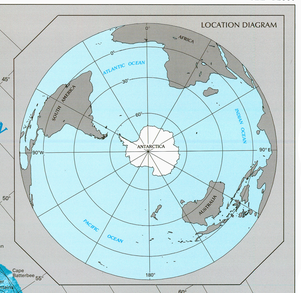
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

ANTARCTICA

MISCELLANEOUS INVESTIGATIONS SERIES
MAP I-2560

LOCATION DIAGRAM



ANTARCTIC PENINSULA
SCALE 1:3 000 000
0 50 100 150 KILOMETERS
0 50 100 MILES

McMURDO SOUND AREA
SCALE 1:1 000 000
0 25 50 75 KILOMETERS
0 50 MILES

SATELLITE IMAGE MAP OF ANTARCTICA

By

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1996

Reprinted with minor revisions 2000

Prepared by the U.S. Geological Survey with joint support from the National Science Foundation Interagency Agreement OPP-9114787.

This satellite image map was produced by substantially modifying an earlier image map of Antarctica, U.S. Geological Survey (USGS) Miscellaneous Investigations Series Map I-2581, published in 1997. The data have been added to the earlier image base to replace areas where clouds obscured surface features; as a result, the new map base is a nearly cloud-free mosaic. The image data have been digitally enhanced, and geographic place-names and generalized topographic contours have been added.

The satellite images used in this mosaic were acquired by the Advanced Very High Resolution Radiometer (AVHRR) sensors on the National Oceanic and Atmospheric Administration (NOAA) 6, 7, 9, 10, 11, and 12 satellites during the period 1980-1994. Although the AVHRR scans a 2,400-km-wide swath and can image nearly half of the continent on a single orbital pass, 63 satellite passes totaling 4,500 hours of AVHRR data were needed to compile this nearly cloud-free data set. Most of the remaining cloud areas have been contoured on the map to minimize confusion between clouds and land-surface features.

The digital image base that was used previously was mosaicked, controlled, and geometrically corrected by the National Remote Sensing Center, United Kingdom. Details of the processing can be found in the *International Journal of Remote Sensing* (1989, v. 10, nos. 4 and 5, p. 669-674). The USGS evaluated the geometric accuracy of the mosaic and determined that the maximum error was 5 km. The USGS then replaced areas of cloud cover in the original mosaic with cloud-free data from other AVHRR images. Replacement images were geometrically corrected to the first image base, digitally inserted into the mosaic, and tone matched to blend with the surrounding images. Finally, the entire mosaic was completed, bands 1 (visible, 0.53-0.68 micrometers) and 2 (near-infrared, 0.725-1.10 micrometers were averaged, and the entire data set was enhanced using a ±1 x σ linear spectral filter. The results were then contrast stretched. The stretch was designed to expand the mid-tone range of brightness values, where 90 percent of the data were located. Stretching the mid-tones helps to discriminate surface features and optimizes the data for lithographic printing.

Geographic place-names used on the map for local, regional, and topographic features have been approved by the U.S. Board on Geographic Names. Feature names in parenthesis are variant names that more accurately describe the feature. Topographic contours were obtained from the Scientific Committee on Antarctic Research (SCAR) Antarctic Digital Database and modified where necessary to fit the image base. Two insets cover areas of significant scientific interest. The Antarctic Peninsula inset uses a NOAA AVHRR image base enlarged to a scale of 1:1,000,000. The McMurdo Sound Area inset uses a Landsat multispectral scanner (MSS) image base at a scale of 1:1,000,000.

The successful completion of this edition of the AVHRR image map is due to the assistance of many individuals. J.G. Utz and J.C. Matheson at the USGS helped with digital plotting. T.A. Scambos of NOAA's National Snow and Ice Data Center and W.G. Gould and R.J. Derycke of Satellite Systems Applications, Inc., assisted in the search for replacement AVHRR data. P. Skvarca, Instituto Antártico Argentino, and I.W. Thomson, British Antarctic Survey, supplied information on coastal change in the Larsen Ice Shelf area. N.W. Young, Australian Antarctic Division, provided elevation data in the Lambert Glacier basin. In addition, many Antarctic researchers provided formal and informal reviews.

SCALE 1:6 000 000

Polar stereographic projection, standard parallel 71° South

100 0 100 200 300 400 500 MILES
100 0 100 200 300 400 500 600 700 KILOMETERS

EXPLANATION OF MAP SYMBOLS

Topographic contours on the ice surface–Dashed where interpolated. Modified from the Antarctic Digital Database (United Kingdom). Datum is mean sea level. Contour interval: 500 m from 0 to 2000 m; 100 m above 2000 m. Some contours omitted in areas of steep slopes.

Spot elevations, in meters above mean sea level

Stations
- Permanent (as of 1999)
- Summer (as of 1996)
- Historic (as of 1996)

Selected major changes in ice shelf and ice/coastal margin since image data were acquired

Location of clouds obscuring imagery. Not all clouds are shown.

IMAGE IDENTIFICATION

Mosaic area	NOAA satellite	Acquisition Date	Acquisition Time (GMT)	Mosaic area	NOAA satellite	Acquisition Date	Acquisition Time (GMT)	Mosaic area	NOAA satellite	Acquisition Date	Acquisition Time (GMT)
1	10	28 Dec 1987	0901	14	9	28 Jan 1987	1343	21	6	17 Jan 1981	2052
2	6	24 Jan 1981	0846	15	6	19 Feb 1990	0243	28	12	06 Jan 1992	1901
3	12	15 Jan 1994	1051	16	9	31 Jan 1987	0621	29	7	12 Feb 1983	0439
4	7	31 Aug 1980	0522	17	12	15 Jan 1994	0130	30	12	08 Dec 1992	1539
5	6	23 Aug 1980	0859	18	11	16 Jan 1994	0109	31	12	08 Dec 1992	1539
6	6	24 Nov 1980	0908	19	6	18 Jan 1980	2309	32	12	21 Dec 1993	1152
7	9	29 Nov 1986	2206	20	9	11 Dec 1986	1043	33	12	08 Nov 1994	1411
8	10	11 Feb 1990	0740	21	9	04 Nov 1990	2323	34	12	08 Nov 1994	1411
9	6	11 Feb 1990	0740	22	6	04 Nov 1990	2323	35	K	08 Nov 1990	0629
10	6	27 Nov 1980	0258	23	7	14 Jan 1980	2256	36	11	11 Jan 1994	0130
11	7	29 Jan 1983	1602	24	11	01 Dec 1992	1015	37	11	11 Jan 1994	0130
12	7	29 Jan 1983	1602	25	11	01 Dec 1992	1015	38	9	24 Feb 1987	2251
13	9	12 Apr 1986	1524	26	6	12 Jan 1990	1836				

IMAGE COVERAGE DIAGRAM

USGS Antarctic Program

Antarctic Treaty

The land and ice has (attached) ice south of 60 S latitude and contains all rights of territorial sovereignty, which reserves the region for peaceful purposes and imposes conservation and waste management measures. Some special areas may not be entered without a permit, issued only for compelling scientific purposes. The treaty's member consultative nations meet annually to discuss and vote on the end of 1998 administer activities of their citizens in Antarctica. Persons intending to enter Antarctica should be familiar with Antarctic Treaty provisions. The United States assures adherence to Antarctic Treaty conservation measures through Public Law 95-541. For more information regarding U.S. activities, or to apply for a permit, contact Permit Officer, Office of Polar Programs, National Science Foundation, Arlington, Virginia 22230.

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