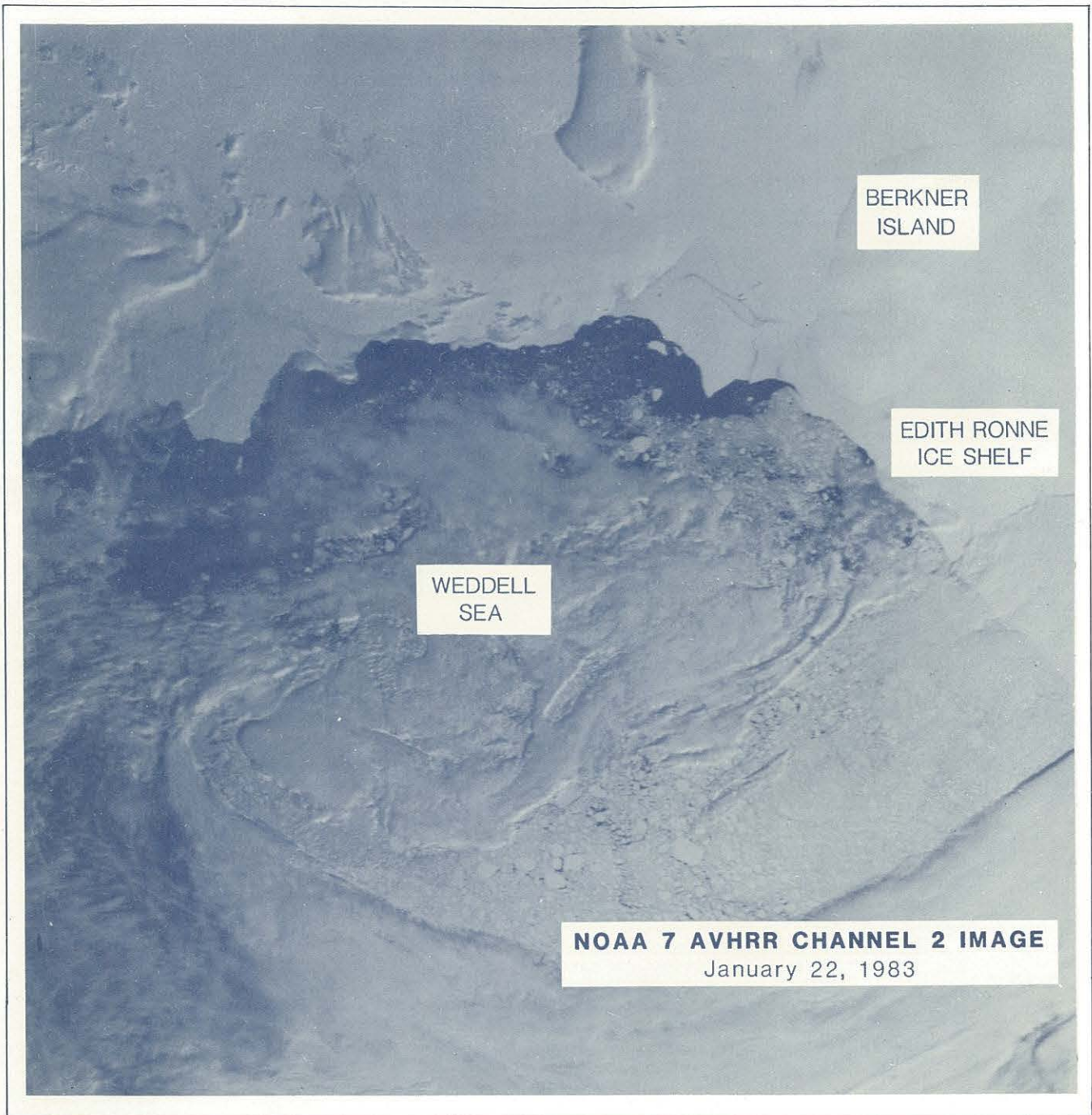


NESDIS Environmental Inventory No. 1

Environmental Data Inventory for the Antarctic Area



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Environmental Satellite, Data, and Information Service

COVER PHOTOGRAPH

The cover photograph is a NOAA 7 AVHRR (Advanced Very High Resolution Radiometer) channel 2 (.75-1.1 μ M-near infrared) image of the Weddell Sea area as viewed on January 22, 1983. Clearly visible in the upper portion of the image are Berkner Island and the Edith Ronne ice shelf. Numerous tabular icebergs can be seen in the Weddell Sea, some slightly obscured by thin cloud cover.



NESDIS Environmental Inventory No. 1

Environmental Data Inventory for the Antarctic Area

Washington, D.C.

May 1984

U.S. DEPARTMENT OF COMMERCE

Malcolm Baldrige, Secretary

National Oceanic and Atmospheric Administration

John V. Byrne, Administrator

National Environmental Satellite, Data, and Information Serv

John H. McElroy, Assistant Administrator

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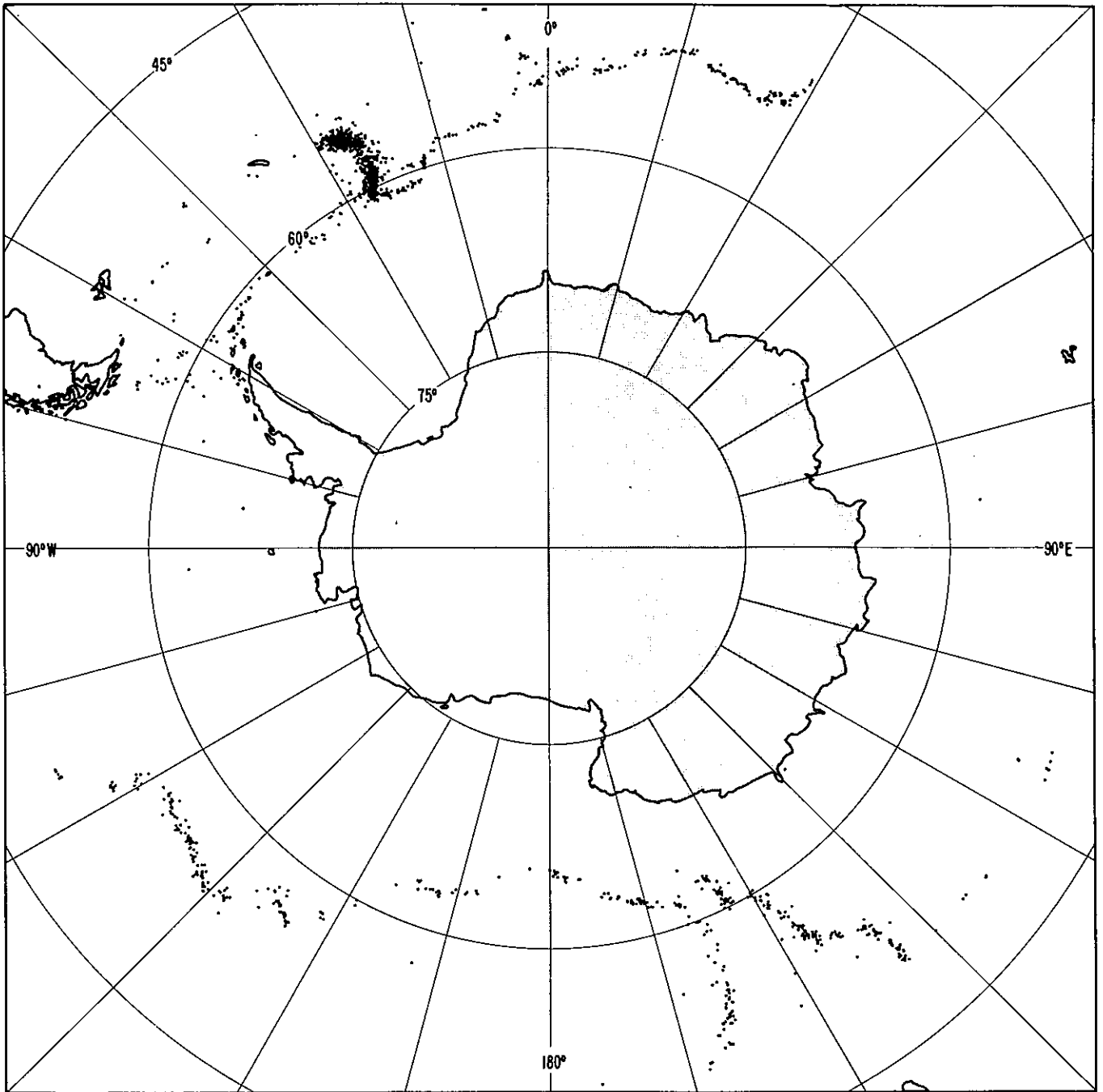
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INTRODUCTION

This is the revised, updated version of an Antarctic environmental data inventory publication first issued in 1978. The purpose of publications in this series is to show in an easily understandable form the major types of environmental data available from the National Environmental Satellite, Data, and Information Service (NESDIS) of the National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce. This publication provides information on the amounts, types, and distribution of NESDIS data holdings in the area from 50°S to the South Pole.

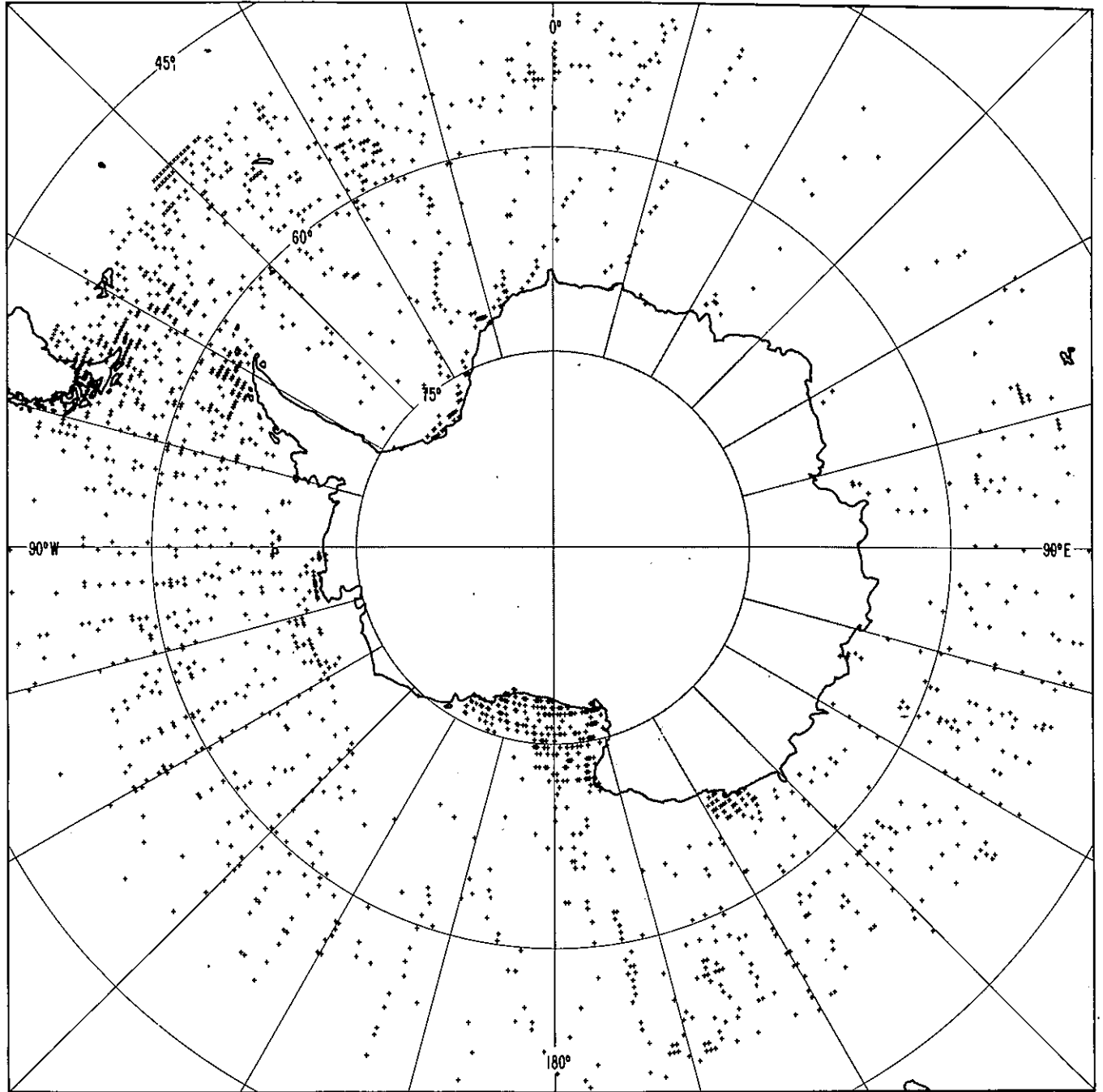
Within NESDIS are discipline-oriented data centers that serve as national repositories and dissemination facilities for global climatological, geophysical, and oceanographic data. The NESDIS data centers acquire data from a variety of sources including government agencies, universities and research institutions, private industry, and foreign organizations. Foreign data is obtained both through bilateral exchanges and through the World Data Center (WDC) system. The World Data Center system comprises WDC-A in the United States, WDC-B in the U.S.S.R., and WDC-C, which includes a number of discipline-oriented centers in Western Europe and Japan. This network of multiple discipline centers is maintained to facilitate international data exchange, to protect data collections against catastrophic loss, and to make the data more accessible to users around the world. Most WDC-A subcenters are located at and operated by the corresponding NESDIS national data centers. For example, World Data Center A for Meteorology is operated by the NESDIS National Climatic Data Center.

