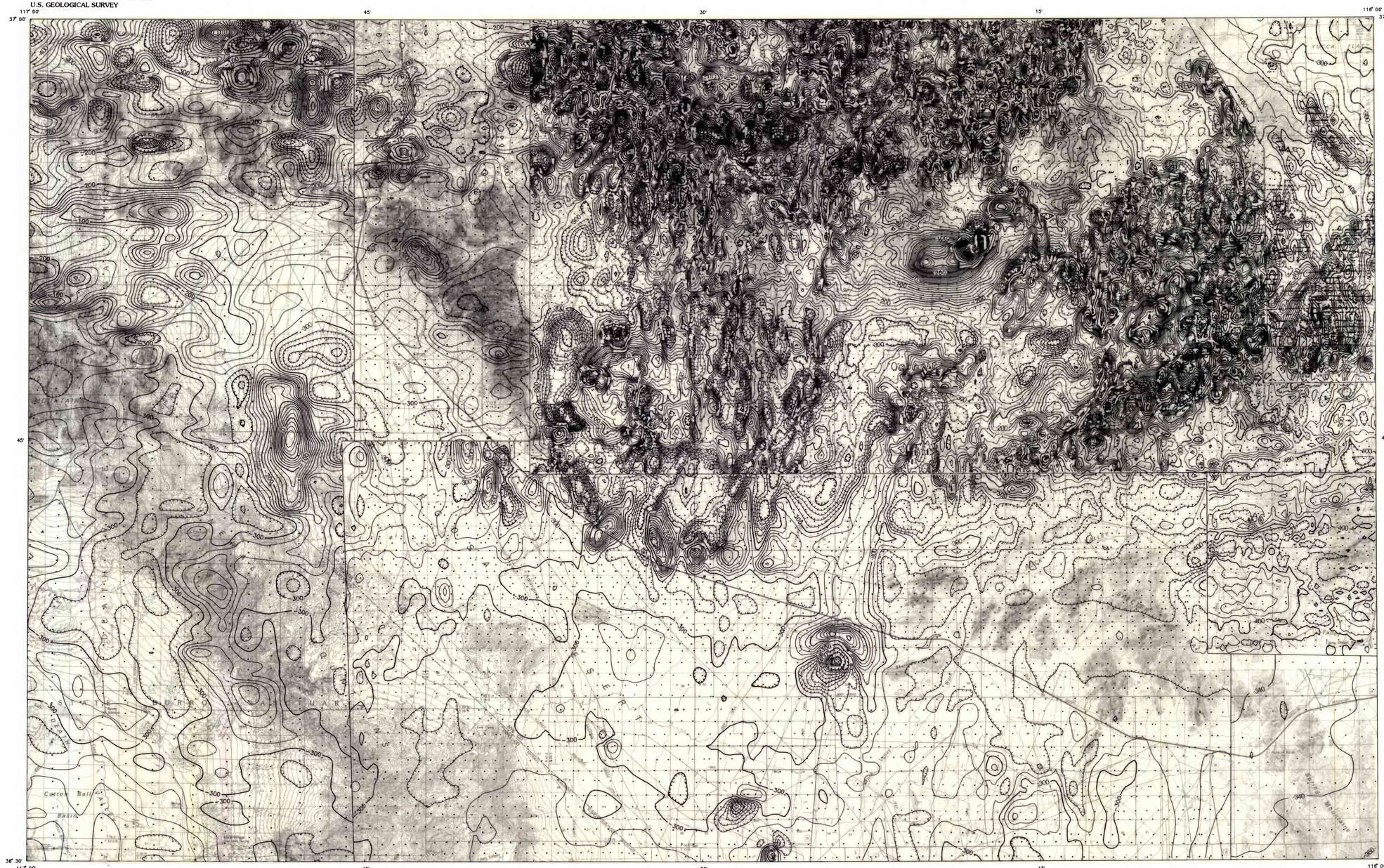
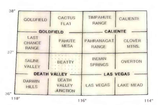
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

OPEN-FILE REPORT
91-105



Base from U.S. Geological Survey
1:100,000 Beatty, 1978.

