

STATUS REPORT FOR THE SCAR WORKING GROUP ON GEODESY
AND GEOGRAPHIC INFORMATION, TOKYO, JAPAN
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U.S. GEOLOGICAL SURVEY COASTAL-CHANGE AND GLACIOLOGICAL MAPS
OF ANTARCTICA PROJECT

Jane G. Ferrigno and Richard S. Williams, Jr.
U.S. Geological Survey
929A National Center
Reston, VA 20192 U.S.A.

The Coastal-Change and Glaciological Maps of Antarctica Project has been discussed at previous SCAR meetings. In brief, the project has five objectives.

1. Determine Antarctic coastline changes that have occurred between the mid- 1970s and the late 1980s/early 1990s primarily using Landsat and other satellite imagery.
2. Identify accurately the glaciological characteristics of the Antarctic coastline (for example, ice fronts, ice walls, etc).
3. Determine ice surface velocities of glaciers at the coastline.
4. Compile a comprehensive inventory of the glaciers visible on remotely sensed images.
5. Publish the results as appropriate, including a series of 24 maps at 1:1,000,000-scale, a composite map at 1:5,000,000-scale, and digital products.

Additional material (USGS Fact Sheet, FS 050-98) is enclosed that explains the project in more detail. The current status and future plans are as follows.

Current status: During the last two years, the Coastal-Change and Glaciological Maps of Antarctica Project has made good progress. We have modified our methodology, changing from an analog/digital method to an exclusively digital process. Although our primary data set is still 1:500,000-scale Landsat photographic prints and interpreted feature overlays, the data is being scanned and digitally processed using ERDAS Imagine software. To improve the geodetic registration of the image data and to avoid the problem of widely scattered geodetic ground control having differing degrees of accuracy and different datums, we are registering the image data to the Radarsat mosaic of Antarctica. We are also evaluating the geodetic accuracy of the Radarsat mosaic to give an accuracy statement that will be valid for the entire series of maps. As before, we will add ice-velocity data that has been calculated by Rosanova and Lucchitta (USGS Flagstaff Field Center). The resulting digital files will be transformed to ArcInfo format and edited for publication on the Web by Cheryl Hallam (USGS/NMD). Contours from the Antarctic Digital Database (UK) will be added.

Products to date: The prototype (first) map has been published:

Swithinbank, Charles, Williams, R.S., Jr., Ferrigno, J.G., Seekins, B.A., Lucchitta, B.K., and Rosanova, C.E., 1997, Coastal-change and glaciological map of the Bakutis Coast, Antarctica, 1972-1990: US Geological Survey Geological Investigations Map I-2600-F; scale 1:1,000,000, with accompanying booklet, 12p.

Products in final editing stage: Three maps are planned for publication in 2000:

Swithinbank, Charles, and others, Coastal-change and glaciological map of the Saunders Coast, Antarctica, 1972-1990: US Geological Survey Geological Investigations Map I-2600-G, scale 1:1,000,000, with accompanying booklet.

