U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

CASERTZ NORTH CENTRAL (NC) REGION

OPEN FILE REPORT
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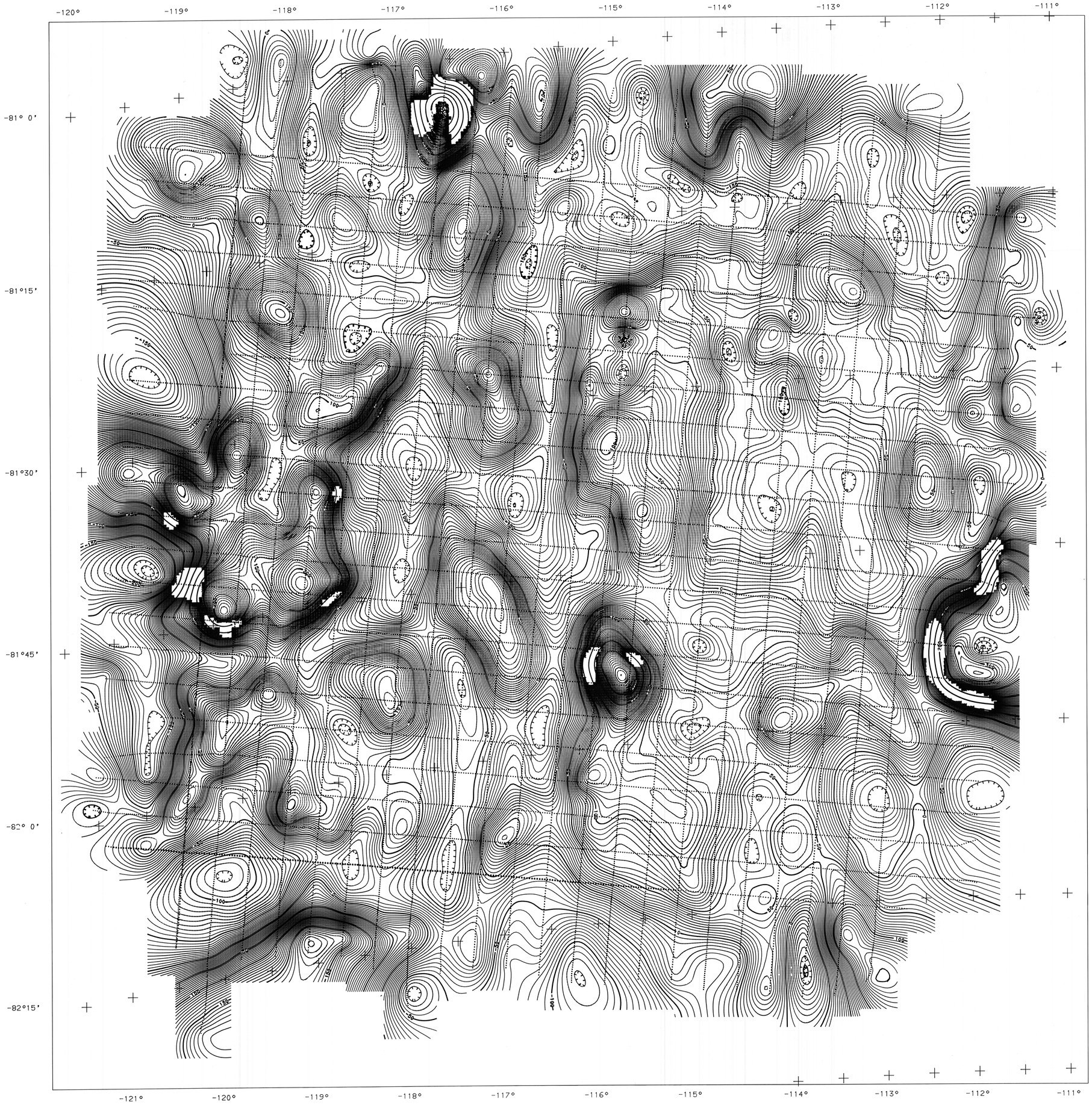
SHEET 1 OF 4



