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Digital Data for an Aeromagnetic survey of Central Georgia

by

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ABSTRACT

Digital data are given for an aeromagnetic survey, flown in 1972, of part of the central Georgia Piedmont. The survey was flown at a nominal terrain clearance of 500 ft along flight lines spaced 1 mile apart and oriented in a northwest-southeast direction. The digital data were obtained by digitizing the original analog contour maps and are contained on a 3.5 inch, high density diskette included with this report. The digital data are in the form of a binary file of 63,512 records, formatted for a personal computer using the DOS operating system.

INTRODUCTION

In 1972 the U.S. Geological Survey (USGS) contracted for an aeromagnetic survey of the southernmost part of the Piedmont geologic province in central Georgia. The survey location is shown in figure 1. The survey (USGS # 3018) was flown nominally at 500 ft above ground along flight lines spaced 1 mile apart oriented in a northwest-southeast direction. This direction was chosen because it is approximately perpendicular to structural trends of the metamorphic rock units. Approximately 7800 line miles were flown, which included tie lines. The output of the magnetometer was recorded on a paper strip-chart. The magnetic total field data were adjusted for diurnal variations. A regional magnetic reference field (IGRF 1972) of approximately 8.45 nanoTeslas/mile in a N3°W direction, had been removed from the contoured data set by the contractor (U.S. Geological Survey, 1973). The corrected data were then displayed as 13 hand-contoured maps at a scale of 1:62,500. The contour interval of the maps is 20 nanoTeslas (nT) with supplemental 10 nT contours. Nearly all of the data processing was done in analog form. A photomosaic of the contour maps at a scale of 1:250,000 was released to the open file in 1973 (U.S. Geological Survey, 1973).

Since the time of this survey, most aeromagnetic surveying contracted by the USGS has been recorded digitally in flight and then processed to the final maps on a digital computer and a computer-controlled plotter. Besides the advantage of automated processing, digital aeromagnetic data makes possible a variety of presentation modes and derivative products. Another advantage follows when merging multiple aeromagnetic surveys into regional digital data sets; the resulting maps are more accurate than those compiled with analog data. The southeastern United States has been nearly completely covered by good quality aeromagnetic surveys. But because a significant number of these are analog surveys, conversion of these data to digital form is necessary before a digital regional grid can be completed.

DIGITIZING PROCESS

Each of the 1:62,500 scale aeromagnetic contour maps was first reduced by 35% on a large photocopier to get the maps to manageable size. Digitizing was performed using a digitizing tablet attached to a personal computer. The hardware was controlled by program

DIGIT (R. Godson, unpublished) running under the DOS operating system. Points on the map were digitized where the marked flight lines are crossed by contours. In addition, selected contour closures were digitized between flight lines. The digital data were recorded as three values for every point, latitude, longitude, and residual magnetic intensity.

THE DIGITAL FILES

The digital data are contained on a 3.5 inch, high density diskette written on a microcomputer using the MSDOS operating system (see table 1 for listing of files). The output digital file is named f3018.xyz and is a binary file of 63,512 records, and a total size of 889,170 bytes. Each logical record represents one digitized location and consists of 3 fields: west longitude, north latitude (both in degrees), and residual magnetic field in nanoTeslas (arbitrary datum). The format of the file matches the binary XYZ type described by Cordell and others (1992) and Grauch and others (1993). The binary file can be converted to an ASCII listing by program XYZ2A.EXE included on the disk, with the Fortran code (from Grauch and others, 1993). The program operates under the DOS operating system, but requires a math coprocessor. Only the names of the input and output files are required as user input to the program. The ASCII output file will be 3,175,600 bytes. Therefore, direct the output to a hard drive which has more than 3.2 megabytes of free space.

Table 1 Listing of files on diskette.

File Name	Bytes	Description
F3018.XYZ	889,170	Binary data file
XYZ2A.EXE	27,850	Executable code
XYZ2A.FOR	649	Fortran code
README.TXT	7,965	Text of the report
Total	925,634	

REFERENCES CITED

Cordell, Lindrith, Phillips, J.D., and Godson, R.H., 1992, U.S. Geological Survey potential-field geophysical software version 2.0: U.S. Geological Survey Open-File Report 92-18 A-H, 16 p.