Universal Transverse Mercator
Base latitude 36° 45' N.
Central meridian long 116° 30' W.



INDEX MAPS SHOWING AREA OF STUDY

APPROXIMATE MEAN
DECLINATION, 1980

SCALE 1:100 000

KILOMETERS 1 0 1 2 3 4 5 6 7 8 9 10

MILES 1 0 1 2 3 4 5

FEET 5000 0 5000 10000 15000 20000 25000

ELEVATION CONTOUR INTERVAL 50 METERS

MAGNETIC ANOMALY CONTOUR INTERVALS 20 AND 100 NANOTESLAS

AEROMAGNETIC MAP OF THE BEATTY QUADRANGLE, NEVADA - CALIFORNIA

By

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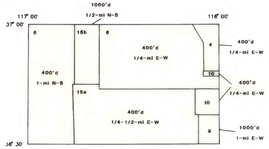
1991

DISCUSSION

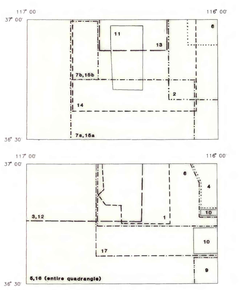
An aeromagnetic map of the Beatty quadrangle was prepared from six separate aeromagnetic surveys (4, 5, 6, 9, 10, and 15; fig. 1 and table 1). All available aeromagnetic surveys that are completely or partly within the Beatty quadrangle are shown in figure 2. The map is a mosaic of the most detailed surveys that cover the quadrangle. Data sets were chosen based on the quality of the aeromagnetic data and the spacing and altitudes of the surveys (table 1). Each data set was compiled from original contour data, except for the Yucca Flat survey (4, fig. 1 and table 1) which was digitized from an unpublished map (U.S. Geological Survey, unpub. data, 1971). In addition, a revised version of the Lathrop Wells survey was used because of positioning errors and missing data found in the original data set (Langenheim and others, 1991) (15, fig. 1 and table 1).

A regional magnetic gradient, calculated from the International Geomagnetic Reference Field (Peddie, 1982) was removed from each survey except the Yucca Flat survey (fig. 1 and table 1). The data were gridded at intervals of one-half the flightline spacing in approximately the direction of the flight path, and one flightline spacing in the perpendicular direction. This resulted in a grid interval of 800 x 1600 m for the Las Vegas survey (9, fig. 1 and table 1) and 200 x 400 m for all other surveys. The gridding algorithm is based on minimum total curvature which provides the least curvature consistent with the data (Briggs, 1974). A uniform datum, referenced to the Timber Mountain survey (6, fig. 1 and table 1) was achieved by adding a constant to each survey.

The aeromagnetic map is useful for identifying areas of geologic interest and for qualitative or quantitative interpretation. Although the mosaic map is difficult to quantitatively interpret across survey boundaries, it preserves the original character of each survey and allows quantitative assessments of individual anomalies within survey borders. In addition to the mosaic map, it is desirable to have a merged map in which surveys are analytically continued to a common level, datum adjusted, and merged. The mosaic and merged aeromagnetic maps are mutually complementary and together they enable a more comprehensive interpretation of magnetic anomalies. The merged map facilitates interpretations of anomalies that cross survey boundaries and yields a clearer picture of the magnetic field. Such a merged map was compiled for the state of Nevada by Hildenbrand and Kucks (1988). However, it contains less detailed data than the Yucca Flat and Lathrop Wells surveys shown here (4, 15; respectively; fig. 1 and table 1). Additional work is required to produce a similar merged map containing the most detailed data.



FIGURES 1.–Index map showing approximate aeromagnetic survey boundaries for surveys used in the compilation of the aeromagnetic map of the Beatty quadrangle.