Data described in this publication are available from the NESDIS data center or WDC-A subcenter specified in the data inventory plot annotations. Data are provided at costs that cover data retrieval and reproduction. In some cases, subsets of data can be selected to meet special user specifications. User services personnel at the centers can assist users in formulating data orders and may be able to provide more detailed data inventory information to help in defining data selection criteria. In all cases, cost estimates can be provided before an actual data search is made. Addresses and telephone numbers of NESDIS contact points, keyed to the data inventory plots presented here, are listed on page 51.



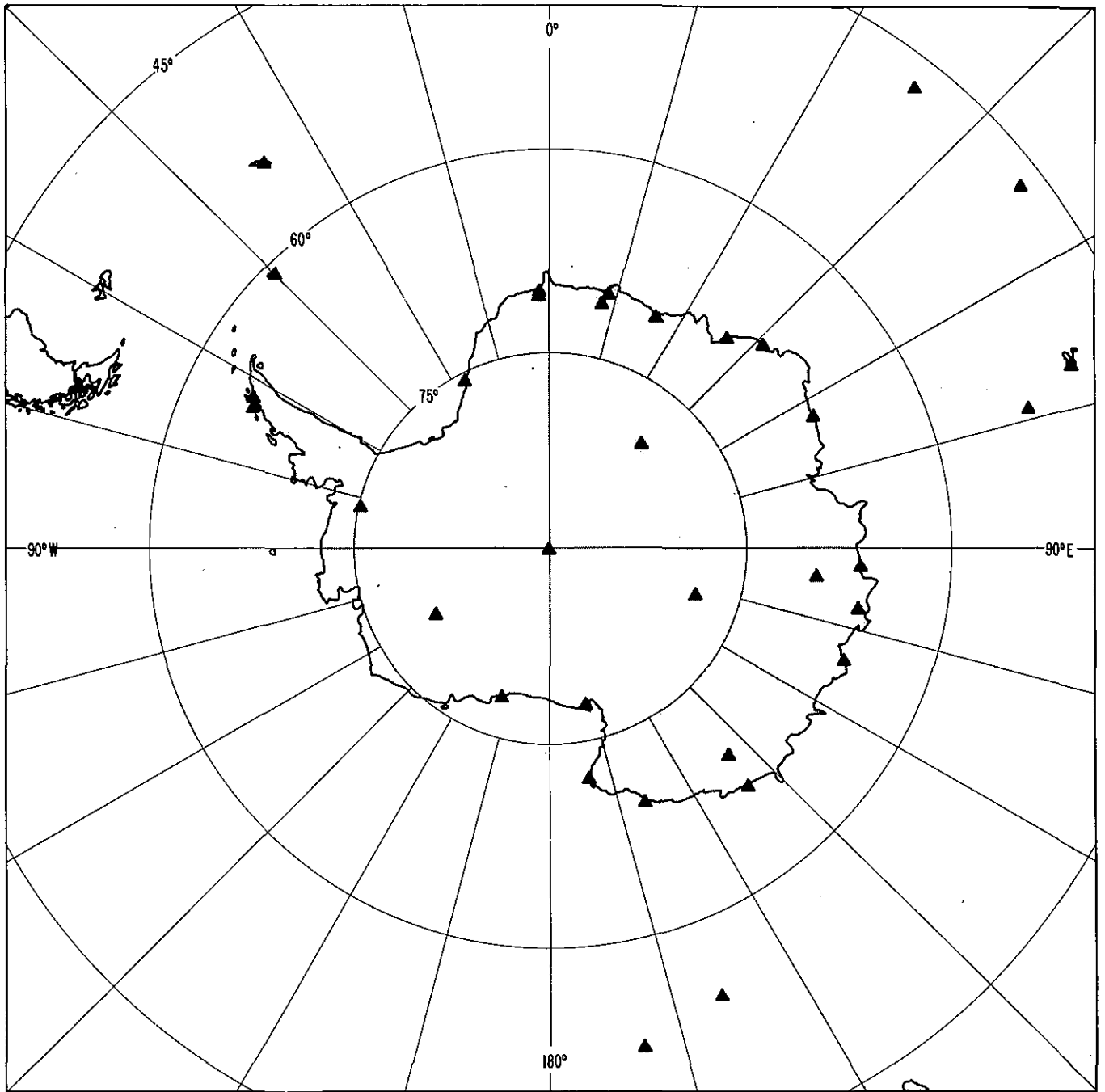
EARTHQUAKES

This plot shows approximately 2,700 earthquake epicenters in the files of the National Geophysical Data Center. The file is fairly complete for all earthquakes above magnitude 5 occurring since 1963. Before 1963 the file is incomplete except for large earthquakes dating back to about 1900.



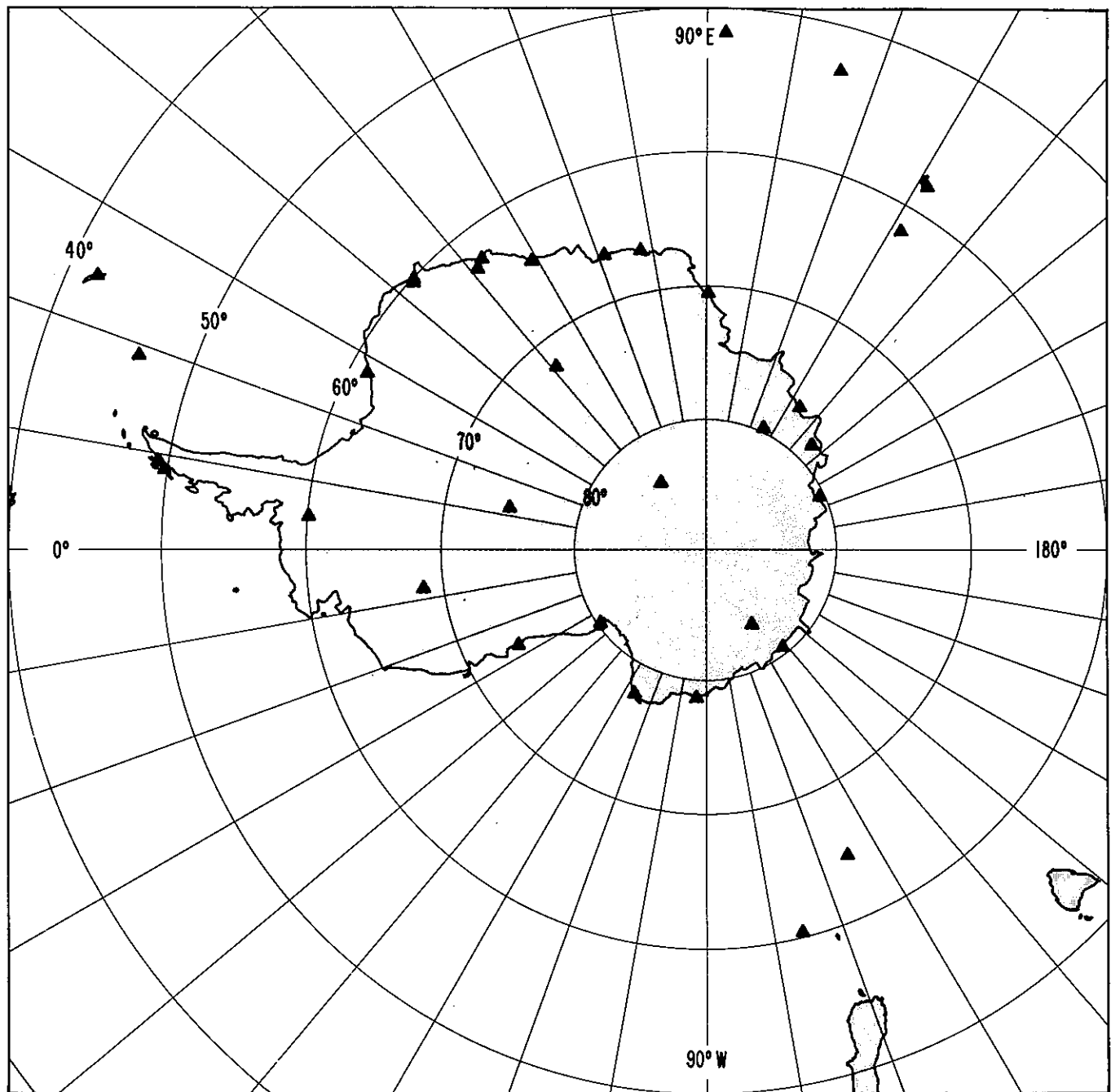
MARINE GEOLOGICAL CORES

This plot shows more than 3500 locations of bottom samples on which the National Geophysical Data Center has information. Included is information on sediment type and texture, grain size, geochemistry, and bottom photos. Each cross locates data within a one-half degree square.



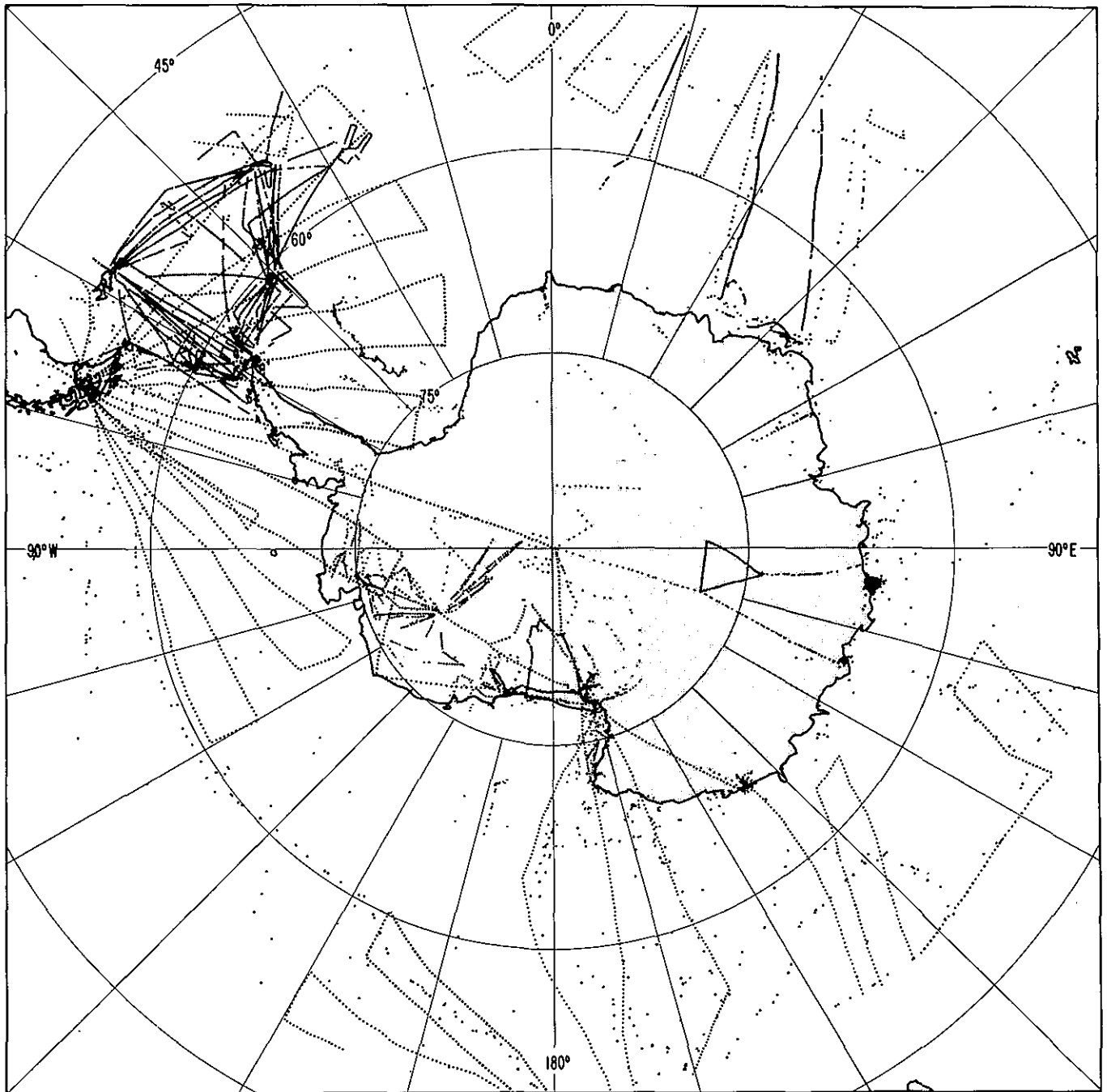
GEOMAGNETIC OBSERVATORIES (Geographic Coordinates)

This plot shows where geomagnetic observatories have been located since 1900. These observatories monitor secular changes in the Earth's magnetic field as well as short-period phenomena. Observatory annual means that are useful to determine secular change are available from the National Geophysical Data Center. Magnetograms and other forms of geomagnetic variation data are also available for most stations.