Grauch, V.J.S., Phillips, J.D., Hoover, D.B., Pitkin, J.A., Livo, K.E., and McCafferty, Anne, 1993, Supplemental materials for the workshop "Geophysical map interpretation on the PC, convened April 21-22, 1993: U.S. Geological Survey Open-File Report 93-560 A-D.

U.S. Geological Survey, 1973, Composite aeromagnetic map of south-central Georgia: U.S. Geological survey Open-File Report 73-324, scale 1:250,000.

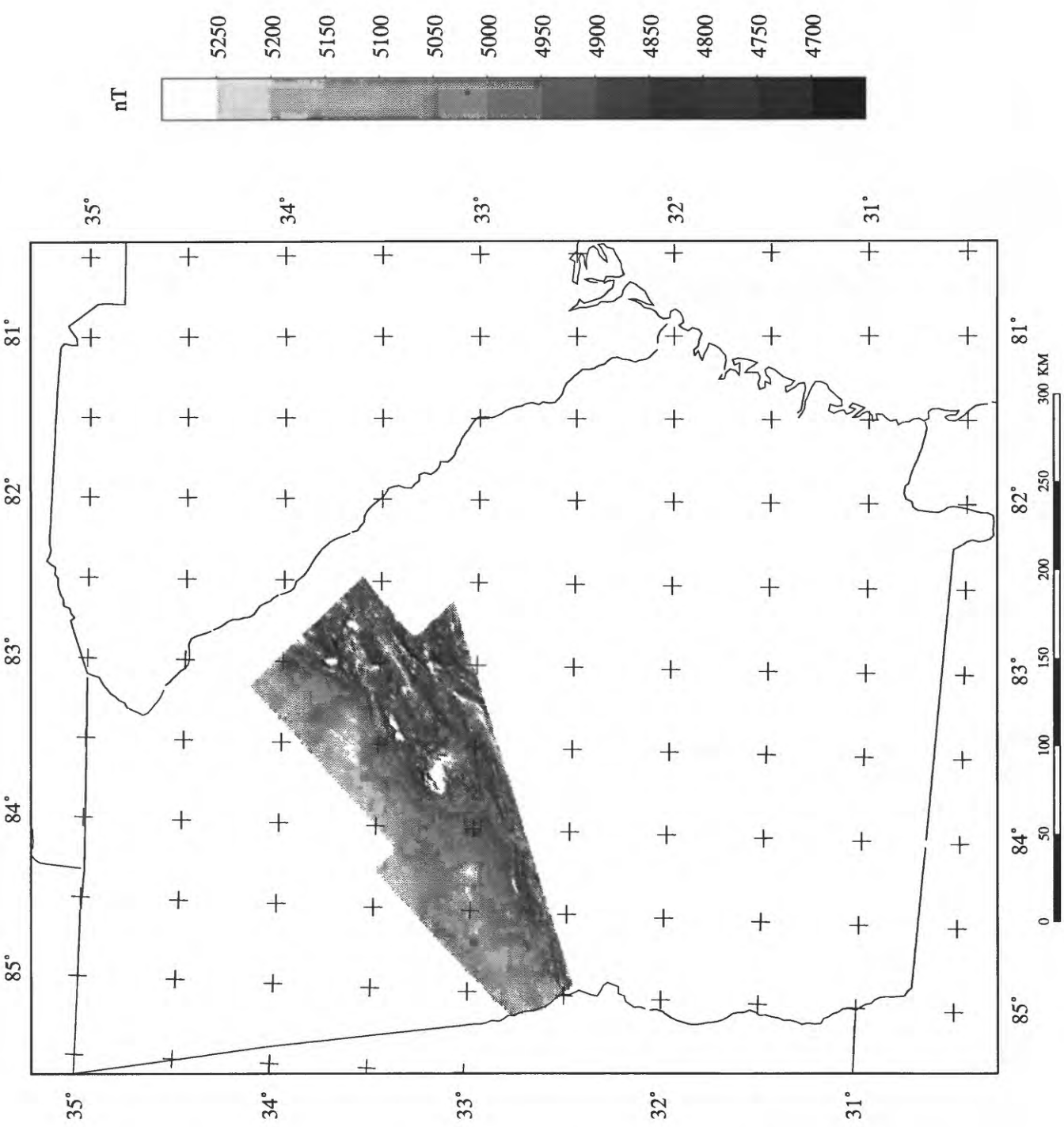

Figure 1 Map showing the location of the aeromagnetic survey within the state of Georgia. The aeromagnetic data are shown as a gray-scale image.