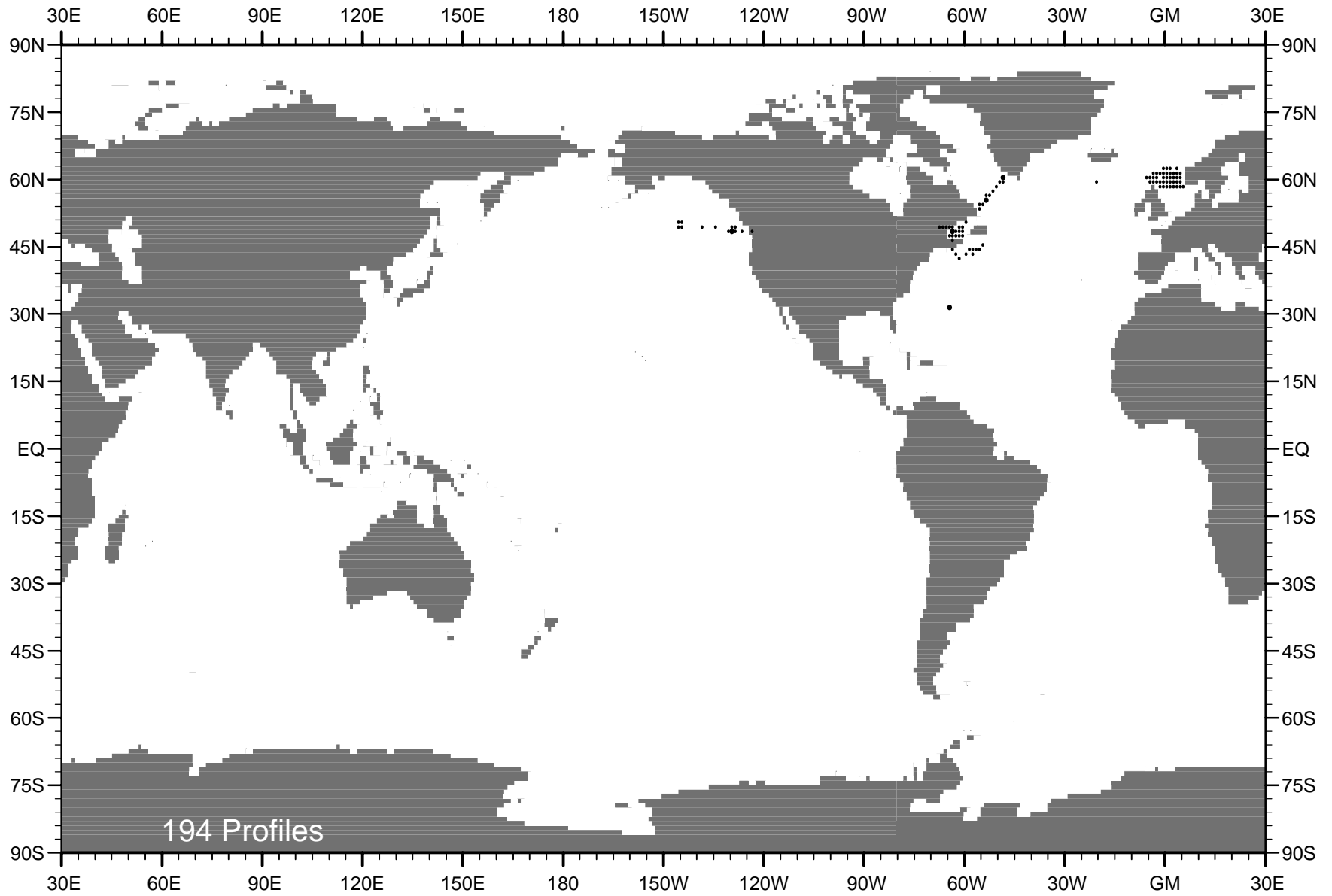


Fig. D28 Distribution of all Ocean Station Data (OSD) nitrate+nitrite profiles in WOD01 for year 1996 .