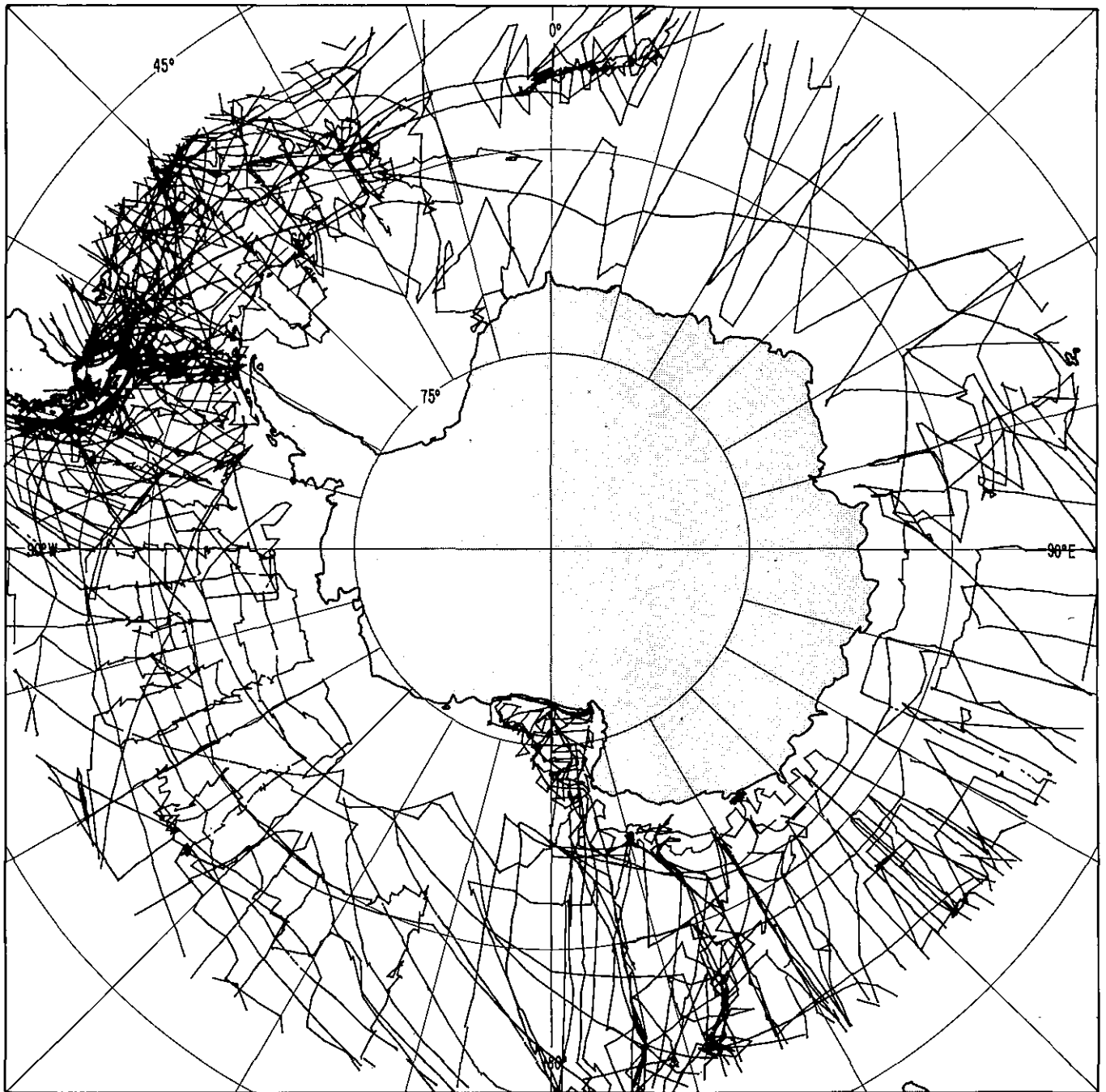
GEOMAGNETIC OBSERVATORIES (Geomagnetic Coordinates)

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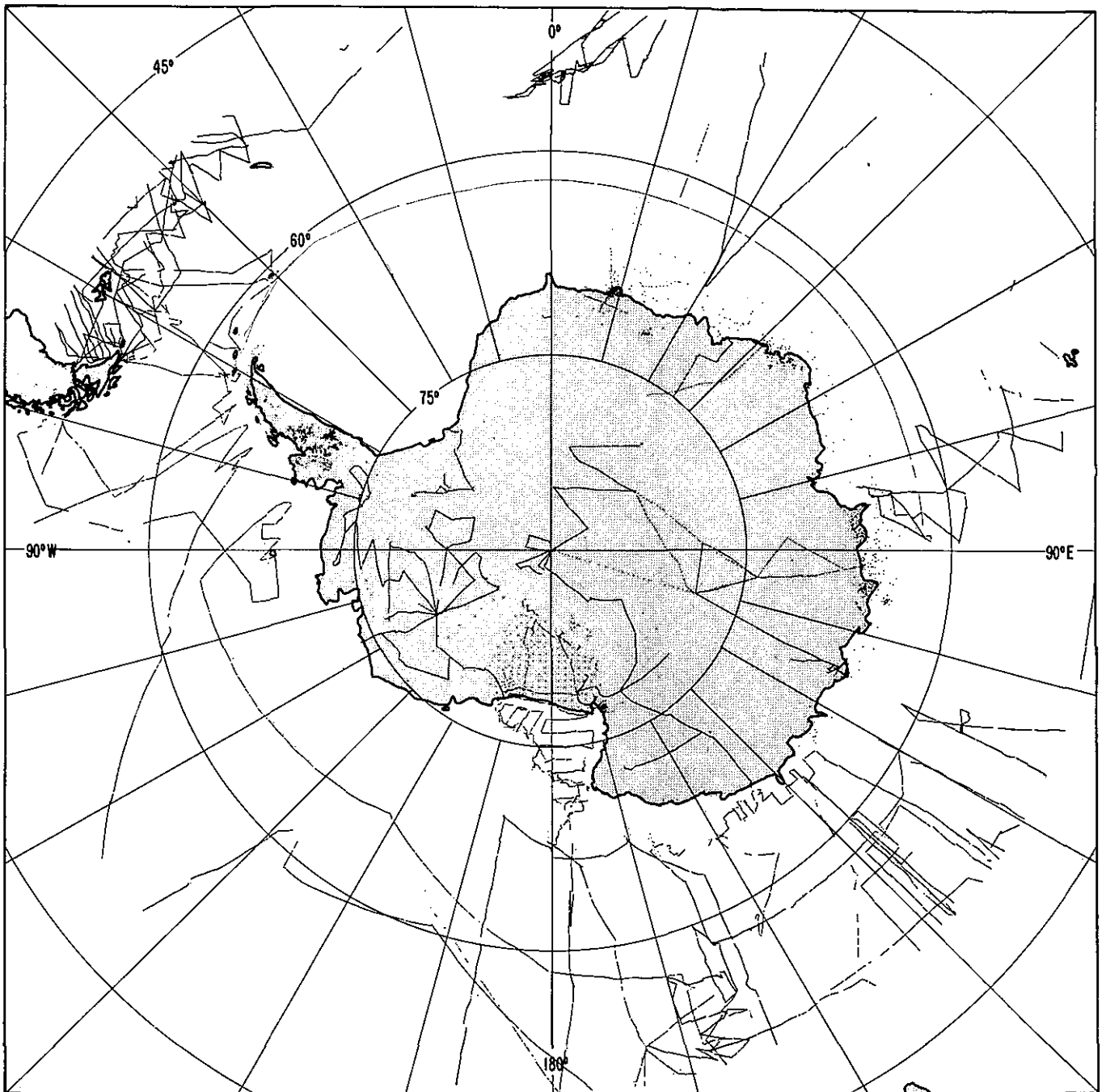
MAGNETIC SURVEYS

This plot shows approximately 10,000 airborne and land observations since 1900 that are available from the National Geophysical Data Center. The observations include those made on coastal landings and on several cross-continent traverses, as well as those made by airborne magnetometers. Many of the observations are three component.



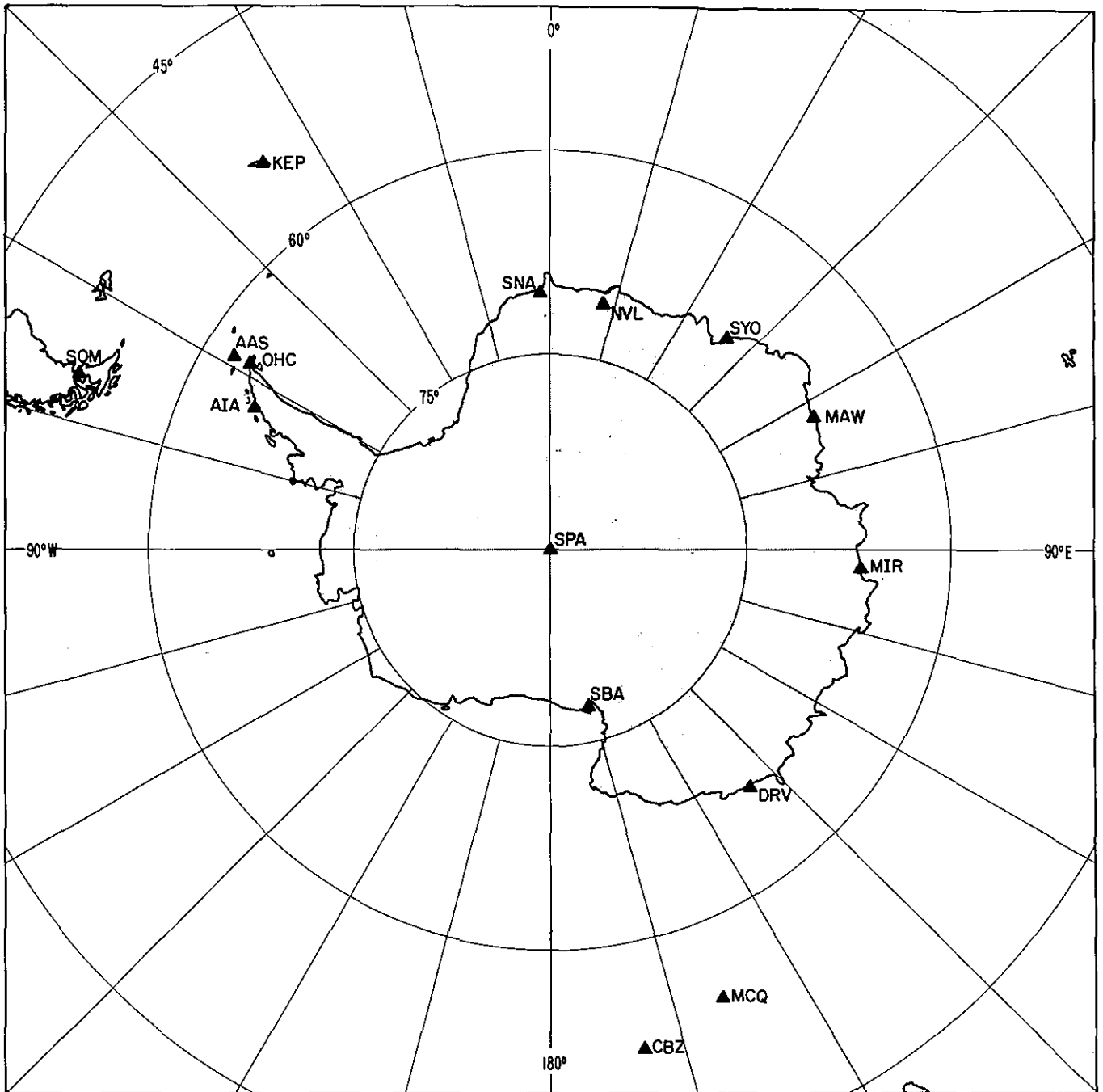
MARINE GEOPHYSICAL TRACKLINES

This plot shows underway marine geophysical data that are available from the National Geophysical Data Center. The 372,000 miles of tracklines include magnetic, gravimetric, and bathymetric measurements and seismic profiles.



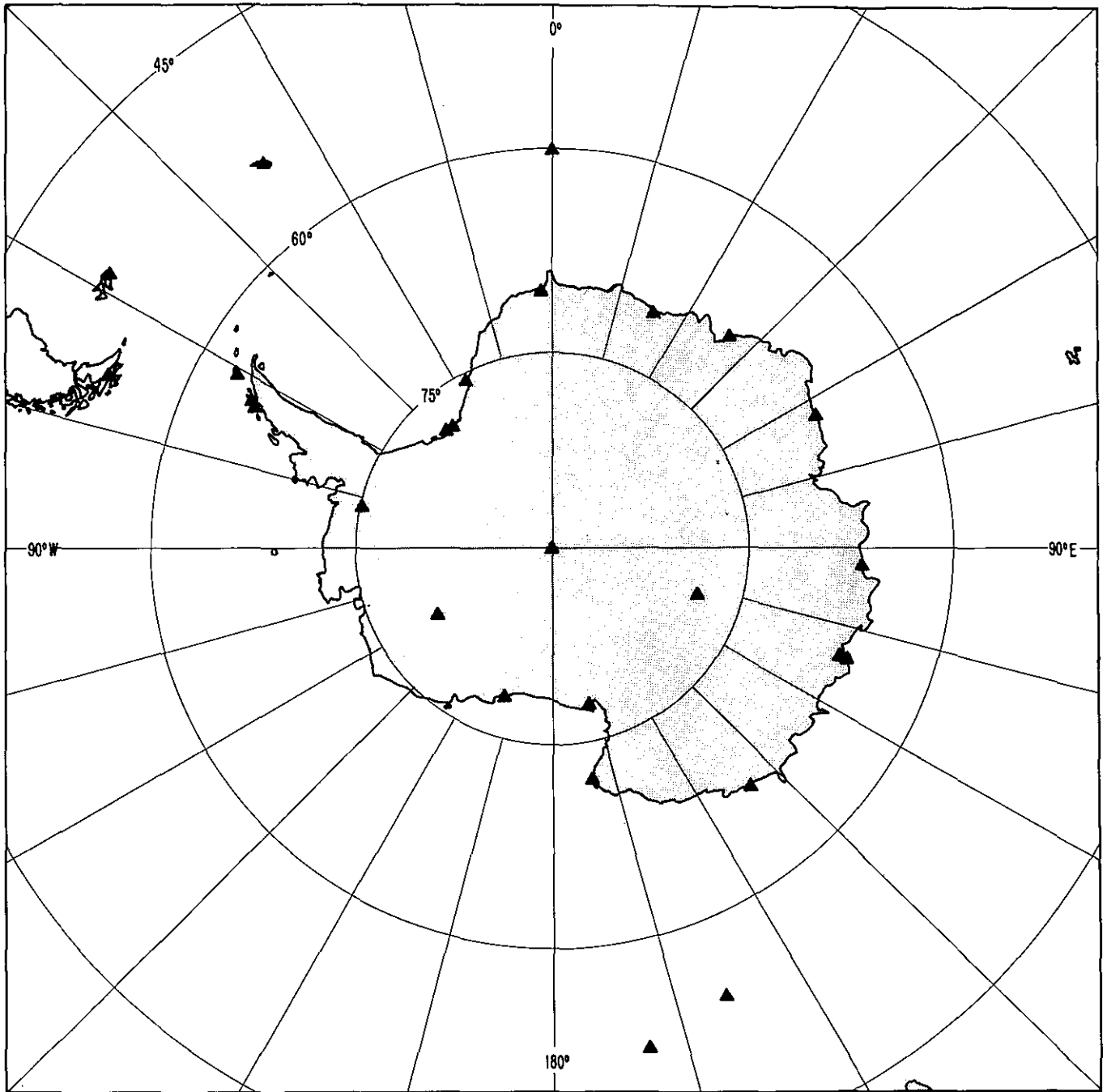
POINT GRAVITY

This plot shows locations of 57,000 bouger and free air anomaly measurements available from the National Geophysical Data Center. These data are from many countries that have made gravity measurements in the Antarctic region.