SCALE 1:250 000

5 0 5 10 15 20 25 MILES

5 0 5 10 15 20 25 KILOMETERS

AEROMAGNETIC MAPS OF THE EASTERN ROSS TRANSECT ZONE, WEST ANTARCTICA, FOLIO A

By

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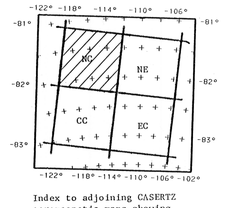

Index to adjoining CASERTZ aeromagnetic maps showing location of this map.

Introduction

The 1991-92 CASERTZ (Corridor Aerogeophysics of the South East Ross Transect Zone) aerogeophysics survey was flown in December, 1991, and January, 1992. Covering approximately 25,000 line-kilometers, this survey made simultaneous measurements of radar ice soundings, laser altimetry, gravity, and magnetics. These data were collected in 4 regions, called CC, EC, NC, and NE, each dimensioned 111-km by 111-km. The transects flown in these regions were separated by 5.3 km in both the flight-line and orthogonal tie-line directions. The magnetic field observations are accurate to one nanoTesla. High-resolution horizontal and vertical positions were obtained from differential positioning techniques based on Global Positioning System (GPS) satellites. When GPS satellite positioning was unavailable, the laser altimetry was corrected using attitude information from an inertial navigation system, and a digital pressure transducer was used to recover vertical positions and accelerations. Original flight-elevation (barometric) specifications were: CC at 2250 meters, EC at 2750 meters, NC at 2500 meters, and NE at 2750 meters. The latitudes of the survey ranged from approximately -81 to -83.5 degrees; the longitudes from approximately -104 to -123 degrees.

Data Reduction

The CASERTZ aeromagnetic survey was reduced by removing both internal and diurnal (temporal) components of the magnetic field. The internal component was represented by the IGRF1990, updated to the day each transect was flown (Sweeney, 1990). For the diurnal field, we used the recordings from two ground base station magnetometers, located at the CASERTZ base camp near the middle of the survey. These base magnetometer values were reduced by 57,150 nanoTeslas, the average quiet-time geomagnetic value at the CASERTZ camp (Saltus and Kucks, 1992). Further temporal reduction and correction for variances in elevation were made by adjusting the data at the transect intersections using an algorithm of Mittal (1984). The data were then gridded with a 1.5 km grid interval (Webring, 1981), and contoured with a contour interval of 5 nanoTeslas (Godson and Webring, 1982).

Map Explanation

The values of the magnetic contours on the map represent the residual total magnetic field at those locations. The map is displayed in a Polar Stereographic projection, with a standard parallel of -80 degrees, and a central meridian of -110 degrees. The contour interval is 5 nanoTesla. The dotted lines on the map show the flight-line locations.

References Cited

Godson, R.H., and Webring, M.W., 1982, CONTOUR - A modification of G. I. Evenden's general purpose contouring program: U.S. Geological Survey Open-File Report 82-797, 73 p.

Mittal, P.K., 1984, Algorithm for error adjustment of potential field data along a survey network, Geophysics, v. 49, p. 467-469.

Saltus, R.W., and Kucks, R.P., 1992, Geomagnetic activity and its implications for the 1991-92 CASERTZ aeromagnetic survey in Antarctica [abs.]: Eos (American Geophysical Union Transactions), v. 73, no. 43, suppl., p. 131.

Sweeney, R.E., 1990, IGRFGRID--A program for creation of a total magnetic field (International Geomagnetic Reference Field) grid representing the earth's main magnetic field: U.S. Geological Survey Open-File Report 90-45, A-B, 37 p., 1 diskette.

Webring, M.W., 1981, MINC--A gridding program based on minimum curvature: U.S. Geological Survey Open-File Report 81-1224, 41 p.

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