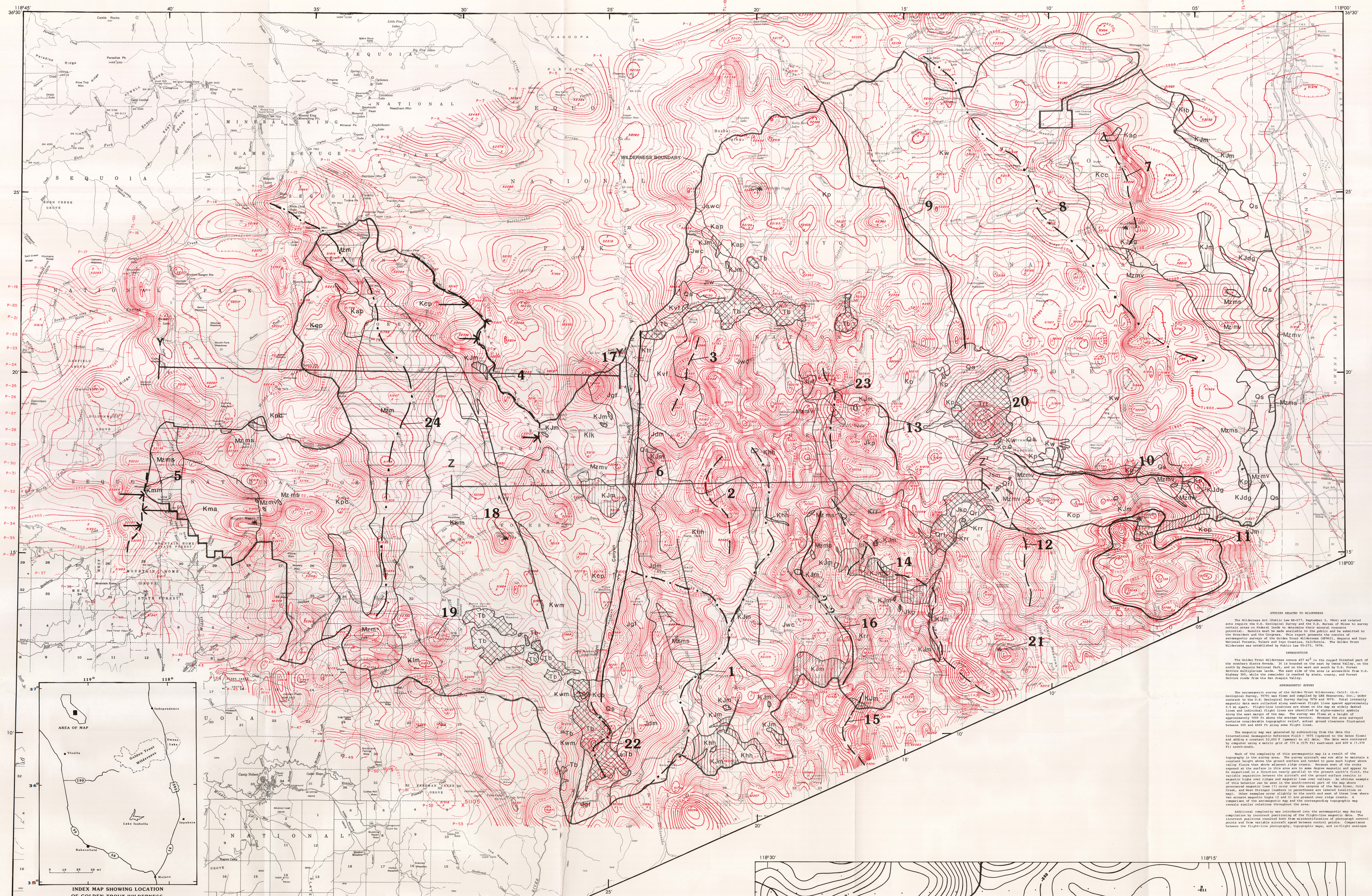
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-1231-D



Base from U. S. Geological Survey Camp Nelson, Hockett Peak, Kern Peak, Mineral King, Monache Mtn., and Olancha, 1956

SCALE 1:62500

CONTOUR INTERVAL 80 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

TRUE NORTH
MAGNETIC NORTH
$14\frac{1}{2}°$
APPROXIMATE MEAN DECLINATION, 1983

Aeromagnetic survey flown and compiled by LKB Resources, Inc., 1978-79.
Geology generalized from du Bray and Dellinger (1981)

MAP SHOWING AEROMAGNETIC INTERPRETATION OF THE GOLDEN TROUT WILDERNESS, TULARE AND INYO COUNTIES, CALIFORNIA

By
Robert C. Jachens and William P. Elder
1983

EXPLANATION

AXIS OF MAGNETIC HIGH--Arrows indicate direction and distance mapped high is offset from actual location

