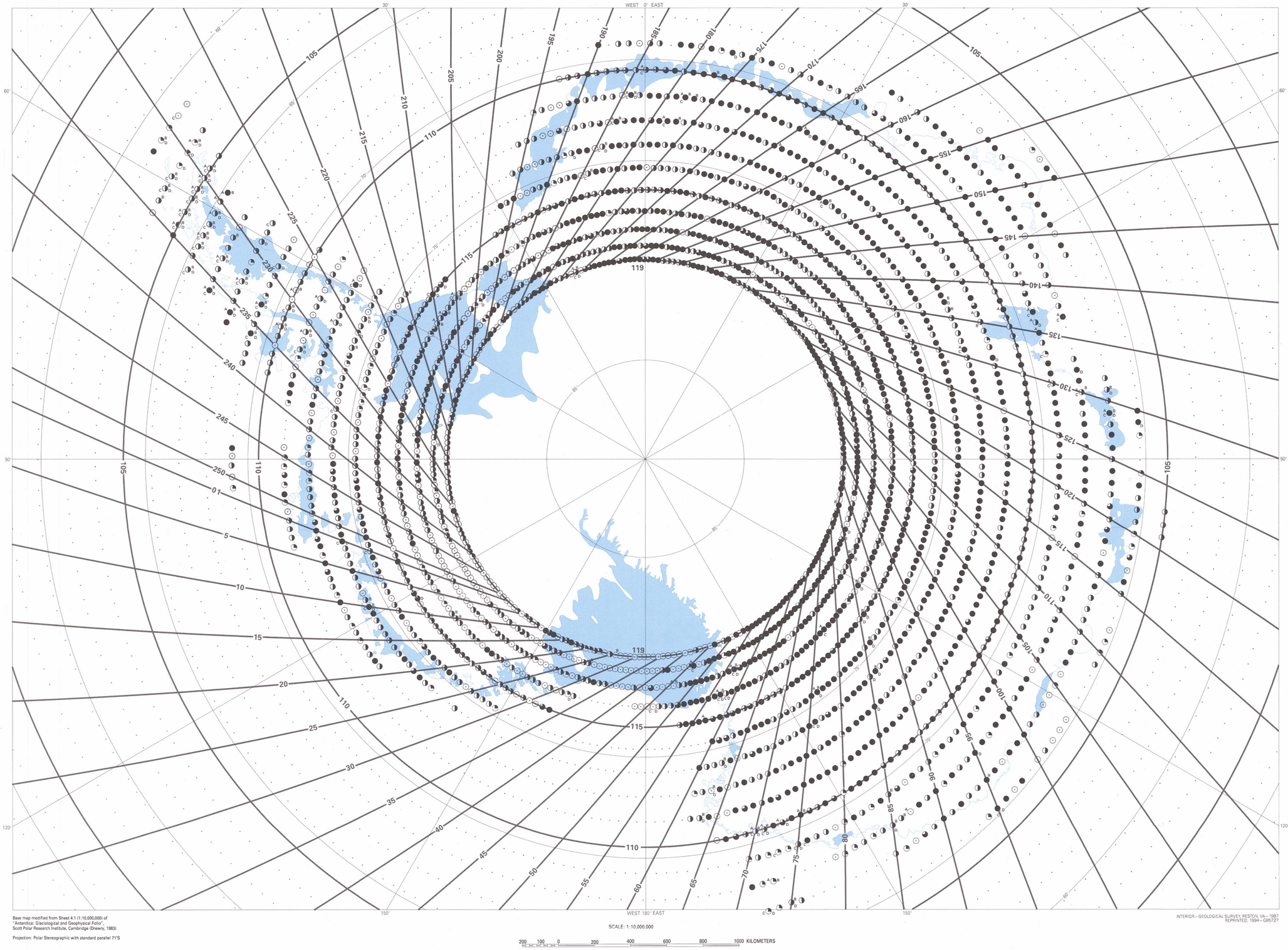
DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

PROFESSIONAL PAPER 1386–B
PLATE 2



Base map modified from Sheet 4.1 (1:10,000,000) of "Antarctica: Glaciological and Geophysical Folio", Scott Polar Research Institute, Cambridge (Drewry, 1983)