FIGURES 2A AND 2B.–Index maps showing approximate aeromagnetic survey boundaries for surveys completely or partly within the Beatty quadrangle.

TABLE 1.–*Aeromagnetic surveys all or partly within the Beatty 1 x 1/2 degree quadrangle*
[Aero, Aero Service; AS, Aerial Surveys; AG, Applied Geophysics Inc.; b, barometric; d, drape; Geodata, Geodata International, Inc.; HLQER, High-Life QER; IGRF, International Geomagnetic Reference Field; LKB, Lockwood, Kessler, and Bartlett, Inc.; USNOO, US Naval Oceanographic Office; USGS, U.S. Geological Survey; var, variable]

Area	Name	Year flown	Contractor	Elevation (feet)	Spacing (mi)	Direction	Scale	Gradient Removed	Reference
				ORIGINAL SURVEYS					
1	Tegopah Spring	1961	USGS	8000b	1/2	E-W	1:62,500	no	Boynton and Vargo (1963b)
2	Cane Spring	1961	USGS	8000b	1/2	E-W	1:62,500	no	Boynton and Vargo (1963a)
3	Buffalog	1967	LKB	9000b	1	E-W	1:62,000	no	USGS (1967)
4 *	Yucca Flat	1971	USGS	400d	1/4	E-W	1:24,000		USGS (unpub. data,1971)
5 *	Death Valley	1977	Geodata	400d	1	N-S	1:500,000	IGRF	Geodata (1979)
6 *	Timber Mtn	1977	AG	400d	1/4	E-W	1:62,500	IGRF	USGS (1979)
7a	Lathrop Wells	1978	Aero	400d	1/4-1/2	E-W	1:62,500	IGRF	USGS (1979)
b		1978	Aero	1000d	1/2	N-S	1:62,500	IGRF	USGS (1978)
8	Clionex Stock	1980	USNOO	7000b	1	E-W	1:250,000	IGRF	Bath and others (1983)
9 *	Las Vegas	1982	HLQER	1000d	1	E-W	1:250,000	IGRF	USGS (1982)
10 *	Mercury	1982	HLQER	400d	1/4	E-W	1:62,500	IGRF	USGS (1984a)
11	Yucca Mtn	1982	HLQER	400d	1/4	N-S	1:62,500	IGRF	USGS (1984b)
				ADDITIONAL MAPS - DERIVED FROM SURVEYS ABOVE					
12	Goldfield	1967	LKB	9000b	1	E-W	1:250,000	no	USGS (1971)
13	Timber Mtn	1977	AG	400d	1/4	E-W	1:48,000	IGRF	Kane and others (1991)
14	Yucca Mtn	1977	AS	400d	1/4	E-W	1:48,000	IGRF	Kane and Bracken (1983)
		1978	AG	1000d	1/2	N-S	1:48,000	IGRF	Kane and Bracken (1983)
15a*	Lathrop Wells	1978	Aero	400d	1/4-1/2	E-W	1:62,500	IGRF	Langenheim and others (1991)
b*		1978	Aero	1000d	1/2	N-S	1:62,500	IGRF	Langenheim and others (1991)
16	Nevada	var	var	1000d	var	var	1:750,000	IGRF	Hildenbrand and Kucks (1988)
17	NTS	var	var	400d	var	var	1:100,000	IGRF	Kirchoff and others (1989)

*Surveys used in the compilation of the aeromagnetic map of the Beatty quadrangle

EXPLANATION

Magnetic contours—showing residual total-intensity magnetic field of the Earth in nanoteslas (1 nanotesla = 1 gamma). Datum is arbitrary. Hachures indicate magnetic low. Contour intervals are 20 and 100 nanoteslas.

Flight path—showing location of approximately every tenth data point along a flightline. Because the Yucca Flat survey was digitized from a published map, dots represent flightline and contourline intersections.

Approximate survey boundary.

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Partly funded by the U.S. Department of Energy-Yucca Mountain Project. Interagency agreement DE-A308-78ET44802