AXIS OF MAGNETIC LOW

LOCUS OF POINTS OF STEEPEST MAGNETIC GRADIENT--Queried where inferred

P-38 FLIGHT PATH--Showing location and spacing of data. Numbers identify each flight line

MAGNETIC CONTOURS--Showing total intensity magnetic field of earth in gammas. Hachured to indicate closed areas of lower magnetic intensity; contours omitted where data are too dense. Contour intervals 20 and 100 gammas

52118 MAXIMUM OR MINIMUM INTENSITY--Location measured within closed high or closed low

VOLCANIC ROCKS

METAMORPHIC ROCKS

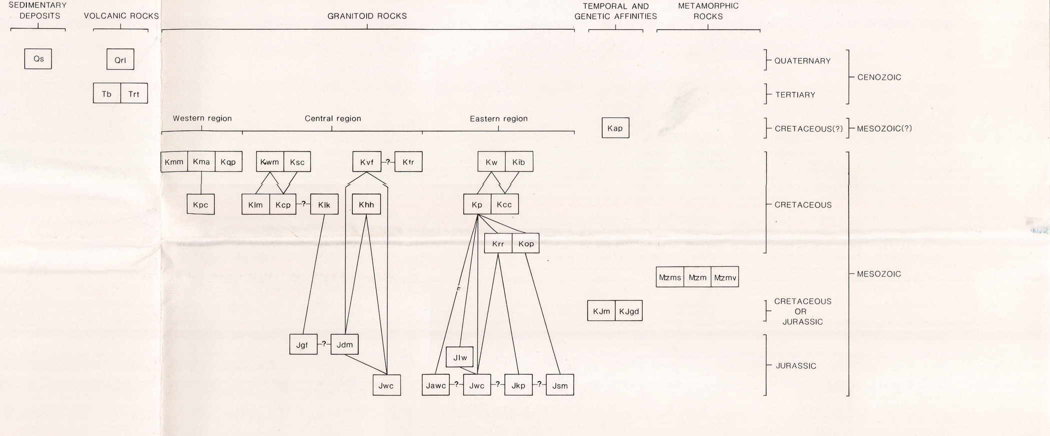
MAFIC PLUTONIC ROCKS

CONTACT--Dashed where approximately located

FAULT--Ball and bar on downthrown side. Arrows indicate direction of relative movement

APPROXIMATE BOUNDARY OF THE GOLDEN TROUT WILDERNESS

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

SEDIMENTARY DEPOSITS

Qs SURFICIAL DEPOSITS (QUATERNARY)--Alluvium, colluvium, talus, glacial moraine deposits, landslide deposits, river gravel, grus, and sand. Only those surficial deposits that obscure contacts between other units are included on map

VOLCANIC ROCKS

Qrl RHYOLITE OF LONG CANYON (QUATERNARY)--Porphyritic pumiceous rhyolite dome with associated pyroclastic-flow lobes at head of Long Canyon. Bacon and Duffield (1979) reported a potassium-argon age of 0.185±0.15 m.y.

Tb BASALT (TERTIARY)--Aa flows and cones in Malpais Valley and along Little Kern River

Trt RHYOLITE OF TEMPLETON MOUNTAIN (TERTIARY)--Flow-banded and dense pumiceous rhyolite forming one large dome, Templeton Mountain, and a smaller adjacent dome on northeast. Bacon and Duffield (1979) reported a potassium-argon age of 2.4±0.3 m.y.

GRANITOID ROCKS

Western region

Kmm ALASKITE OF MOSES MOUNTAIN (CRETACEOUS)--Medium-grained equigranular alaskite, characterized by scarcity of plagioclase

Kma ALASKITE OF MAGGIE MOUNTAIN (CRETACEOUS)--Medium- to coarse-grained equigranular alaskite

Kqp GRANODIORITE OF QUINN PEAK (CRETACEOUS)--Medium-grained granodiorite characterized by abundant euhedral hornblende grains as long as 0.4 in. (1 cm)

Kpc GRANODIORITE OF PECKS CANYON (CRETACEOUS)--Mafic granodiorite characterized by blue-gray color and content of anhedral hornblende and some biotite

Central region

Kwm GRANITE OF WHITE MOUNTAIN (CRETACEOUS)--Very light colored medium- to coarse- grained granite, strongly porphyritic with respect to potassium feldspar; biotite is principal mafic mineral

Ksc GRANODIORITE OF SHEEP CREEK (CRETACEOUS)--Medium-grained mafic granodiorite; hornblende is the principal mafic mineral. Appears to intrude the alaskite of Coyote Pass