Projection: Polar Stereographic with standard parallel 71°S

INTERIOR—GEOLOGICAL SURVEY, RESTON, VA—1987
REPRINTED, 1994—GBS/727

INDEX MAP SHOWING OPTIMUM LANDSAT 1, 2, AND 3 IMAGES OF ANTARCTICA

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1988

DESCRIPTION OF INDEX MAP TO OPTIMUM LANDSAT 1, 2, AND 3 IMAGES OF ANTARCTICA

1. The path and row numbers for Landsat 1, 2, and 3 nominal scene centers follow the "Extended Canadian or Worldwide Reference System (WRS)" used by the U.S. Geological Survey's EROS Data Center, Sioux Falls, SD 57198 U.S.A., where all Landsat multispectral scanner (MSS) and return beam vidicon (RBV) images of Antarctica are archived. Complete imaging of the Earth's surface between about 81° north and south latitudes is achieved with Landsat 1, 2, and 3 MSS and RBV sensors in 251 orbits. These 251 orbits are divided into 119 rows of overlapping (15 percent), successive Landsat images acquired along the orbital path. The points of intersection of the orbital paths and the rows are known as nominal scene centers. This index map includes all nominal scene centers that give coverage of Antarctica beginning at the coast (defined as the boundary between the ocean and either bedrock or glacial ice) for all or parts of 17 rows from Row 103 (tip of Antarctica Peninsula) to Row 119 (about 81°S. latitude) and all 251 paths (orbits).

2. Actual Landsat 1, 2, and 3 scene centers can vary up to 40 km from the latitude and longitude coordinates of the nominal scene center, depending upon specific orbital path and framing; therefore, the precise area of coverage of each image can also vary.

3. Optimum Landsat 1, 2, and 3 MSS and Landsat 2 RBV images of Antarctica are evaluated on the basis of cloud cover (see explanation below). In the inland-ice regions the optimum image was selected both on the basis of minimum cloud cover and low solar elevation angle to enhance subtle morphologic details on the ice-sheet surface.

4. Landsat 3 RBV images are evaluated on the basis of the amount of distinguishable ground features on an image. Only usable (some distinguishable ground features) Landsat 3 RBV image subscenes (A, B, C, D) are included.

EXPLANATION OF SYMBOLS

Evaluation of image usability for glaciologic, geologic, and cartographic applications. Symbols defined as follows:

- Excellent image (0 to ≤ 5 percent cloud cover)
- Good image (>5 to ≤10 percent cloud cover)
- Fair to poor image (>10 to ≤100 percent cloud cover)
- Unusable image (100 percent cloud cover)
- No image available
- Nominal scene center for a Landsat image that lies beyond the coast of Antarctica
- Usable Landsat 3 return beam vidicon (RBV) scenes (A, B, C, D refer to usable RBV subscenes)

EVALUATION OF OPTIMUM LANDSAT 1, 2, AND 3 MSS IMAGES OF ANTARCTICA

Assessment Category	Number of Nominal Scenes	Percentage
Excellent image	933	37.1
Good image	187	7.4
Fair to poor image	937	37.3
Unusable image	153	6.1
No image available	304	12.1
Total:	2,514	100

The first two classes, comprising 44.5 percent of the nominal scene centers, have little or no cloud cover, minimum snow cover in areas of exposed rock, or were acquired during times of low solar elevation angle (above the horizon) to maximize morphologic details in the inland areas of the ice-sheet surface. Taking into account both image sidelap and suitability, about 70 percent of the Antarctic continent, from the coast to about 81° south latitude, has high quality Landsat MSS images available.

Landsat has the potential for imaging about 1.1 x 10^7km^2, or 79 percent of the area of Antarctica. It cannot image the region around the geographic South Pole, because it is beyond the Landsat orbit. About 70 percent of the Landsat imaging area (about 7.7 x 10^6km^2) or about 55 percent of the continent now has excellent or good coverage.

Approximate size of area encompassed by 1:10,000,000-scale Landsat MSS image. Landsat 3 RBV subscenes encompass slightly more than one overlapping quadrant (A, NW; B, NE; C, SW; D, SE) of an MSS nominal scene.

Information on cost and available formats of Landsat imagery of Antarctica may be obtained from Landsat Customer Services, EROS Data Center, Sioux Falls, SD 57198 U.S.A. (Telephone 605–594–6151).