DATA DESCRIPTION AND REDUCTION

The map of the residual total magnetic field was compiled from a synthesis of digital data acquired from forty-two aeromagnetic surveys. These surveys were flown at elevations ranging from 500 ft (0.15 km) to 2,500 ft (0.76 km) above terrain and with flight-line spacings of 0.5, 1, 2, and 4 mi (0.8, 1.61, 3.22, and 6.44 km). More than 90 percent of the total survey area was flown at a spacing of 1 mi (1.61 km) or less. Surveys covering western Virginia and western and central New York used a 2 mi (3.22 km) flight-line spacing. Data from the survey located in the eastern part of the Pennsylvania coverage were gathered at a spacing of 4 mi (6.44 km). Flight-line directions for most surveys were east-west.

The residual aeromagnetic field was obtained by removing the International Geomagnetic Reference Field (1965 and 1975) after updating to the years in which the surveys were flown. Alternative reference fields, GSFC1266 and POGO, were employed for two surveys, covering Indiana (Richardson, 1978) and southwest Illinois (Johnson and others, 1980), respectively.

To merge the various surveys, an elevation of 1,000 ft (0.30 km) above terrain was selected as the reduction datum level. Surveys flown in a draped mode (constant elevation above terrain) above or below this datum level were analytically continued upward or downward so that the data are compatible. For surveys flown at a constant barometric altitude, the mean terrain clearance within the survey area was determined and used to analytically continue the associated data to the selected reduction datum level. Using the mean terrain clearance in the continuation process considerably reduced the amount of computations in data reduction and should not produce any significant errors because the coverage of this map generally includes regions of relatively constant elevation. The survey of western Virginia, flown predominantly at a barometric altitude of 3,500 ft (1.07 km), however, encompasses an area of the Appalachian Mountains where terrain ranges in altitude from about 1,500 ft (0.46 km) to 4,200 ft (1.28 km). Because no level adjustments were made to the data, terrain effects may be contained in the associated magnetic field for this survey.

After reducing the surveys to a common elevation, they were merged utilizing one-dimensional splining techniques described by Bhattacharyya and others (1979). A two kilometer grid of values, using a minimum curvature method (Briggs, 1974), was created and then contoured utilizing Applicon Incorporated* proprietary software.

*Use of a specific brand name does not necessarily constitute endorsement of the product by the U.S. Geological Survey.

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SCALE 1:1 000 000

25 0 25 50 75 100 MILES

25 0 25 50 75 100 KILOMETERS

MAP WAS COMPUTER GENERATED

AEROMAGNETIC MAP OF EAST-CENTRAL UNITED STATES

By
T. G. Hildenbrand, R. P. Kucks, and R. W. Johnson, Jr.
1981

Data gridded at spacing of 2 km; on Lambert Projection with 87° west as central meridian

Data adjusted to an elevation of 1000 feet (0.30 km) above mean terrain clearance. Contour interval 50 gammas

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