Kvf GRANODIORITE OF VOLCANO FALLS (CRETACEOUS)--Fine- to medium-grained equigranular granodiorite. Euhedral hornblende crystals are 0.04 to 0.12 in. (1-3 mm) long

Ktr GRANODIORITE OF TOWER ROCK (CRETACEOUS)--Medium-grained porphyritic light-colored granodiorite characterized by many small euhedral pink potassium feldspar phenocrysts

Klm GRANODIORITE OF LOGGY MEADOW (CRETACEOUS)--Fine- to medium-grained dark grano-diorite; mafic inclusions abundant

Kcp ALASKITE OF COYOTE PASS (CRETACEOUS)--Medium-grained heterogeneous alaskite with color index varying between 0 and 10; encloses bodies of the mafic plutonic rocks unit (Kjm)

Klk GRANITE OF LITTLE KERN LAKE CREEK (CRETACEOUS)--Medium-grained porphyritic granite. Phenocrysts are of subhedral potassium feldspar 0.4 to 0.6 in. (1.0-1.5 cm) long. Rock has slightly sheared appearance, and hornblende and biotite are altered

Khh ALASKITE OF HELLS HOLE (CRETACEOUS)--Medium- to coarse-grained very light colored granite enclosing abundant small bodies of the mafic plutonic rocks unit (Kjm)

Jgf GRANITE OF GRASSHOPPER FLAT (JURASSIC)--Fine- to medium-grained porphyritic granite. Phenocrysts are of euhedral potassium feldspar 0.2 to 0.4 in. (0.5-1.0 cm) long. Age is Jurassic based on potassium-argon date of 170 m.y.

Jdm GRANODIORITE OF DOE MEADOW (JURASSIC)--Medium-grained equigranular mafic grano-diorite; euhedral hornblende is principal mafic phase

Jwc GRANITE OF WINDOW CLIFFS (JURASSIC)--Medium-grained porphyritic granite containing pinkish-purple potassium feldspar phenocrysts. Has a sheared appearance in most places. Age is Jurassic based on potassium-argon date of 160 m.y.

Eastern region

Kw WHITNEY GRANODIORITE (CRETACEOUS)--Medium- to coarse-grained, strongly porphyritic granodiorite; biotite is dominant mafic mineral and hornblende is minor constituent. Potassium-argon age of 79.8 m.y.

Kib INTRUSION BRECCIA OF TIMOSEA PEAK (CRETACEOUS)--Complex intrusive system including mafic plutonic rocks, aplite, and granodiorite. Rock types appear to crosscut one another in this zone

Kp PARADISE GRANODIORITE (CRETACEOUS)--Porphyritic granodiorite with minor granite. Potassium feldspar phenocrysts are characterized by abundant zonally arranged inclusions of biotite and hornblende. Potassium-argon age of 85.5 m.y.

Kcc GRANITE OF CARROLL CREEK (CRETACEOUS)--Coarse-grained granite, locally somewhat porphyritic. Hornblende and biotite are subhedral

Krr GRANODIORITE OF REDROCK MEADOWS (CRETACEOUS)--Medium-grained light-colored grano-diorite, locally porphyritic

Kop ALASKITE OF OLANCHA PEAK (CRETACEOUS)--Fine- to coarse-grained equigranular alaskite containing less than 2 percent mafic minerals

Jlw GRANITE OF LITTLE WHITNEY MEADOW (JURASSIC)--Fine-grained equigranular alaskitic granite, possibly associated with the granite of Window Cliffs

Jawc ALASKITE OF WINDOW CLIFFS (JURASSIC)--Fine- to medium-grained alaskite, possibly associated with the granite of Window Cliffs. Cut by basic dikes

Jwc GRANITE OF WINDOW CLIFFS (JURASSIC)--For description see central region

Jkp ALASKITE OF KERN PEAK (JURASSIC)--Fine- to coarse-grained equigranular alaskite containing less than 5 percent mafic minerals. Unmapped blocks (of this unit) various sizes are enclosed within the granodiorite of Redrock Meadows

Jsm GRANODIORITE OF SCHAEFFER MEADOW (JURASSIC)--Strongly sheared mafic granodiorite; hornblende is subhedral to euhedral

IGNEOUS ROCKS OF UNCERTAIN TEMPORAL AND GENETIC AFFINITIES

Kap APLITE (CRETACEOUS?)--Fine grained, sugary rock, characteristically weathering orange on the surface

KJm MAFIC PLUTONIC ROCKS (CRETACEOUS OR JURASSIC)--Includes fine-grained diorite and tonalite, poikilitic hornblende gabbro, and hybridized mafic granodiorite