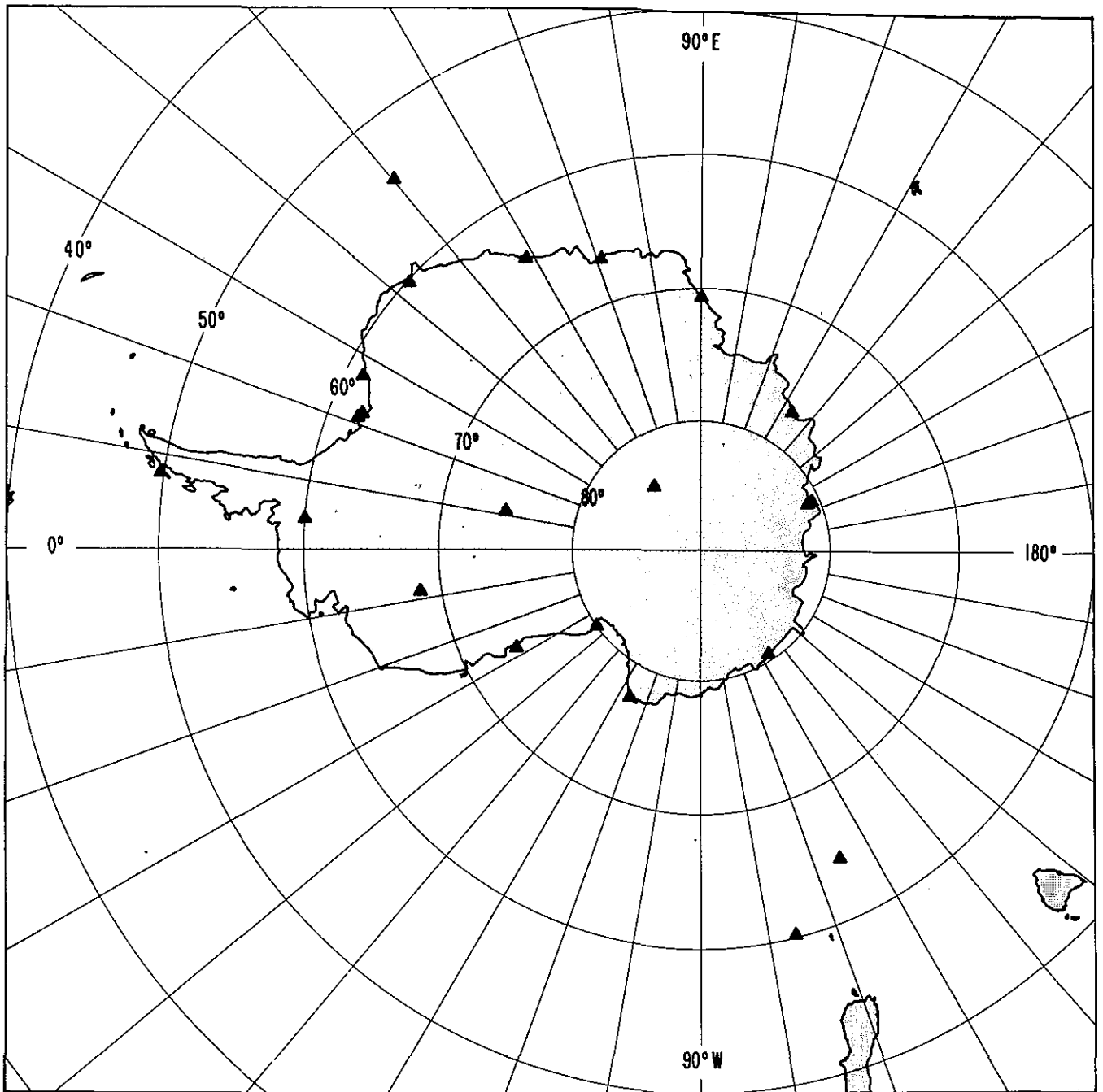
SEISMIC OBSERVATORIES

This plot shows locations of operating seismic stations for which the National Geophysical Data Center has an archive of seismograms and station constants. The Data Center also maintains an archive of data from closed stations not shown on this plot.



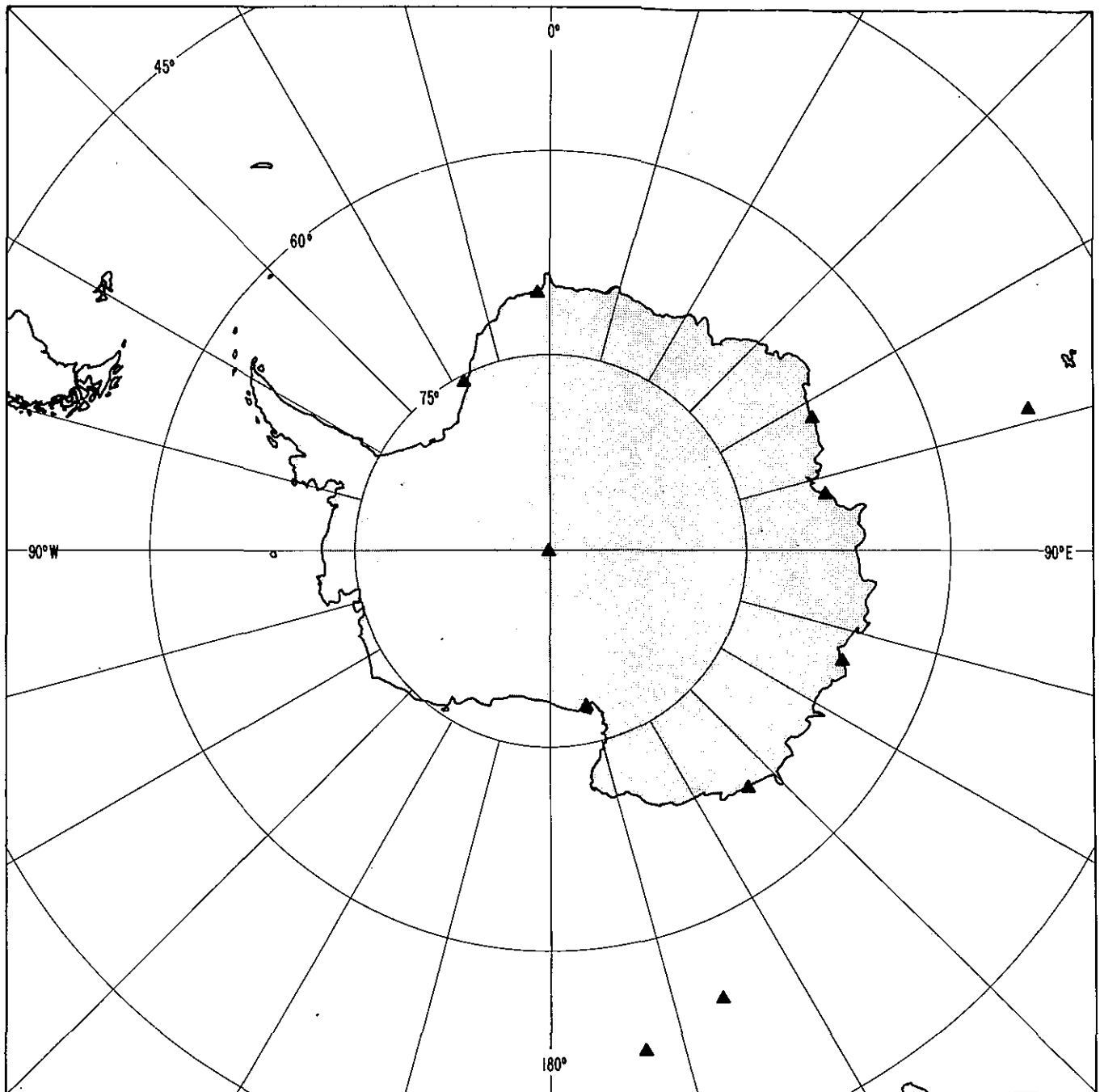
IONOSPHERIC OBSERVATORIES. (Geographic Coordinates)

Antarctic stations monitor ionospheric phenomena in various ways. Instrumentation in the Antarctic network has included: ionosondes, topside ionosonde receiving stations, total electron content monitors of satellite beacons, pulse echo absorption instruments, riometers, CW field strength recorders, a set of ionospheric drift equipment, ionospheric scintillation recorders, whistler and VLF emission recorders, and sudden ionospheric disturbance recorders. Several of these programs have operated simultaneously at some sites. The programs began in 1957, and most of the data are available from the National Geophysical Data Center.



