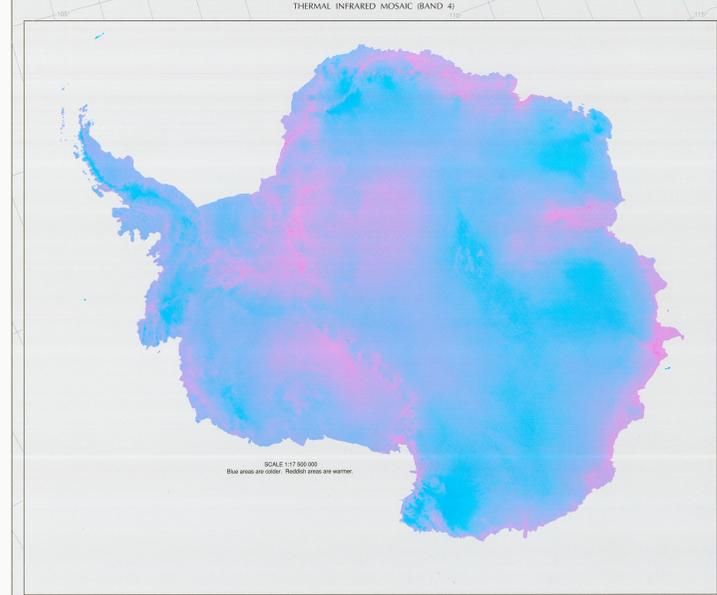


IMAGE IDENTIFICATION

Image No.	NASA Satellite	Acquisition Date	Time (GMT)	Image No.	NASA Satellite	Acquisition Date	Time (GMT)
1	19	28 Jan 1987	0845	16	19	21 Jan 1987	0215
2	19	14 Feb 1987	0823	17	19	17 Feb 1987	0242
3	19	29 Feb 1987	0828	18	19	18 Feb 1987	0236
4	19	14 Mar 1987	0828	19	19	22 Mar 1987	0232
5	19	29 Mar 1987	0828	20	19	12 Apr 1987	0439
6	19	14 Apr 1987	0828	21	19	13 Apr 1987	0232
7	19	29 Apr 1987	0828	22	19	19 Apr 1987	0232
8	19	14 May 1987	0828	23	19	20 Apr 1987	0232
9	19	29 May 1987	0828	24	19	24 Apr 1987	0232
10	19	14 Jun 1987	0828	25	19	04 May 1987	0232



SATELLITE IMAGE MAP OF ANTARCTICA
Prepared by the United States Geological Survey
in cooperation with the
National Oceanic and Atmospheric Administration and
the National Remote Sensing Center, England
with support from the National Science Foundation

This satellite image map has been prepared as a cooperative effort of the U.S. Geological Survey (USGS) and the National Oceanic and Atmospheric Administration (NOAA) in the United States and the National Remote Sensing Center (NRSC) in England. The data were supplied from NOAA satellites, the image mosaic was assembled by NRSC, and the map was prepared and printed by USGS, with support from the National Science Foundation. (Interagency Agreement DPP-91-147)

The images were acquired during the period 1986-1987 by Advanced Very High Resolution Radiometers (AVHRR) on the NOAA C-12 and 10 satellites. Although the AVHRR scans a swath 2400 km wide, 25 separate scenes were needed to assemble a mosaic of cloud-free ice. NRSC selected 68 parallel swaths acquired by NOAA before making the final selection. In some areas, small amounts of cloud could not be eliminated. The clouds and cloud shadows that partially obscure the image map have different shapes and sizes because of their type, altitude, and position in relation to the Sun. Some representative clouds have been annotated to aid confusion between clouds and land surface features would be minimized.

The AVHRRs continuously acquired four spectral bands of data on NOAA 6 and 10, and five bands on NOAA 7 and 9. These are:

AVHRR band	Wavelength (in micrometers)	Part of electromagnetic spectrum
1	0.55-0.68	visible
2	0.725-1.10	near infrared
3	3.55-3.95	shortwave infrared
4	10.50-11.50	longwave (thermal)
5	11.50-12.50	longwave (thermal)

Bands 1 and 2 were combined for the primary satellite image map. Band 1 is visible band in green with band 2 is near-infrared band printed in black to enhance surface detail. The pixel size of the original image varies from 1.1 km at the edge of a 2400 km swath to 4.4 km at 6 km nadir range at the edge. Band 4 is thermal infrared band; the low resolution from bands 1 and 2 was printed at a smaller scale in the lower left corner.

NRSC carried out numerous digital image processing steps including corrections of missing or distorted lines, correction of bands 1 and 2 for varying Sun angle illumination, resampling into a polar stereographic projection using ground control points, outlining the edges of the features to be used, and resampling the mosaic into a constant low resolution image of the continent. The mosaic was then re-sampled to a polar stereographic grid at 1:5,000,000 scale with a constant parallel of 71°S.

The ground control points used in the resampling transformation were selected visually by comparing images with a digitized coastline supplied by the South Polar Research Institute, Cambridge, England. The coastline was digitized from a variety of sources dating from 1961 to 1981. Thirty to fifty control points per image were selected along the coastline; uncertain coast boundaries generally were avoided. A distance discrepancy correction was applied to each image; the typical root-mean-square error was about 1.4 to 2.3 km. Ground control was not available or could not be readily identified in the interior of the continent, and only a few control points were used to minimize the introduction of other distortions during transformation. A more complete discussion of the procedures used by NRSC can be found in the International Journal of Remote Sensing, 1989, v. 10, nos. 4 and 5, p. 699-674.

The image mosaic in digital form was resampled by the USGS to a resolution of geographic accuracy and preparation for printing. The USGS identified and measured more than 30 points around or near the coast. The digital data were edited, resampled and processed to produce the materials used in making the printing plates. The extension north from coast was of the map is 2.5 km. A geographic grid, selected geographic place names, and the name, position, and nationality of permanent bases were added to the map. The thermal band was extracted from the mosaic and printed separately as a small-scale inset. The USGS prepared the mosaic area diagram and the list of names from information supplied by NRSC and added a location diagram showing Antarctica in relation to other continents.

In some areas along the coast, the image coastline shows differences in one or more significant details from previously digitized coastlines and existing maps. The list may be an different geographic position because of different dates of data collection. Each satellite image document contains the time of acquisition. In addition, the USGS, using Landsat imagery, existing maps, spot interpretation, and other sources, examined the entire coastline to eliminate most of the last and patch ice.