KJgd GRANODIORITE (CRETACEOUS OR JURASSIC)--Small bodies of fine- to medium-grained relatively dark granodiorite on range front, associated with the Whitney Granodiorite

METAMORPHIC ROCKS

Mzms METASEDIMENTARY ROCKS (MESOZOIC)--Fine grained hornblende-hornfels-facies metasedimentary rocks including quartzite, siliceous hornfels, pelitic schist, and calc-silicate rock

Mzm METAMORPHIC ROCKS, UNDIFFERENTIATED (MESOZOIC)--The Mineral King roof pendant. Contains both metavolcanic and metasedimentary rocks

Mzmv METAVOLCANIC ROCKS (MESOZOIC)--Chiefly fine grained metamorphosed dacite and andesite tuff and flows. Basalt is minor. Includes some rhyolitic tuff and ash deposits

STUDIES RELATED TO WILDERNESS

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal lands to determine their mineral resource potential. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of aeromagnetic surveys of the Golden Trout Wilderness (NF903), Sequoia and Inyo National Forests, Tulare and Inyo Counties, California. The Golden Trout Wilderness was established by Public Law 95-273, 1978.

INTRODUCTION

The Golden Trout Wilderness covers 457 mi^2 in the rugged forested part of the southern Sierra Nevada. It is bounded on the east by Owens Valley, on the north by Sequoia National Park, and on the west and south by U.S. Forest Service multiple-use lands. The east side of the area is accessible from U.S. Highway 395, while the remainder is reached by state, county, and Forest Service roads from the San Joaquin Valley.

AEROMAGNETIC SURVEY

The aeromagnetic survey of the Golden Trout Wilderness, Calif. (U.S. Geological Survey, 1979) was flown and compiled by LKB Resources, Inc., under contract to the U.S. Geological Survey during 1978 and 1979. Total intensity magnetic data were collected along east-west flight lines spaced approximately 0.5 mi apart. Flight-line locations are shown on the map as widely dashed lines and individual flight lines are identified by alpha-numeric symbols along the west margin of the map. The survey was flown at a height of approximately 1000 ft above the average terrain. Because the area surveyed contains considerable topographic relief, actual ground clearance fluctuated between 300 and 4600 ft along some flight lines.

The magnetic map was generated by subtracting from the data the International Geomagnetic Reference Field - 1975 (updated to the dates flown) and adding a constant 52,000 γ (gammas) to all data. The data were contoured by computer using a metric grid of 175 m (575 ft) east-west and 400 m (1,310 ft) north-south.

Much of the complexity of this aeromagnetic map is a result of the topography in the survey area. The survey aircraft was not able to maintain a constant height above the ground surface and tended to pass much higher above valley floors than above adjacent ridge crests. Because most of the rocks exposed at the surface in this area are to some degree magnetic and appear to be magnetized in a direction nearly parallel to the present earth's field, the variable separation between the aircraft and the ground surface results in magnetic highs over ridges and magnetic lows over valleys. An obvious example of this behavior can be seen in the south-central part of the map where pronounced magnetic lows (1) occur over the canyons of the Kern River, Cold Creek, and West Stringer (numbers in parentheses are labeled localities on map). Other examples occur slightly to the north and west of these lows where two arcuate magnetic highs (2 and 3) are present over ridge crests. A comparison of the aeromagnetic map and the corresponding topographic map reveals similar relations throughout the area.

Additional complexity was introduced into the aeromagnetic map during compilation by incorrect positioning of the flight-line magnetic data. The incorrect positions resulted both from misidentification of photograph control points and from variable aircraft speed between control points. Comparisons between the flight-line photography, topographic maps, and in-flight analogue records containing superposed traces of magnetometer and radar altimeter outputs were used to identify incorrect positioning. Numerous such comparisons indicated that position errors of 0.3-0.6 mi are common throughout the map and errors of 0.6-1.2 mi occur in many places. The southwestern part of the map seems to be particularly poor, but the problems are by no means restricted to this area.

Data-position errors cause features on the aeromagnetic map that are unrelated to the geology of the region. In general, position errors tend to impart to the aeromagnetic map a grain that is parallel to the flight-line direction (east-west). Slight errors in position between adjacent flight lines cause otherwise smooth contours to appear kinked where crossing the flight lines. More severe position errors can result in isolated, roughly circular anomalies that appear along isolated flight lines.

Examples of the types of features generated by data-position errors are shown by two magnetic highs (4 and 5) that are present in the western half of the map. Both anomalies occur along ridge crests and the true positions of the anomalies are indicated by the dashed lines. The arrows indicate the direction and distance that individual magnetic highs should be moved in order to be placed in their proper location. In (4), the contours that form the western flank of the anomaly are shown as kinked when, in reality, the western flank probably is quite smooth. In (5), the positioning is so poor that the magnetic high shown on the map is not even a continuous feature (see flight lines P-32, P-33, and P-34).