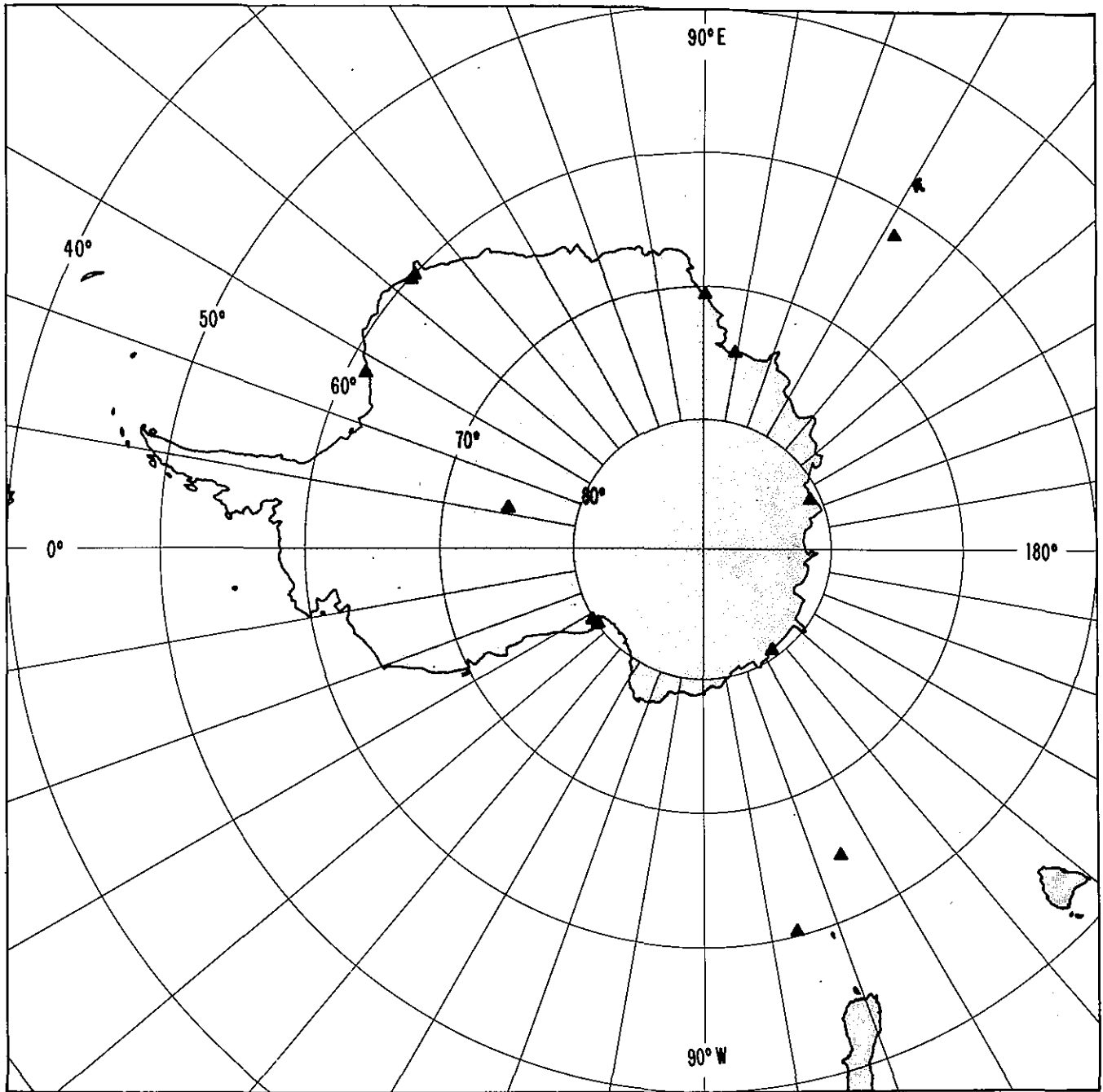
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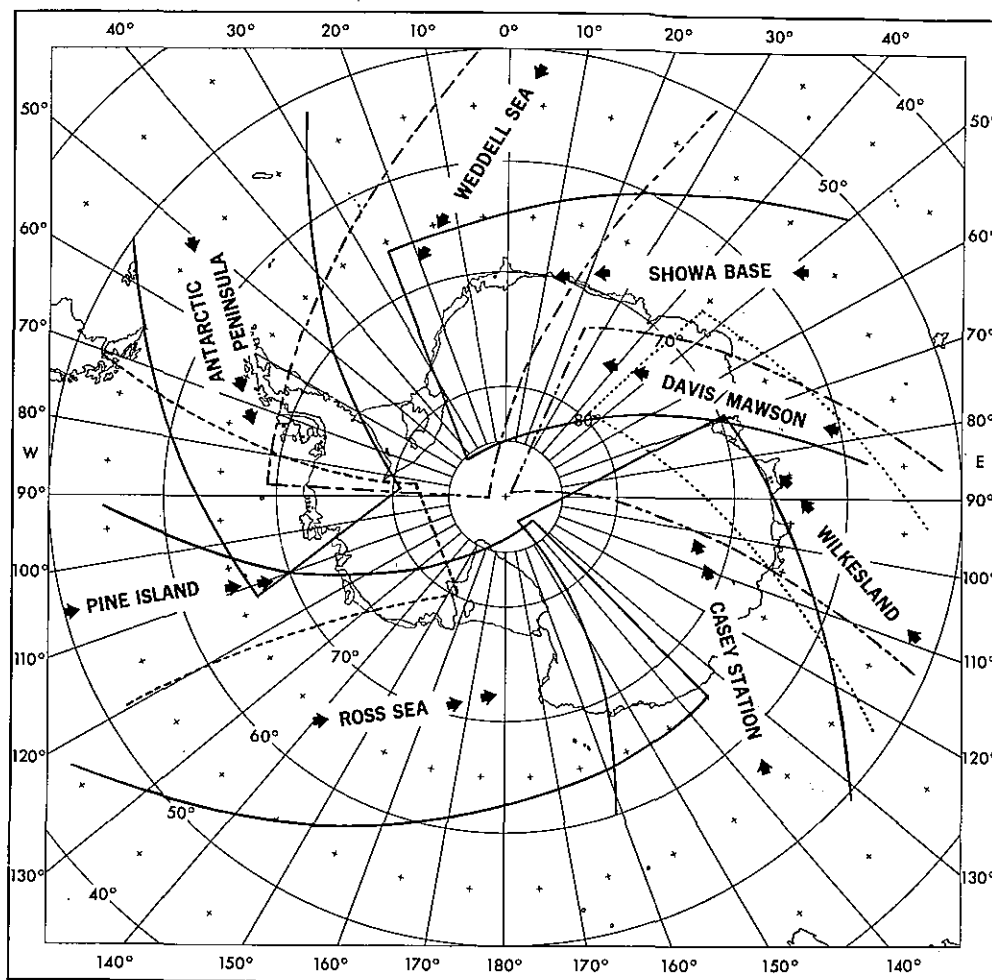
SOLAR-TERRESTRIAL OBSERVATORIES (Geographic Coordinates)

Antarctic stations monitor solar-terrestrial phenomena in various ways. Instrumentation in the Antarctic network has included: aeronomical rocket sites, atmospheric radio noise measurement monitors, sets of micropulsation equipment, all-sky cameras, visual auroral stations, auroral photometers, radio and radar observation monitors of aurora, cosmic ray neutron monitors, cosmic ray ionization chambers, cosmic ray meson telescopes, balloon launching sites for cosmic rays, and airglow recorders. Several of these programs have operated simultaneously at some sites. The programs began in 1957 and most of the data are available from the National Geophysical Data Center. At present there is little activity in atmospheric radio noise measurements and cosmic ray ionization chambers.



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ENVIRONMENTAL SATELLITE COVERAGE OF THE ANTARCTIC AREA

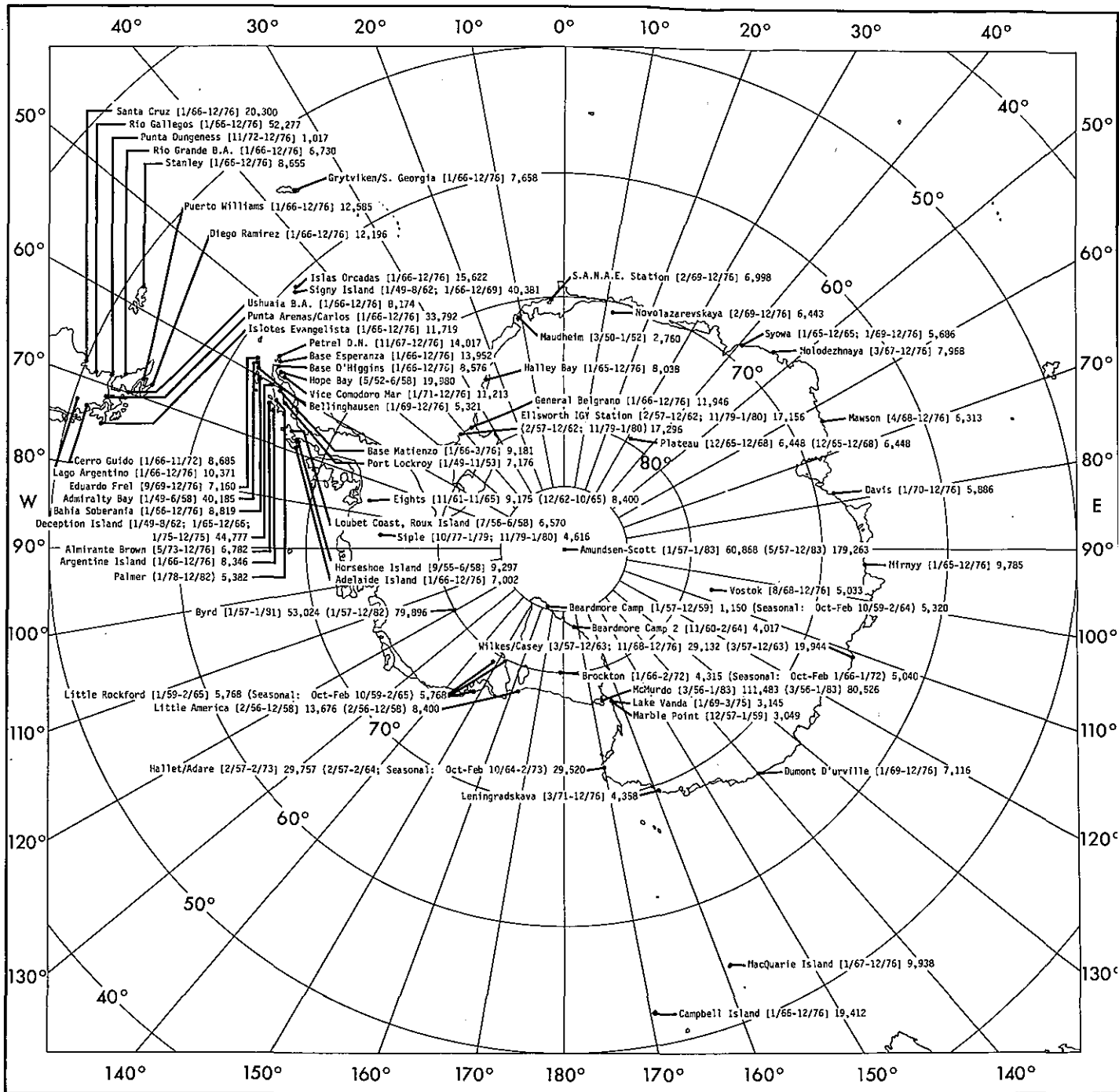
The polar-orbiting environmental satellites have been operating since the early sixties, but only since 1969 has the coverage of the Antarctic continent been consistent enough to be of operational value. Visible imagery data in the form of daily mosaics (4-mile resolution) are held at the Satellite Data Services Division on 35 mm negative film (1969-84) and on 25 by 25 cm negatives from 1972 to the present except for the period March-December 1978. Visible images of the South Pole area are possible only during the Southern Hemisphere summer season.

In April 1973, the infrared sensors that were placed on the polar-orbiting satellites made nighttime infrared data available. Infrared daytime data were added to the holdings effective May 1974. Since March 1973, all such daily mosaics are also archived in digital format. From March 1973 to May 1974, the tape format was 7-track, 556 bpi, and, from May 1974 to the present, 9-track, 1,600 bpi.

In 1972, the first Very High Resolution Radiometer (VHRR) was placed onboard the spacecraft followed by the AVHRR (Advanced VHRR) in December 1978. The sensor furnished imagery (half-mile resolution simultaneously in the infrared and visible spectra over scheduled area during the individual orbits. Very limited amounts of these images are available during 1972 and 1973; however, increased Antarctic coverage took place in 1974 and 1975. For the past 6 years, VHRR and AVHRR coverage of the Antarctic area has been plentiful, and are available as film and digital tape products.

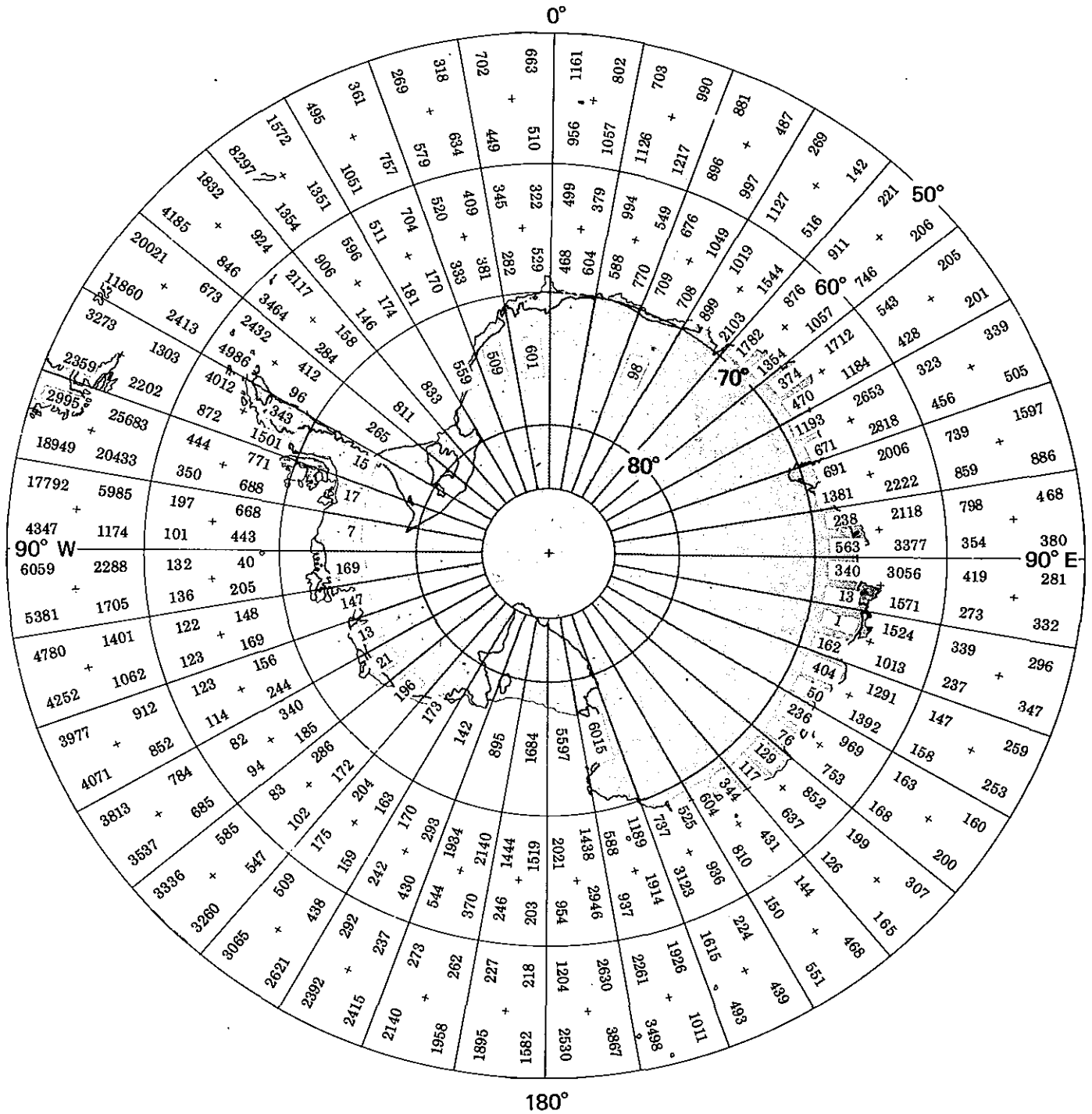
The chart shows the approximate areas of the Antarctic continent for which VHRR and AVHRR coverage is available. Peninsula area has good coverage nearly all year. As a rule, the Weddell and Ross Seas areas are received on about 10 days per month, but dates when data are available are very sporadic.

