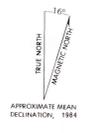


45° 30'

45° 25'

110° 15'

110° 05'



**EXPLANATION**

Contours shown on the accompanying map represent magnetic field intensity over the Stillwater Complex, a mafic igneous intrusion of Proterozoic age located in south-central Montana. The Stillwater Complex is approximately 10 miles in length, 2 miles wide and up to 1 mile high. It was emplaced about 2,700 Ma (Lambert and others, 1977) and is composed of a variety of mafic rocks. The complex is intruded by granitic rocks of the Stillwater pluton. The complex is composed of a variety of mafic rocks, including gabbro, diorite, and gneiss. The complex is intruded by granitic rocks of the Stillwater pluton. The complex is composed of a variety of mafic rocks, including gabbro, diorite, and gneiss. The complex is intruded by granitic rocks of the Stillwater pluton.

Magnetic data were obtained over the complex in 1979 by Anacosta Minerals Company. Flightlines were spaced approximately 200 m apart and oriented north-south, roughly parallel to the main geologic features of the complex. Data were collected by helicopter at a mean terrain clearance of 76 m (Lillian Turner, written communication, 1984). No flightlines were included in the compilation. Original data are no longer available, but magnetic intensity contour maps of these data at a scale of 1:24,000 were provided to the U.S. Geological Survey. The map shown here was created by (1) digitizing values of magnetic intensity from the original contour maps along flightlines, (2) interpolating the digitized values by standard techniques to a rectangular grid with grid intersections spaced 100 m apart, and (3) machine contouring the gridded data. Because of the large range of amplitudes, the contour interval is 20 m for values less than 57,500 mT and 100 mT for values greater than 57,500 mT. The map is scaled at 1:24,000 to conform with the geologic map of the Stillwater Complex by Ingersoll and Carlson (1982). It should be noted that some short-wavelength information present on the original contour maps is suppressed on the new map because of the digitizing and gridding procedures.

The largest magnetic anomalies exceed 65,000 mT and are located over the lowermost, a narrow, discontinuous band of magnetite-rich rocks conformable with the southeastern boundary of the complex (Page, 1977; Lambert and others, 1980). Other magnetic anomalies of significant but lower amplitude are associated with peridotite and certain other olivine-bearing rocks within the complex. Based on detailed studies of these data (Blakely and others, in press), secondary magnetic results from the magnetization of the olivine-bearing units is the most significant magnetic mineral within the complex.

**ACKNOWLEDGMENTS**

We are grateful to Anacosta Minerals Company for allowing these aeromagnetic data to be published.

**REFERENCES**

Blakely, R. J., and Slichter, W. L., 1985, Magnetic anomalies over a mafic intrusion: the Stillwater Complex, Montana. *Geology*, v. 13, p. 103-106.

Blakely, R. J., 1982, Stillwater igneous complex, Montana—a quantitative mineralogical study. *Geological Society of America Bulletin*, v. 93, p. 230-239.

Blakely, R. J., 1983, Primary textures and mineral assemblages in the Stillwater Complex, Montana. *U.S. Geological Survey Professional Paper 350*, 106 p.

Lambert, D. B., Hens, D. R., and Ingersoll, R. D., 1985, Isotopic investigations of the Stillwater Complex: a review. *Handbook on the Stillwater Complex, Montana system of Mines Special Publication 92*, in press.

Page, R. J., 1977, Stillwater Complex, Montana: from succession, metamorphism, and structure of the complex and adjacent rocks. *U.S. Geological Survey Professional Paper 999*, 70 p.

Page, R. J., 1982, Geologic map of the Stillwater Complex and adjacent rocks, Stillwater, Montana. *U.S. Geological Survey Bulletin*, v. 1382, scale 1:24,000.

Walters, D. W., Page, R. J., and Laska, T., 1980, Contact metamorphic effects of the Stillwater Complex, Montana: the contact aureole. *Journal of Metamorphic Geology*, v. 6, p. 109-122.

**MAPSHEET COPIES** -- showing total field anomaly in mT. Contour interval 20 mT for values less than 57,500 mT; 100 mT for values greater than 57,500 mT. Contours suppressed in regions of very high horizontal gradient.

This map is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature. Any use of trade names is for descriptive purposes only and does not imply endorsement by the USGS.

MAP SHOWING AEROMAGNETIC DATA OVER THE STILLWATER COMPLEX AND VICINITY, MONTANA

By  
 Richard J. Blakely

1984