Because of the positioning errors present throughout the map, individual anomalies that are discussed in the following sections have been checked by reference to the flight-line photography, in-flight analogue records or both. In places where the map and the flight records disagree, the map was assumed to be in error. Time constraints prevented the examination of every anomaly on the map and so the reader should be aware that undiscovered errors probably exist. In particular, any anomalies that show a pronounced east-west lineation should be viewed with caution.

AEROMAGNETIC INTERPRETATION

Kern Canyon fault

One of the most pronounced magnetic anomalies is the north-south lineation (6) that occurs along the trace of the Kern Canyon fault, a major right-lateral fault in the southern Sierra Nevada (Moore and du Bray, 1978). Through most of the area covered on the geologic map, the lineation is a steep magnetic gradient that separates a region of high-intensity magnetic anomalies east of the fault from a region of subdued anomalies to the west. The magnetic background level east of the fault is 100-200 γ higher than the level west of the fault. This magnetic gradient also can be seen on the aeromagnetic map compiled from data measured along east-west flight lines spaced at 1 mi intervals at a constant barometric altitude of 14,000 ft (fig. 1). North of the wilderness boundary, the magnetic background levels are approximately equal on both sides of the lineation and the lineation is defined by a narrow magnetic low.

Within the wilderness the gradient reflects the juxtaposition, along the Kern Canyon fault, of rocks with different magnetic properties. The rocks west of the fault are less magnetic than those east of the fault. The magnetically inferred contact (6), defined by the locus of points of steepest gradient, falls quite close to the fault trace. Slight differences in position between the mapped trace and the magnetically inferred contact probably result from a combination of position errors and topographic effects caused by the presence of Kern Canyon.

An attempt was made to determine the depth of the Kern Canyon fault by comparing the high-level magnetic data (fig. 1) along profile Z-Z' with the results of model calculations. The assumptions in the model calculations are: 1) the fault is vertical, 2) the directions of magnetization are parallel to the earth's field, 3) the gross magnetic properties can be represented by a single magnetization contrast across the fault, and 4) the magnetization contrast extends far enough north and south such that a two-dimensional approximation is valid. Magnetizations of the near-surface rocks on either side of the fault were determined by modeling the magnetic anomalies associated with isolated topographic features and comparing these with the low-level magnetic data from the analogue flight records. These magnetizations then were used as starting values in a series of models in which only the depth extent of magnetization contrast was varied.

Results of this model study indicate that the gradual westward decline of the magnetic field west of the fault is the most important feature for determining the depth of the magnetization contrast. The model results show that west of the fault the observed and calculated profiles agree only if the magnetization contrast, and by inference the fault, extends to a depth of about 6-7 mi or greater. This depth is comparable to the depth of the interface between a 3.75 mi/s surface layer and a deeper 4.0 mi/s layer found in a seismic refraction study of the Sierra Nevada (Eaton, 1966).

Granitoid rocks east of the Kern Canyon fault

The aeromagnetic map shows a strong magnetic high (7) over the western part of the granite of Carrol Creek that probably reflects topographic relief. The axis of this anomaly coincides with a ridge crest that forms the western limit of the east flank of the Sierra Nevada. East of this high, the topography falls steeply toward Owens Valley. To the northwest, west, and southwest, the Carrol Creek pluton is in contact with the Whitney Granodiorite, but no obvious magnetic anomaly is correlated with the contact, indicating that the granitoid rocks of the two units have similar magnetic properties.

The Whitney pluton is characterized by low-amplitude magnetic anomalies superposed on a background level of approximately 52,050 γ. Some of the anomalies are correlated with topography indicating that the surface rocks are magnetic. Four magnetic lows that do not correlate with topography are alined northwest-southeast near the center of the pluton (8). These lows probably reflect a zone of locally lower magnetization and suggest that the Whitney pluton may be zoned internally.

Along the southwest edge of the Whitney pluton, the contact with the Paradise Granodiorite is associated spatially with a magnetic gradient that separates magnetic values typical of the Whitney pluton from values 100 - 200 γ higher over the Paradise pluton. The steepest part of this gradient (9) lies above or slightly southwest of the mapped contact indicating that, at least near the surface, the contact is nearly vertical or dips to the southwest.

Along its south edge, the Whitney pluton is in contact with a thin sliver of the Paradise pluton which, in turn, is in contact with the alaskite of Olancha Peak. The steepest part of the magnetic gradient (10) near the Whitney-Paradise contact is parallel to the contact and lies about 0.3 mi south of it. This gradient seems most closely associated with the contact between the Paradise pluton and the alaskite of Olancha Peak.