On January 1, 1979, the Satellite Data Services Division initiated a continuous file of VHRR and AVHRR digital data tapes. Additional information on actual coverage by area and data can be obtained from the Satellite Data Services Division.



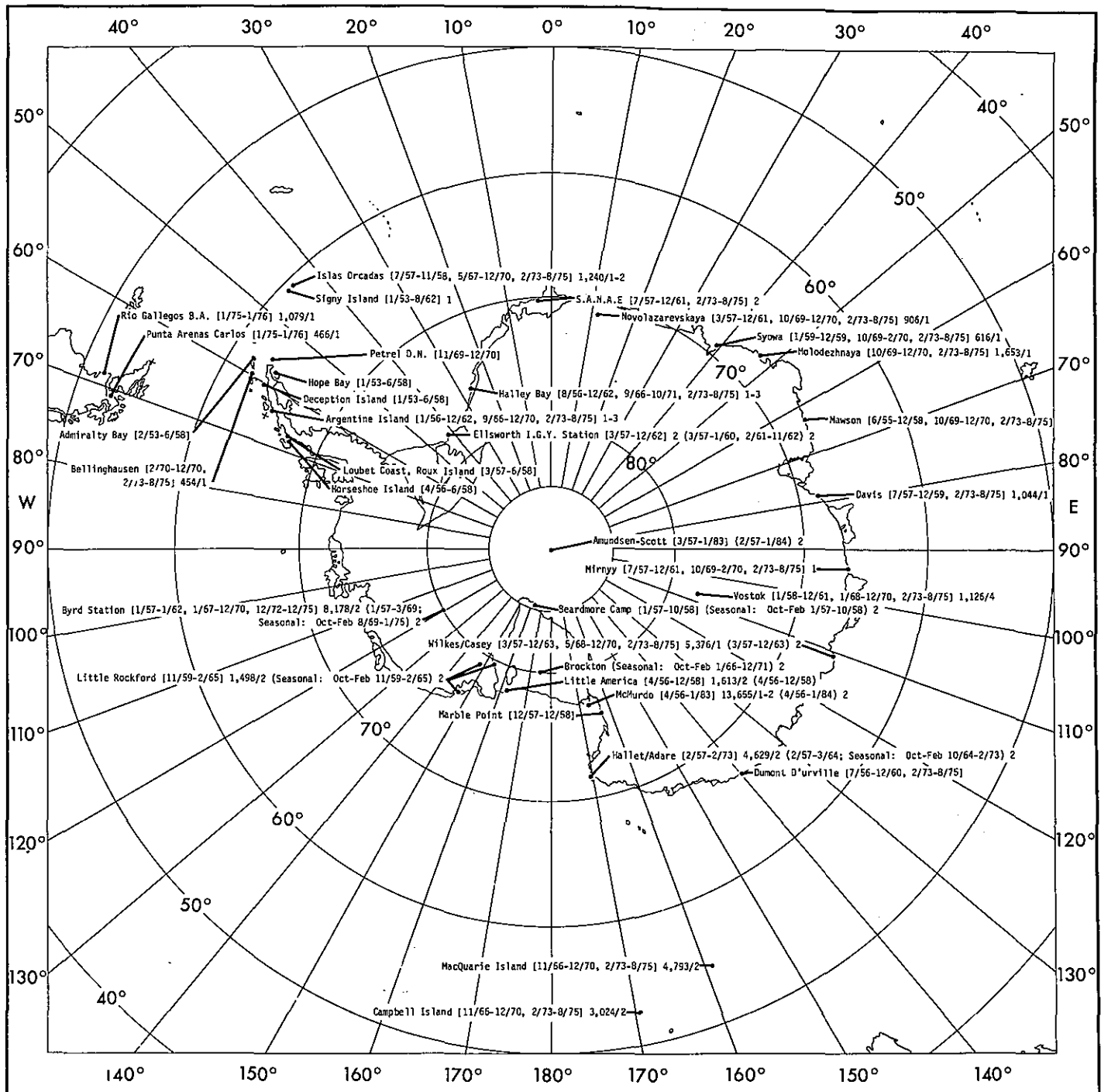
**SURFACE LAND METEOROLOGICAL DATA SURVEY CHART
FOR SOUTHERN POLAR REGION (50°-90° S)**

This survey chart defines those land stations having hourly surface weather observations held at the National Climatic Data Center in manuscript and digital forms. An observation normally contains: wind, visibility, weather, pressure, air and wet-bulb temperatures, clouds, and sky conditions. The information plotted for each station includes location, station name, [digital period of record], number of digital observations, (manuscript period of record), and number of manuscript observations. Many manuscript stations also have some period in autographic form for wind, temperature, pressure, and sunshine. Many of the manuscript data are also on microfilm or fiche. Some 20 stations having less than 1,000 observations were not plotted.



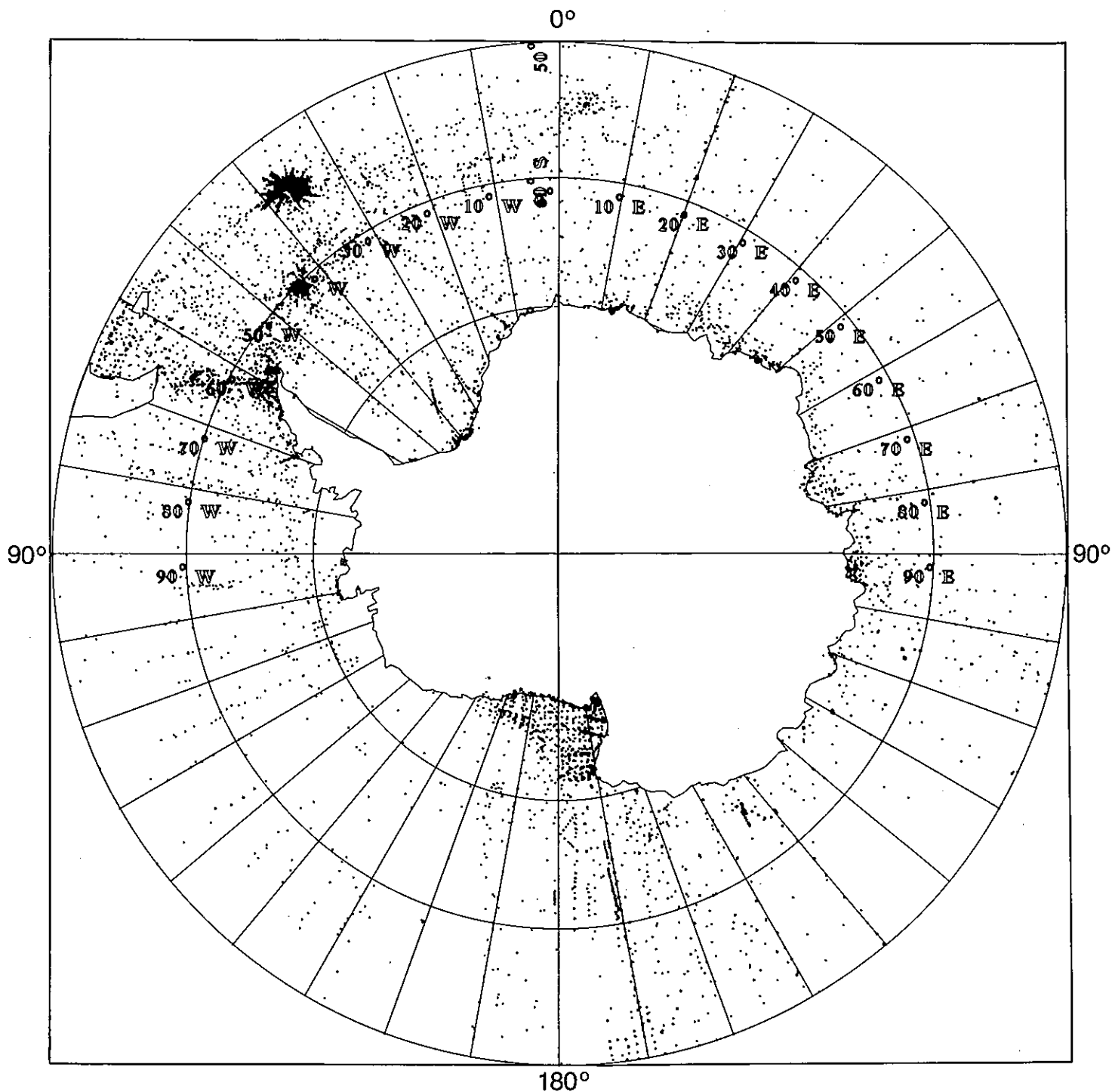
**SURFACE MARINE METEOROLOGICAL DATA SURVEY CHART
FOR SOUTHERN POLAR REGION (50°-90° S TO ANTARCTICA COAST)**

Each 5° or 10° square contains the total count of surface marine observations available for the period of 1869-1983 from Tape Data Family-11 held at the National Climatic Data Center. An observation normally contains the basic weather elements: wind, visibility, weather, sea-level pressure, air, sea, and wet-bulb temperatures, clouds, and waves. The total number of observations is 434,041.



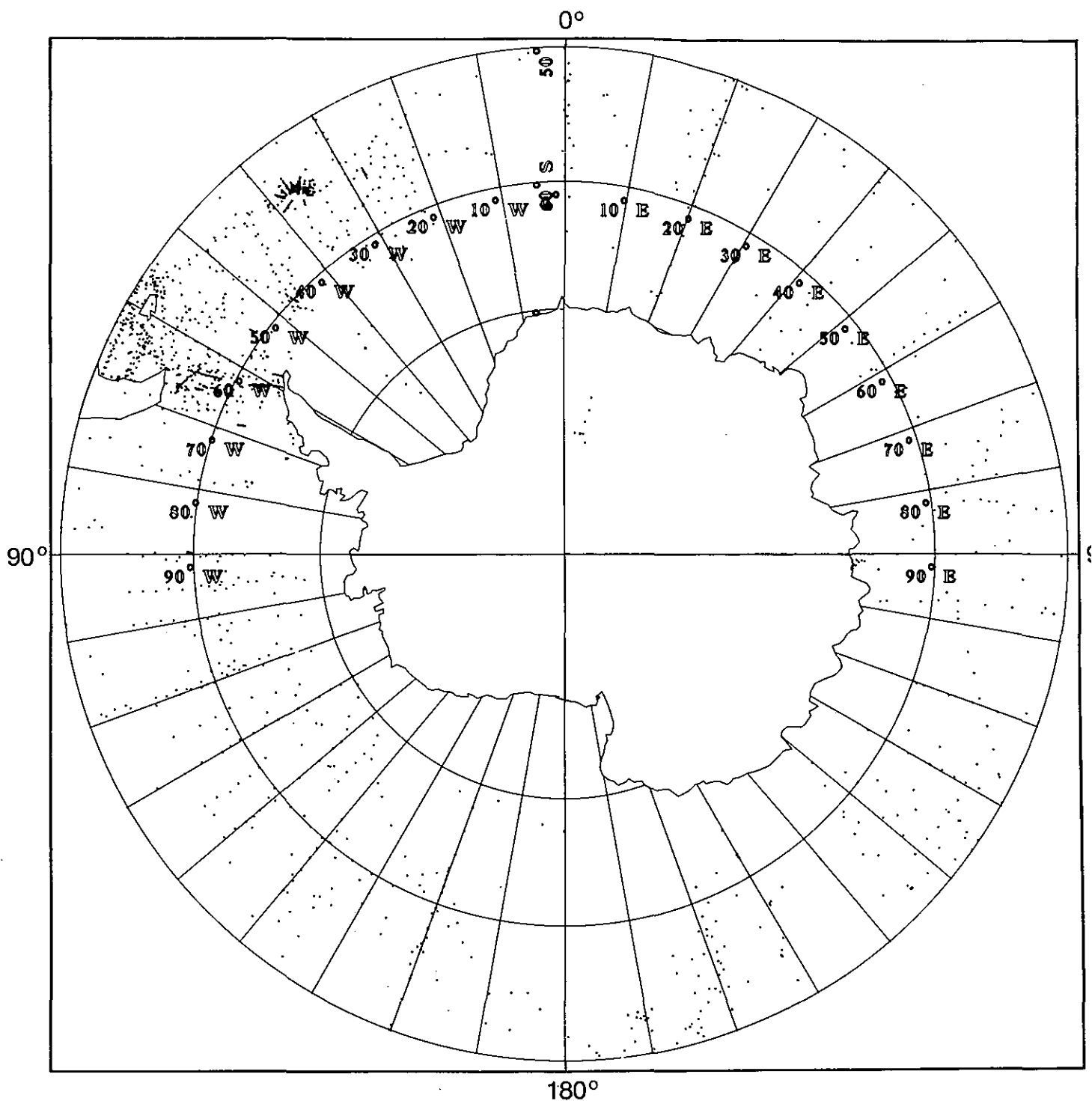
UPPER AIR METEOROLOGICAL DATA SURVEY CHART
FOR SOUTHERN POLAR REGION (50°-90°S)

This survey chart defines those land stations having upper air weather observations held at the National Climatic Data Center in manuscript and digital forms. An observation normally contains height, temperature, humidity, pressure, and wind speed and direction. The information plotted for each station includes location, station name, [digital period of record], number of digital observations/average number per day, (manuscript period of record), and number of manuscript observations/average number per day. Many of the manuscript data are also on microfilm or fiche.



