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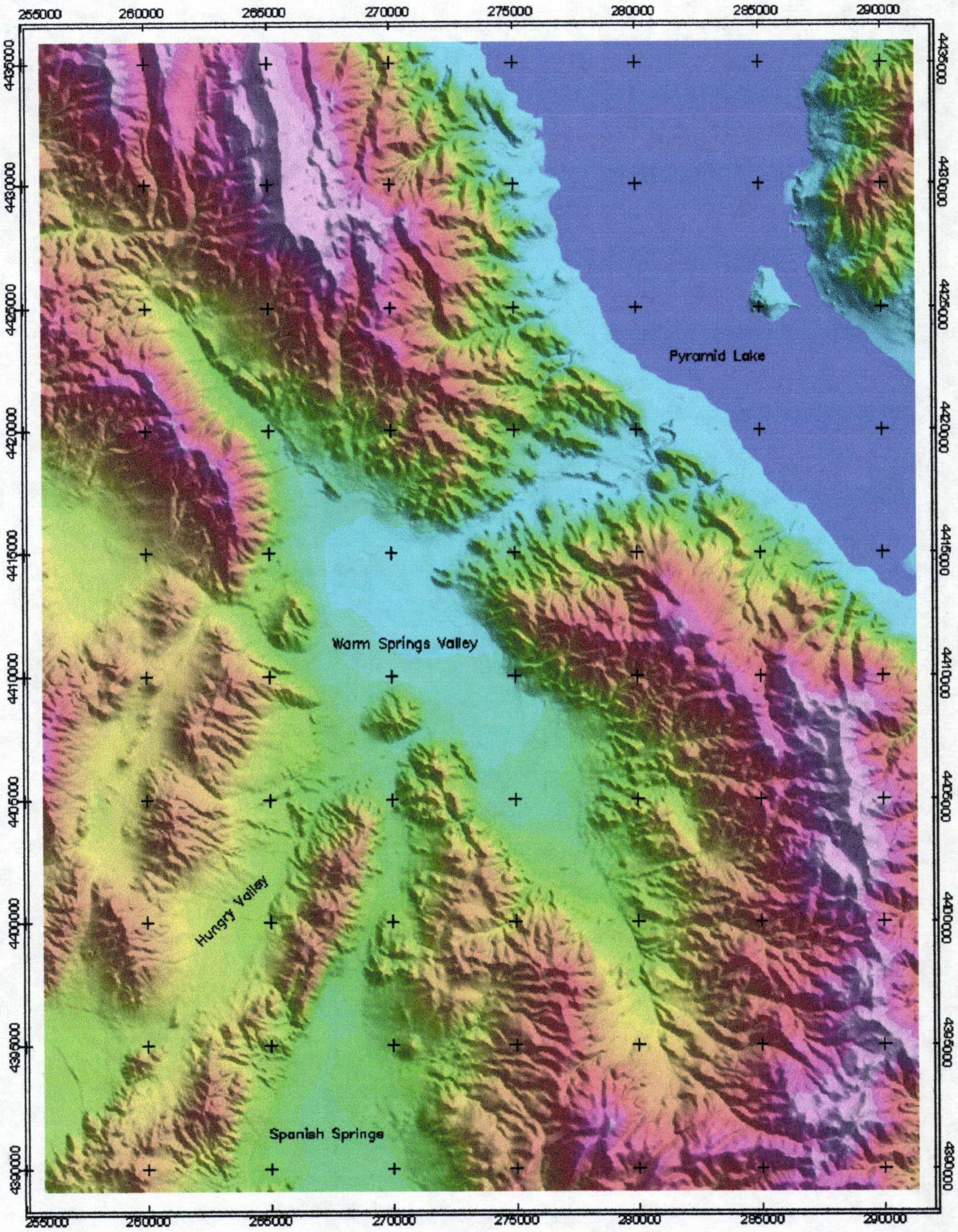
LINEAMENT ANALYSIS OF AN AEROMAGNETIC SURVEY, WARM SPRINGS VALLEY, WASHOE COUNTY NEVADA



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Introduction

This report discusses a lineament analysis of aeromagnetic data for Warm Springs Valley. The results can be used to further the understanding of geologic structure, particularly fault structure. The analysis combines recent work with a previous report by Paul Hartley (1995), under contract with the Washoe County Department of Water Resources. His analysis was to determine the depth of bedrock and the delineation of sediments within a portion of Warm Springs Valley.

Airborne Geophysical Data

Dighem, Inc. was contracted by Washoe County to conduct an airborne geophysical survey (Dighem, 1994). Magnetic and electromagnetic instrumentation was installed in a Lama turbine helicopter (Geoseis Helicopters, Inc.) which flew at an average airspeed of 100 kph (62 mph) with a magnetometer bird height of 30 meters (98 feet) above ground level. The survey consisted of 414 kilometers of traverse line (257 miles) oriented at 50°/230° to geographic north with 667 meters (2000 feet) line spacing. Two tie lines were oriented at 140°/320° to geographic north. The magnetic data was collected with a Picodas 3340 optically pumped cesium vapor magnetometer. The sampling rate was 10 per second with a sensitivity of 0.01nT. Navigation and positioning consisting of a Sercel NR 106 real-time differential global positioning system with <5 meter accuracy. A Scintrex MEP-710 cesium vapor magnetometer was operated at the survey base to record diurnal variations. The base station clock was synchronized with that of the airborne system to permit subsequent removal of diurnal drift. Data processing by Dighem Inc. consisted of corrections for diurnal variations and leveling. Data processing by Washoe County consisted of reduction to pole and 50 meters of upward continuation (Geosoft, 1999). The reduction to the pole shifts asymmetric magnetic fields to a symmetrical field that aides in determining the edges of magnetic bodies. The asymmetry being the signature of a magnetic body's geometry. Upward continuation reduces short wave length "noise".

Results

Figure 1 is a location map of Warm Springs showing the airborne flight lines and major roads. Figure 2 is a shaded relief map of the gridded Total Field Magnetic data that was reduced to the pole and upward continued 50m. The range between the low and high magnetic values is 2,500 nT (51,825 to 54,357 nT). In the southern half of the figure the magnetic "highs" are well correlated with the Pah Rah Range and the magnetic "lows" with relatively thick sedimentary basin-fill. Of particular interest is the large magnetic high west of the Pyramid Lake Highway (which bisects the map and is oriented north-south). This high is a subsurface magnetic body that appears to be associated with a mapped granitic dome located immediately to the south. Also shown is an unmapped subsurface magnetic ridge that trends northwest across the northern portion of the figure. In Figure 3, the Total Field Magnetic contours are placed onto a Digital Elevation Model (DEM) for Warm Springs. The granitic dome is well correlated to the magnetic high. The subsurface ridge is on strike with the edge of the south face of the Pah Rah Range and the Winnemucca Valley.