The magnetic field over the Olancha Peak pluton is characterized by a northward decline of more than 400 γ. This gradient lies on the north flank of a large, nearly circular region of magnetic highs (11) that lies mostly south of the Golden Trout Wilderness boundary. The magnetic highs occur above rocks designated as "Mesozoic basic instrusives" by Matthews and Burnett (1965). These rocks probably correspond to the mafic plutonic rocks unit found enclosed within the Olancha Peak pluton. The isolated magnetic highs over the alaskite of Olancha Peak possibly reflect buried inclusions of mafic rocks.

Just west of the Olancha Peak pluton a magnetic high (12) that is not correlated with topography occurs over granodiorite comprising the Schaeffer Meadow pluton. The continuation of this high, south of the wilderness boundary, suggests that this pluton or one with similar magnetic properties extends about 3 mi south of the boundary.

The magnetic map of the alaskite of Kern Peak just west of the Schaeffer Meadow pluton indicates that the Kern Peak body contains two distinct magnetic regions. The western one-third of this body is more magnetic than the eastern two-thirds and the boundary between the two regions lies approximately along (13). Within the more magnetic region, a magnetic high (52,542 γ on flight line P-26) occurs directly above a small exposure of the mafic plutonic rocks unit. Other buried mafic inclusions might be the source of the other magnetic anomalies in this region.

Some of the largest magnetic anomalies on the map occur over the granodiorite of Redrock Meadows, which is located just south of the Kern Peak pluton. Magnetic highs are not distributed uniformly over this body but rather tend to define a zone that trends northwest (14). Most individual highs along this trend occur above or near exposures of the mafic plutonic rocks unit. Also, at the extreme south end of the mapped part of the Redrock Meadows unit, an arcuate magnetic high (15) that lies mostly south of the Golden Trout Wilderness boundary has its northern terminus over an exposure of the mafic plutonic rocks unit. A pronounced magnetic gradient occurs at the contact between the Redrock Meadow unit and granite of Window Cliffs to the west. The spatial correlation between the location of the steepest part of the gradient (16) and the mapped contact indicates that this contact is also a distinct magnetic boundary.

The Window Cliffs pluton and the four large plutons that lie between it and the Kern Canyon fault (the granodiorite of Volcano Falls, alaskite of Hells Hole, granite of Grasshopper Flat, and the granodiorite of Doe Meadow) seem to be composed of rocks with similar magnetic properties. No distinct magnetic anomalies are evident along the contacts between the plutons. In fact, a number of magnetic anomalies (for example, 1, 2, 3) can be found that cut across the contacts, but these anomalies have already been explained as caused by topographic features that cross the contacts rather than by magnetic zones that are continuous from one pluton to another.

Granitoid rocks west of the Kern Canyon fault

Based on the magnetic map, the rocks that make up the four granitoid units that lie just west of the Kern Canyon fault near the north edge of the Golden Trout Wilderness (the granite of Little Kern Lake Creek, granite of Grasshopper Flat, granodiorite of Sheep Creek, and the alaskite of Coyote Pass) appear to have similar magnetic properties. No distinct magnetic anomalies follow the contacts between these units. A series of magnetic highs (4) occur over exposures of the Coyote Pass pluton. These highs occur directly above and reflect the topography of the ridge that makes up the Great Western Divide.

A large, roughly circular, magnetic anomaly (17) lies directly above the contact between the Little Kern Lake Creek and the Grasshopper Flat units at the north edge of the Golden Trout Wilderness. The source of this anomaly is unknown but an estimate of the depth to the top of the source based on the method of Vacquier and others (1951) indicates that the magnetic material either is exposed at the surface or lies at a depth of less than a thousand feet. The source appears to straddle the contact, which suggests that if the source is confined to either unit, then the contact between the two units dips at a shallow angle.

To the southwest, the magnetic field over the granite of White Mountain is characterized by low-amplitude, long-wavelength anomalies superposed on a background level similar to that over the Whitney pluton. Within the White Mountain pluton, a sharp roughly circular magnetic high (18) with a diameter of approximately 0.6 mi is centered over White Mountain. This anomaly partly reflects topography but modeling of the magnetic data indicates that it also reflects a region that is more magnetic than its surroundings.

A circular magnetic high (19) similar to the one over White Mountain is shown on the aeromagnetic map as associated with the White Mountain pluton near its west edge, approximately 2.5 mi north of the south boundary of the Golden Trout Wilderness. However, this anomaly was mislocated during compilation of the map and actually occurs approximately 1 mi west of its map location, over the highly magnetic granodiorite of Loggy Meadow.