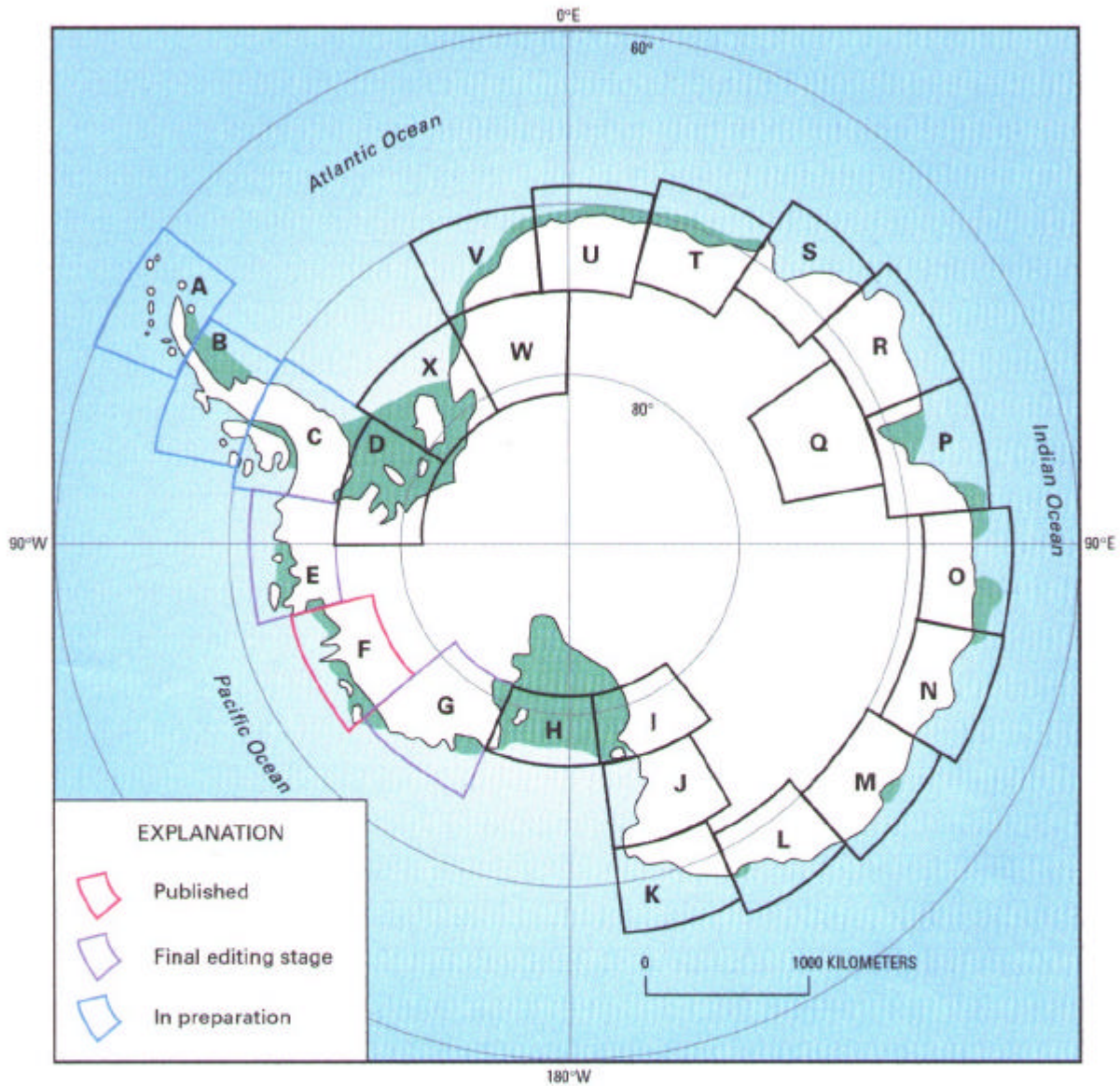
Swithinbank, Charles, and others, Coastal-change and glaciological map of the Eights Coast, Antarctica, 1972-1990: US Geological Survey Geological Investigations Map I-2600-E; scale 1:1,000,000, with accompanying booklet.

Swithinbank, Charles, and others, Coastal-change and glaciological map of the Bakutis Coast, Antarctica, 1972-1990: US Geological Survey Geological Investigations Map I-2600-F (revised using the new methodology); scale 1:1,000,000, with accompanying booklet.

Future plans: The next maps planned for production are the three maps that cover the Antarctic Peninsula (Trinity Peninsula, I-2600-A, Larsen Ice Shelf, I-2600-B, and Palmer Land, I-2600-C). These maps are being done in cooperation with Mrs. Janet Thomson of the British Antarctic Survey and Dr. Ing. Jörn Sievers of the Bundesamt für Kartographie und Geodäsie. Jörn Sievers is providing his highly accurate Landsat 4 and 5 mosaic of the Antarctic Peninsula to use as an image base, and Janet Thomson is making available some SPOT image data as well as a great wealth of historic coastline information. Ice-velocity measurements and ice front extents will be documented using all available satellite data. Data sets for the peninsula include Corona, AVHRR, Landsat MSS and TNL SPOT and ERS radar data, as well as the historic data.

Following the three peninsula maps, the maps covering the Ross Ice Shelf (I-2600-H) and Northern Victoria Land (Ross Island, I-2600-I, Drygalski Ice Tongue, I-2600-J, and Oates Coast, I-2600-K) will be produced, followed by the maps of the remaining coastline continuing in a counter-clockwise direction. We expect that our improved methodology will enable us to make good progress in the future.

Status of Antarctic Glaciological and Coastal-Change Project (AGCCP)



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|------------------------|---------------------------|
| A-Trinity Peninsula | M-Banzare Coast |
| B-Larsen Ice Shelf | N-Knox Coast |
| C-Palmer Land | O-Queen Mary Coast |
| D-Ronne Ice Shelf | P-Amery Ice Shelf |
| E-Eights Coast | Q-Lambert Glacier |
| F-Bakutis Coast (1997) | R-Mawson Coast |
| G-Saunders Coast | S-Prince Olav Coast |
| H-Ross Ice Shelf | T-Princess Ragnhild Coast |
| I-Ross Island | U-Fimbul Ice Shelf |
| J-Drygalski Ice Tongue | V-Cape Norvegia |
| K-Oates Coast | W-Caird Coast |
| L-George V Coast | X-Berkner Island |