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This research was supported by National Science Foundation grant DPP 82-14212 to Macalester College (G.F. Webers, principal investigator).

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Geology of the central Transantarctic Mountains

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Publication has been completed on a volume of the American Geophysical Union's *Antarctic Research Series* entitled "Geology of the Central Transantarctic Mountains." The 15 chapters in the volume were published as soft-cover minibooks as editorial work and printing schedules allowed. The final chapters were printed in early 1987, and the American Geophysical Union then issued foreword material for the volume, such as title page, contents page, etc., and plates for libraries and others to bind the contents into a single volume. The pocket plates are four colored geologic maps of the U.S. Geological Survey Antarctic Geologic Map Series. The complete contents of the volume and the plates are listed below.

This volume is the culmination of field studies done primarily by geologists from the Institute of Polar Studies, Ohio State University, and others beginning in the mid-1960s and continuing into the 1970s. Major discoveries in paleobotany and vertebrate paleontology in the 1969–1970 field season are reported here in chapters by James M. Schopf and E.H. Colbert, respectively. The remote field camp located at Coalsack Bluff in that season provided a base for helicopter-supported operations over a large area (Elliot 1970). That was followed by camps on the McGregor Glacier and Amundsen Glacier in the 1970–1971 season (Elliot and Coates 1971). Some of the results of that season are also presented here, as well as studies by other investigators in earlier and later seasons. The volume is published by the American Geophysical Union as volume 36 in its *Antarctic Research Series*, a project supported by the National Science Foundation. Chapters are available individually from the American Geophysical Union as indicated in the following list, in booklets of two, three, or four chapters.

Antarctic Research Series volume 36: *Geology of the Central Transantarctic Mountains*, Mort D. Turner and John F. Splettstoesser, editors.

Booklet:
- Paper 1. Gunner, John D. Basement geology of the Beardmore Glacier region, pages 1–9.
- Paper 2. Colbert, Edwin H. Triassic vertebrates in the Transantarctic Mountains, pages 11–35.
- Paper 3. Schopf, James M. Forms and facies of *Vertebraria* in relation to Gondwana coal, pages 37–62.

Booklet:
- Paper 4. Hoffman, J., A.E.M. Nairn, and D.N. Peterson. The paleomagnetic investigation of flows and sills from the Queen Alexandra Range, Antarctica, pages 63–74.
- Paper 5. Tasch, Paul, and Edward Leighman Gafford, Jr. Central Transantarctic Mountains nonmarine deposits, pages 75–96.
- Paper 6. Collinson, James W. and David H. Elliot. Geology of Coalsack Bluff, Antarctica, pages 97–102.
- Paper 7. Collinson, James W. and David H. Elliot. Triassic stratigraphy of the Shackleton Glacier area, pages 103–117.

Booklet:
- Paper 8. Robinson, Edwin S., and John F. Splettstoesser. Structure of the Transantarctic Mountains determined from geophysical surveys, pages 119–162.
- Paper 9. LaPrade, Kerby E. Climate, geomorphology, and glaciology of the Shackleton Glacier area, Queen Maud Mountains, Transantarctic Mountains, Antarctica, pages 163–196.

Booklet:

- Paper 10. Elliot, David H., Robert J. Fleck, and John F. Sutter. Potassium-argon age determinations of Ferrar Group rocks, Central Transantarctic Mountains, pages 197–224.
- Paper 11. Stump, Edmund. Stratigraphy of the Ross Supergroup, Central Transantarctic Mountains, pages 225–274.

Booklet:

- Paper 12. Mayewski, Paul A., and Richard P. Goldthwait. Glacial events in the Transantarctic Mountains: A record of the East Antarctic ice sheet, pages 275–324.
- Paper 13. Coates, Donald A. Late Paleozoic glacial patterns in the Central Transantarctic Mountains, Antarctica, pages 325–338.

Booklet:

- Paper 14. Barrett, P.J., David H. Elliot, and John F. Lindsay. The Beacon Supergroup (Devonian-Triassic) and Ferrar Group (Jurassic) in the Beardmore Glacier area, Antarctica, pages 339–428.
- Paper 15. Wade, F. Alton, and Carl A. Cathey. Geology of the basement complex, western Queen Maud Mountains, Antarctica, pages 429–453.

Plates:

- Barrett, Peter J., John F. Lindsay, and John Gunner. Reconnaissance geologic map of the Mount Rabot quadrangle, Transantarctic Mountains, Antarctica. *U.S. Geological Survey Antarctic Geologic Map,* No. 1, 1970.
- Lindsay, John F., John Gunner, and Peter J. Barrett. Reconnaissance geologic map of the Mount Elizabeth and Mount Kathleen quadrangles, Transantarctic Mountains, Antarctica. *U.S. Geological Survey Antarctic Geologic Map,* A-2, 1973.
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Advances in antarctic surveying and mapping

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The U.S. Antarctic Mapping Program directed its efforts in two major areas of mapping during the 1986–1987 antarctic season. These were 1:250,000-scale satellite image mapping and 1:50,000-scale topographic mapping. Other areas of emphasis included gravity data acquisition, geodetic analysis, South Pole activities, aerial photography, and maintenance of the Scientific Committee on Antarctic Research (SCAR) Library for Geodesy and Cartography.

The 1:250,000-scale Landsat Multispectral Scanner (MSS) image mapping project in the McMurdo Sound region progressed well with the original data processing taking place at the U.S. Geological Survey (USGS) Flagstaff facility and with reprocessing of the data to meet mapping specifications being done at the EROS Data Center. Follow-on projects using Landsat Thematic Mapper (TM) data have been scheduled and data acquisition has begun for satellite image maps (made from Landsat topographical mapping data) of the Siple Coast Ice Stream D&E areas.

The field surveying team cartographers, James Stoner and Kathy Covert, performed a joint geodetic and mapping control survey with surveyors from the New Zealand Department of Survey and Land Information (NZDSLI). The expert scientific and technical methods of the USGS team augmented by the highly experienced NZDSLI surveyors made this a very successful season. The control data acquired will support additional 1:50,000-scale mapping in areas of high scientific interest immediately to the north and south of the published 1:50,000-scale topographic maps of the dry valley area of northern Victoria Land. The USGS is analyzing the control data to provide the mathematical framework required for mapping. That data, together with aerial photography acquired by the USGS in previous seasons will be sent to New Zealand for map compilation. The USGS will then review and publish the maps. The program is expected to produce two maps per year with publication beginning in 1989.

The quality of the surveying will also support crustal motion studies in some areas. A tide gauge installed at McMurdo Station by New Zealand scientists was positioned by USGS using doppler satellite data. During the austral field season, 11 new stations were established by satellite doppler observations; 22 new stations were established by electronic traverse methods; and 36 previously established stations were reoccupied. In addition, eleven stations were established by intersection. Gravity data were obtained on 39 stations.

Geodetic analysis combining data obtained during the past three decades from the McMurdo Sound area to the Beardmore Glacier has been initiated. Preliminary results indicate an unadjusted vertical closure of less than 1 meter over an 800-kilometer distance. Classical and electronic survey data, satellite doppler data, and the Goddard Earth Model (GEM 10b) are used in the analysis. Additional analysis is being done to verify these results and to determine horizontal closure.

Three new 1:250,000-scale reconnaissance series maps that provide coverage for the base of the Antarctic Peninsula are