A strong magnetic gradient lies above the west edge of the White Mountain pluton indicating that the two units to the west, the undifferentiated metamorphic rocks unit comprising the Mineral King roof pendant and the Loggy Meadow pluton, have magnetizations that are significantly different from the magnetization of the White Mountain pluton. On the map, the location of the steepest part of the gradient appears to differ from the location of the contact by as much as 0.5-1 mi in many places but most of this discrepancy is the result of position error. Errors are extreme along the contact between the White Mountain and Loggy Meadow units and result in the map data being nearly uninterpretable in this region.

West of the Mineral King roof pendant, strong magnetic gradients occur above the contacts between highly magnetic granodiorite of Pecks Canyon and the less magnetic adjacent units, the Mineral King roof pendant to the east and the alaskite of Maggie Mountain to the southwest. The gradients along both the east and southwest edges of the Pecks Canyon pluton are severely distorted by position errors. The form of the gradient above the contact between the Pecks Canyon and Maggie Mountain plutons indicates that this contact is nearly vertical and extends to great depth.

Mafic plutonic rocks

As has been mentioned in previous sections, most of the largest magnetic anomalies over the Golden Trout Wilderness are associated with the mafic plutonic rocks unit, especially where that unit is associated with the Redrock Meadows and Olancha Peak plutons. However, three relatively large segments of the mafic plutonic rocks unit do not give rise to large magnetic anomalies which suggests that these three masses either are very thin or of a different composition than those that cause the large magnetic anomalies. Two of these segments occur at the south boundary of the wilderness, enclosed within the Hells Hole pluton and the Window Cliffs pluton, respectively. The third lies just west of the Kern Canyon fault, between the Coyote Pass and the Grasshopper Flat plutons.

Volcanic rocks

Rhyolite domes and flows are mapped at three locations covered by the aeromagnetic map and two of these have distinctive magnetic anomalies associated with them. The rhyolite of Long Canyon, which lies above the Redrock Meadows, Kern Peak, and Schaeffer Meadow plutons near the south edge of the Golden Trout Wilderness, shows no obvious magnetic expression. In contrast, the rhyolite of Templeton Mountain causes a large magnetic high (20) as does the rhyolite of Monache Mountain (21) which lies outside the Golden Trout Wilderness nearly due south of Templeton Mountain (Mathews and Burnett, 1965). These two magnetic highs correlate very well with the topography of the respective mountains and the marginal magnetic lows that surround the two highs (especially evident at Monache Mountain) suggest that the magnetic source material does not extend to great depth. Three-dimensional modeling (Blakely, 1981) of the magnetic anomalies over Templeton and Monache Mountains confirms this conclusion and indicates that within the resolution of the magnetic data these rhyolite domes have nearly flat bottoms at levels approximating those of the surrounding topography. The magnetic data are too widely spaced to resolve anomalies from small diameter feeder pipes that are presumed to lie beneath the domes.

Basalt cones and flows (unit Tb) occur in two places in the wilderness, one just east of the Kern Canyon fault in the northern part of the area and the other straddling the fault near the south boundary of the area. A sharp magnetic low (22), confused somewhat by position errors, is associated with

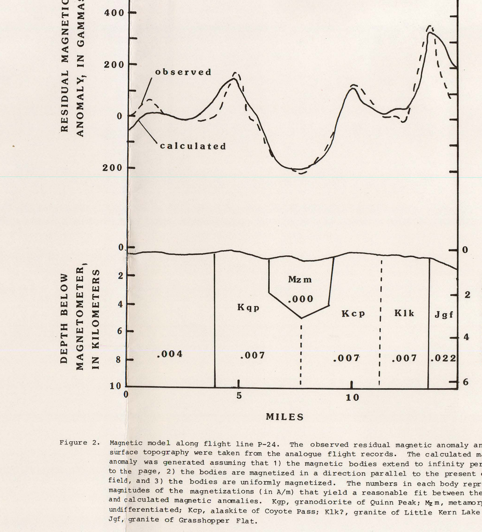


Figure 2. Magnetic model along flight line P-24. The observed residual magnetic anomaly and ground-surface topography were taken from the analogue flight records. The calculated magnetic anomaly was generated assuming that 1) the magnetic bodies extend to infinity perpendicular to the page, 2) the bodies are magnetized in a direction parallel to the present earth's field, and 3) the bodies are uniformly magnetized. The numbers in each body represent the magnitudes of the magnetizations (in A/m) that yield a reasonable fit between the observed and calculated magnetic anomalies. Kqp, granodiorite of Quinn Peak; Mzm, metamorphic rocks, undifferentiated; Kcp, alaskite of Coyote Pass; Klk?, granite of Little Kern Lake Creek (?); Jgf, granite of Grasshopper Flat.