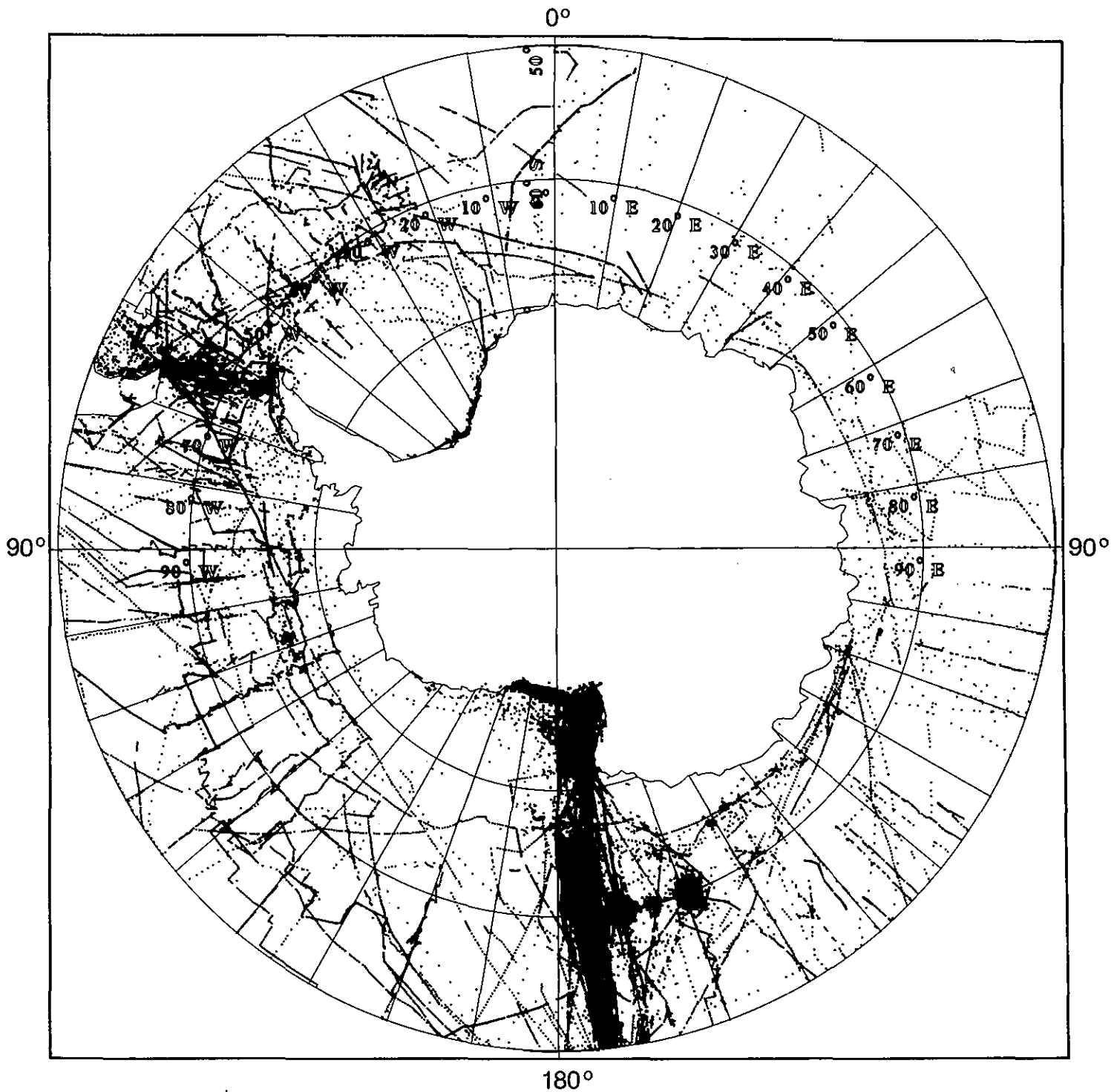
OCEANOGRAPHIC STATION DATA-AUSTRAL SUMMER

This plot shows the locations of 6333 oceanographic station (Nansen cast) observations made in the Antarctic during the past 55 years. Resulting data are from U.S. national and international observations and measurements include temperature, salinity, dissolved oxygen and nutrient chemistry. Most stations consist of multi-level bottle casts, some of which are up to 20 levels. The period of austral summer used for this plot is from October through March. Resulting data are available as computer listings, in automated form on magnetic tape, or as selected analytical displays and graphic products. These data and data presentations can be obtained from the National Oceanographic Data Center.



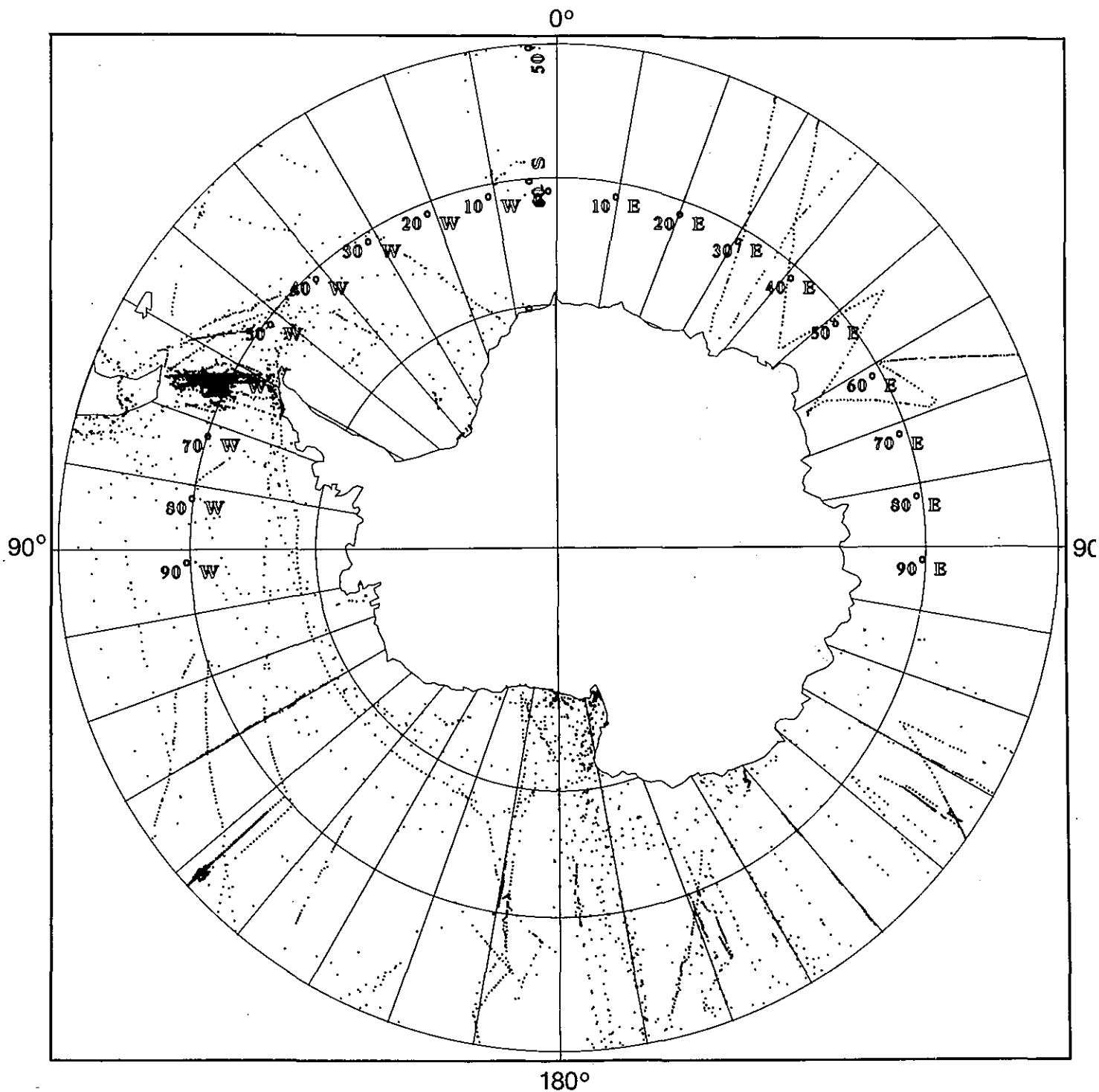
OCEANOGRAPHIC STATION DATA-AUSTRAL WINTER

This plot shows the locations of 1343 oceanographic station observations made in the Antarctic during the past 55 years. Resulting data are from U.S. national and international observations and measurements include temperature, salinity, dissolved oxygen and nutrient chemistry. Most stations consist of multi-level bottle casts, some of which are up to 20 levels. The period of austral winter used for this plot is from April through September. Resulting data are available as computer listings, in automated form on magnetic tape, or as selected analytical displays and graphic products. These data and data presentations can be obtained from the National Oceanographic Data Center.



MECHANICAL BATHYTHERMOGRAPH DATA-ALL SEASONS

This plot shows the location of 28,645 mechanical bathythermograph observations of water temperature versus depth made in the Antarctic area. Resulting temperature measurements are from the surface to 250 meters and approximately 22,000 of these measurements were made during austral summer months of October through March. The remainder were made during the austral winter months from April through September. Data can be provided as computer printouts, in automated form on magnetic tape or in the form of analytical products and displays. Available displays include vertical and horizontal array summaries, temperature difference summaries and analyses for mixed layer and thermocline depth. These data and data presentations can be obtained from the National Oceanographic Data Center.



EXPENDABLE BATHYTHERMOGRAPH DATA-ALL SEASONS

This plot shows the locations of 3,928 expendable bathythermograph observations of water temperature versus depth made in the Antarctic area. Resulting temperature measurements provide generally deeper coverage than those made with mechanical bathythermographs and may extend to as much as 1500 meters. Approximately half of the plotted observations were made during austral summer months of October through March. The remainder were made during austral winter months from April through September. Data can be provided as computer printouts, in automated form on magnetic tape or in the form of analytical products and displays. Available displays include vertical and horizontal array summaries, temperature difference summaries and analyses for mixed layer and thermocline depth. These data and data presentations can be obtained from the National Oceanographic Data Center.

WORLD DATA CENTER-A FOR GLACIOLOGY (SNOW AND ICE)

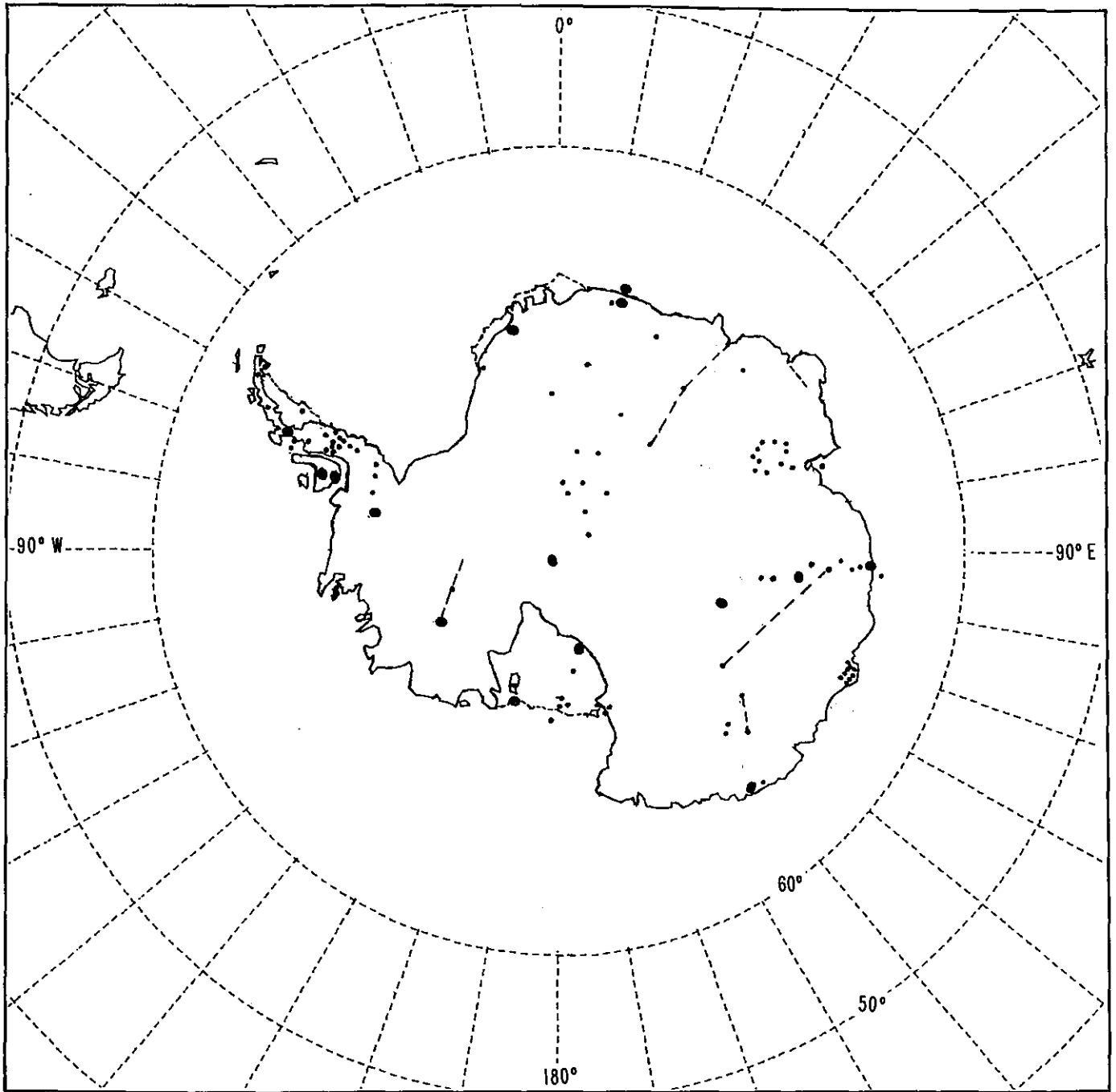
Since October 1976, responsibility for the operation of World Data Center-A for Glaciology has been assumed by the University of Colorado Cooperative Institute for Research in Environmental Sciences (CIRES) in conjunction with NESDIS.