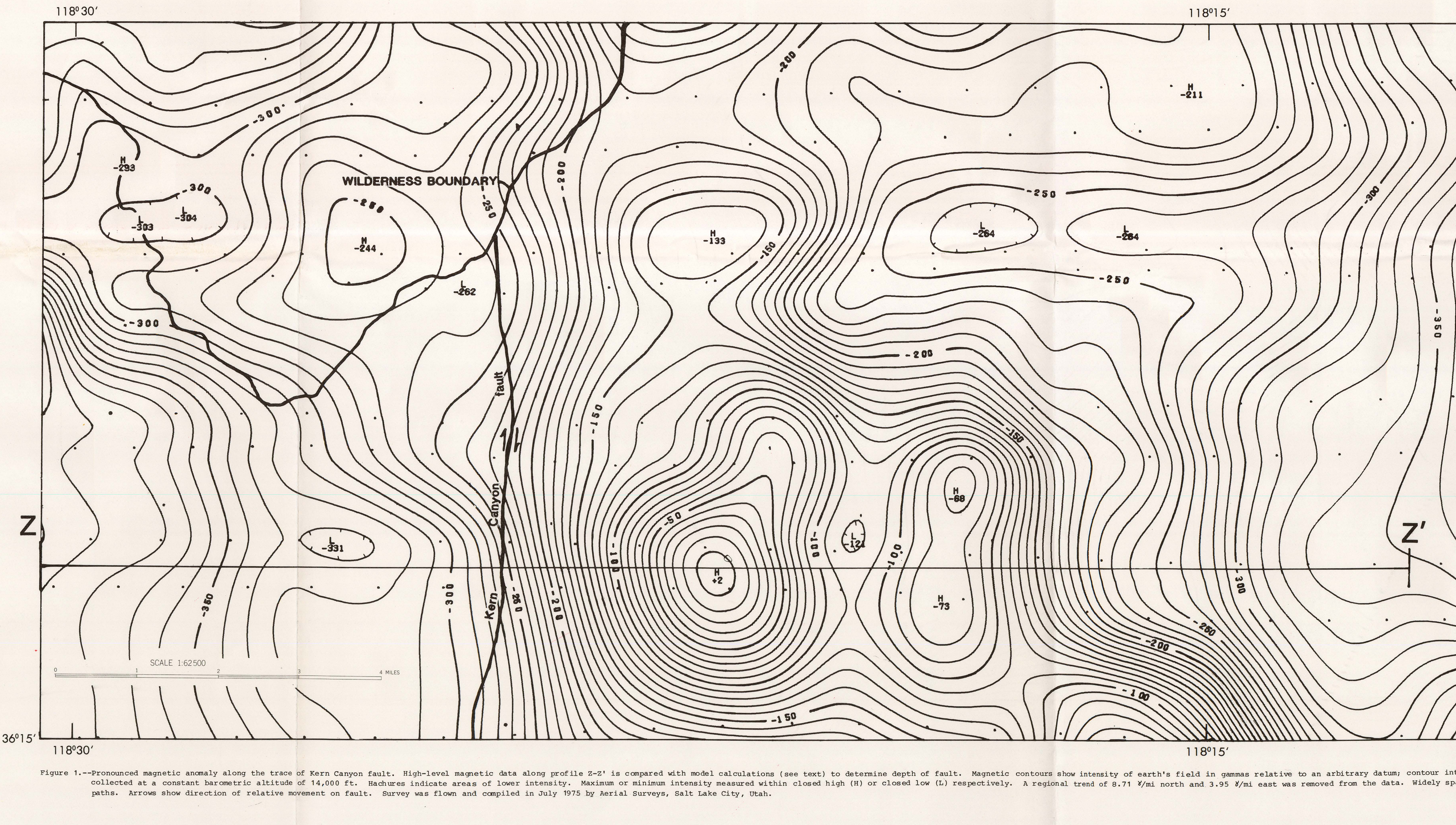


Figure 1.--Pronounced magnetic anomaly along the trace of Kern Canyon fault. High-level magnetic data along profile Z-Z' is compared with model calculations (see text) to determine depth of fault. Magnetic contours show intensity of earth's field in gammas relative to an arbitrary datum; contour interval 10 gammas. Data collected at a constant barometric altitude of 14,000 ft. Hachures indicate areas of lower intensity. Maximum or minimum intensity measured within closed high (H) or closed low (L) respectively. A regional trend of 8.71 γ/mi north and 3.95 γ/mi east was removed from the data. Widely spaced dots show flight paths. Arrows show direction of relative movement on fault. Survey was flown and compiled in July 1975 by Aerial Surveys, Salt Lake City, Utah.

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