Glaciology, as defined by the International Council of Scientific Unions (ICSU), deals with the occurrence, properties, processes, and effects of all forms of snow and ice in the atmospheric-earth-ocean system, and with aspects of their past occurrences and effects.

The Center's collection comprises over 7,500 reprints, 3,000 technical reports and monographs, and 70 journals. A number of these publications deal specifically with the Antarctic, such as the Antarctic Journal of the United States; Antarctic Record (National Institute of Polar Research, Tokyo); Antarctica (Argentine Antarctic Institute); British Antarctic Survey Bulletin; Dry Valley Drilling Project Bulletin; Current Antarctic Literature (NSF); INACH Boletine (Instituto Antartico Chilene); Soviet Antarctic Expedition Bulletin; and various national reports to the Scientific Committee for Antarctic Research (SCAR). The Center also receives Southern Ice Limit maps from the U.S. Navy Fleet Weather Facility showing weekly sea ice limits.

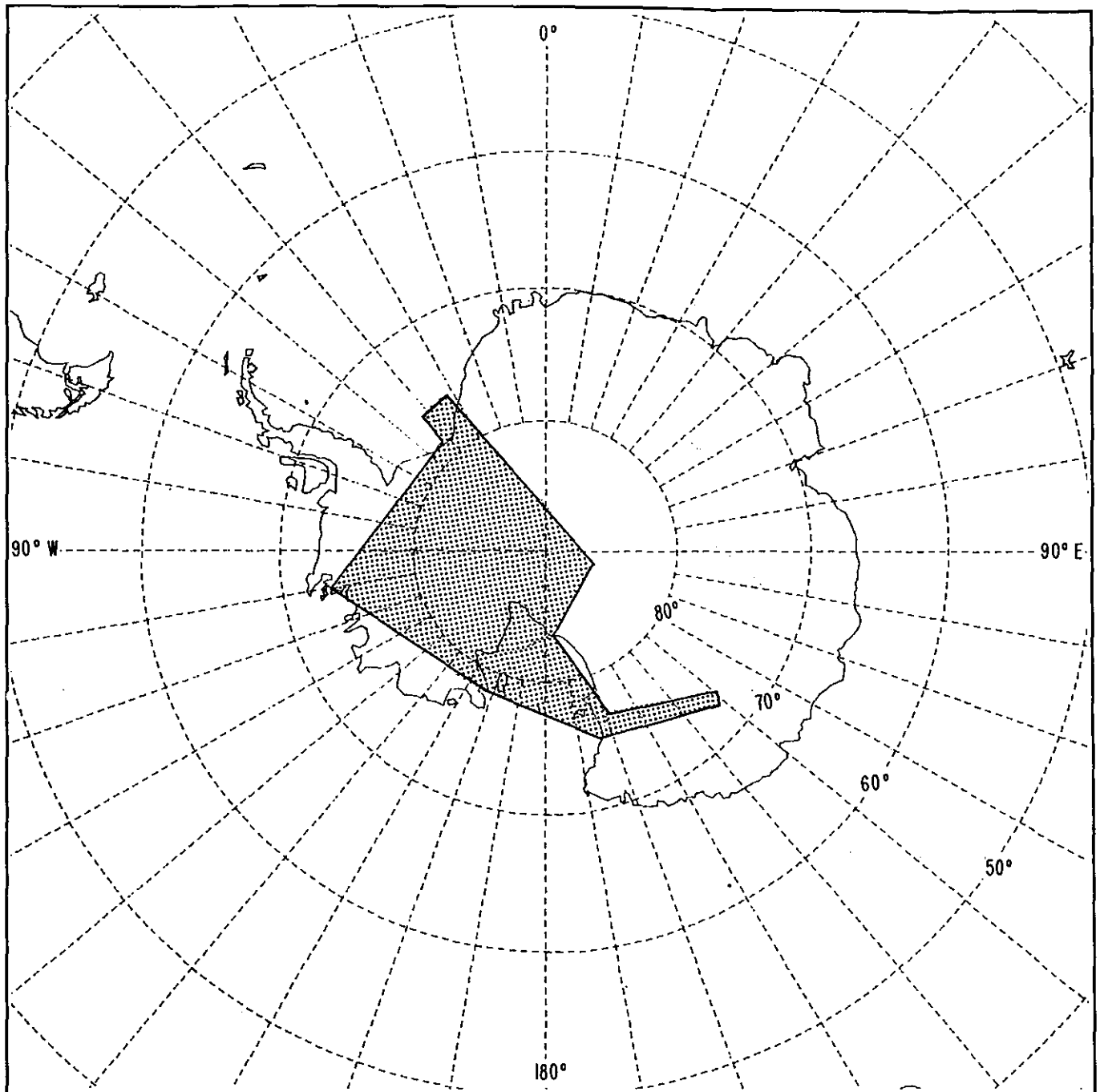
Many other miscellaneous publications specifically on Antarctica are received, plus general glaciological materials and maps that contain data on Antarctica. Among the broad subject areas covered are: land ice and ice history, including glacial surges; sea ice, including ice shelves and icebergs; and permafrost. A quarterly list of new accessions is prepared. The Center also publishes the Glaciological Data reports series several times a year: issues include inventories, specialized bibliographies and data related articles. Report 15 summarizes the Workshop on Antarctic Climate Data.

The Center encourages use of its facilities through short or long term visits in addition to letter and telephone requests. For further information contact the World Data Center-Glaciology (Snow and Ice).



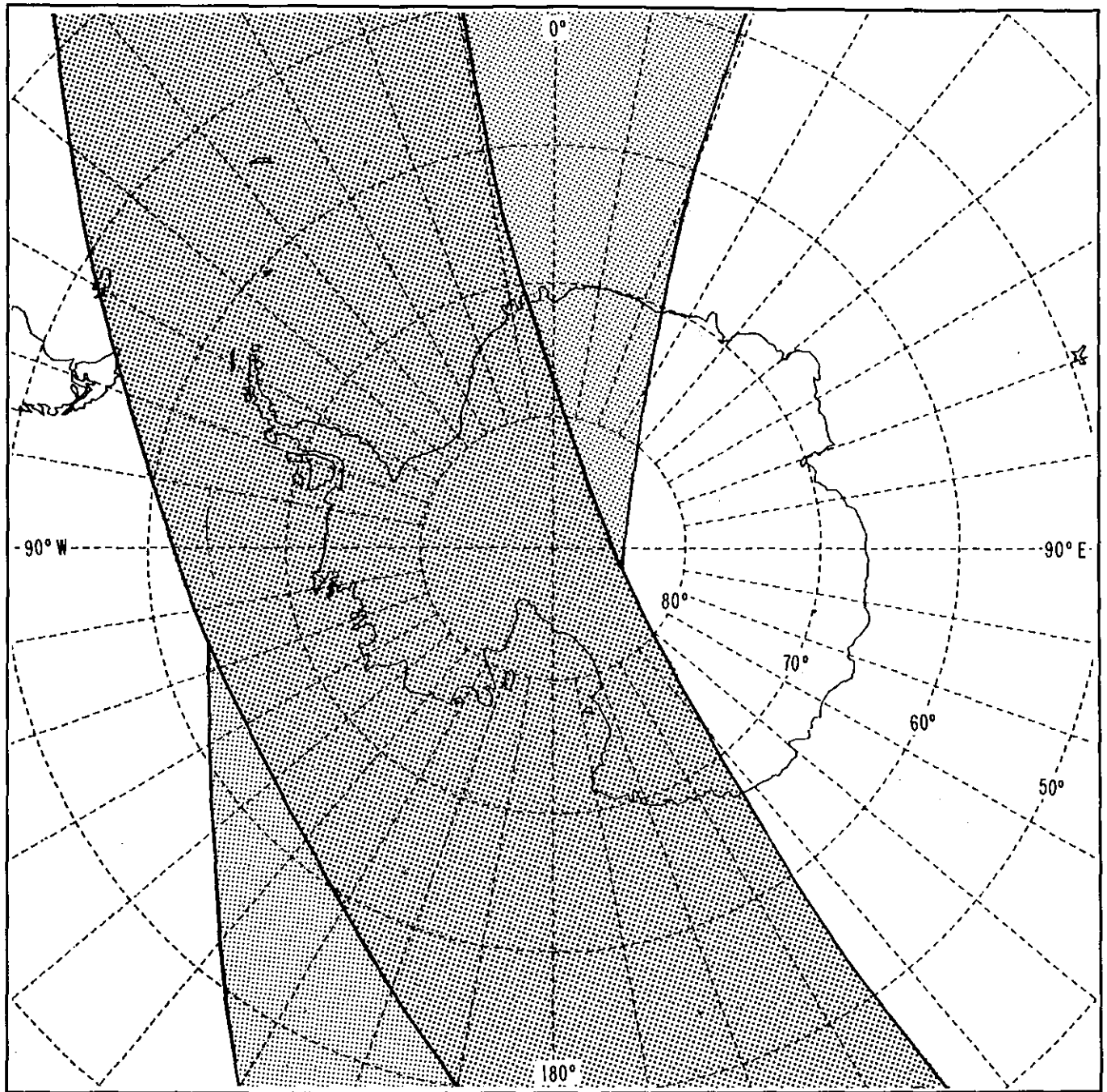
ICE CORE DRILLING

This plot indicates the sites of ice core drilling activity. The larger dots represent multiple cores extracted at a site and the dotted lines indicate traverses. The World Data Center A for Glaciology (Snow and Ice) has compiled an inventory of the ice cores reported in the literature between 1949 and 1980. Available information includes: site name, year, location, elevation, core depth and diameter, drill type, and drilling agency.



REMOTE SENSING SURVEY FLIGHTS

The National Snow and Ice Data Center archives ice thickness profiles and geomagnetics generated during NSF-funded remote sensing flights in 1977/78 and 1978/79 austral summers. Shaded areas on the map above indicate areas surveyed. A scalar magnetometer and inertial navigation system provide digital data; radar soundings of ice thickness are recorded as analog Z-mode oscillographic traces. Data for the 92 flights (23 ice sounding missions) are available on magnetic tape, with ice soundings available on 16mm microfilm.



DEFENSE METEOROLOGICAL SATELLITE PROGRAM

The National Snow and Ice Data Center archives environmental satellite data from the United States Air Force Defense Meteorological Satellite Program (DMSP). DMSP is a system of near-polar orbiting satellites providing information in the visual and thermal infrared spectral bands. The shaded areas on the map above show the coverage of two adjacent passes of a DMSP satellite. Frequent daily coverage is available at resolutions of 2.7 km and 5.4 km from 1973 onwards. The data have proven useful for a variety of snow cover, sea ice and cloud studies. DMSP imagery are archived by NSIDC after operational use (usually 30 to 60 days) by the Air Force.

**CONTACTS FOR FURTHER INFORMATION
AND TO ORDER DATA**

Geological/Geophysical Data-Pages 3,5,7,9,11,13,15,17,19,21,23,25

National Geophysical Data Center (NGDC)

325 Broadway
Boulder, CO 80302

Phone: (303) 497-6215
FTS 320-6215

Satellite Data-Page 27

Satellite Data Services Division (SDSD)

Room 606
World Weather Building
Washington, DC 20233

Phone: (202) 763-8111
FTS 763-8111

Meteorological Data-Pages 29,31,33

National Climatic Data Center (NCDC)

Federal Building
Asheville, NC 28801

Phone: (704) 259-0682
FTS 672-0682

Oceanographic Data-Pages 35,37,39,41

National Oceanographic Data Center (NODC)

User Services Branch, OC2
2001 Wisconsin Avenue, NW
Washington, DC 20235

Phone: (202) 634-7500
FTS 634-7500

Glaciological, Snow, and Ice Data-Pages 43,45,47,49

World Data Center A-Glaciology (Snow and Ice)

Box 449
University of Colorado
Boulder, CO 80309

Phone: (303) 492-5171
FTS 320-5311

Data or additional information should be requested through one of the discipline-oriented data centers listed above. In the case of a request for data of multi-disciplinary nature, the request will be handled through the data center most convenient to the user. The data center involved will make any additional contacts so that only one point of contact will be required by the data requestor.

When ordering data or information, please make reference to this publication and indicate the type of data of interest as well as the page number describing the data.

OTHER PUBLICATIONS DESCRIBING NESDIS DATA HOLDINGS, PRODUCTS, AND SERVICES

Meteorological and Satellite Data

Available through NCDC:

- Climatological Data for Antarctic Stations
- Selective Guide to Climatic Data Sources
- Index of Surface Marine Climatic Data Products

Available through SDSO

- National Holdings of Environmental Satellite Data

Available through NTIS:

- Guide to Standard Weather Summaries and Climatic Services

National Technical Information Service
Port Royal Road
Springfield, VA 22161

Oceanographic Data

Available through NODC:

- NODC Users Guide

Geological and Geophysical Data

Available through NGDC.

- Marine Geology and Geophysics Data Services and Publications
- Earthquake Data Services and Publications
- Marine Geophysical Data Catalog
- Solar-Terrestrial Physics Services and Publications

Glaciological Data

Available through WDC-A Glaciology (Snow and Ice)

- Glaciological Data Reports