DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-900 C

Ag, HILLSBORO AND SAN LORENZO QUADS., NEW MEXICO

CORRELATION OF MAP UNITS

SURFICIAL DEPOSITS

Qs	QUATERNARY	

SEDIMENTARY AND VOLCANIC ROCKS		IGNEOUS AND METAMORPHIC ROCKS	
QTs, QTb	QUATERNARY AND TERTIARY	pEu	PRECAMBRIAN
Tri, Trn, Tv, Trs, Tb	TERTIARY	INTRUSIVE ROCKS: Tri, Trs, Tas	TERTIARY
Kv	CRETACEOUS	INTRUSIVE ROCKS: Tqi, Ta, Trsd	TERTIARY
Ks	CRETACEOUS	INTRUSIVE ROCKS: Kal, Kq, Tps, Klf	CRETACEOUS
Pzu	PALEOZOIC		

LIST OF MAP UNITS

	Qs	UNCONSOLIDATED SEDIMENTARY DEPOSITS (QUATERNARY)
	QTs	GILA AND SANTA FE FORMATIONS (QUATERNARY AND TERTIARY)
	QTb	BASALTIC LAVA AND GILA AND SANTA FE FORMATIONS (QUATERNARY AND TERTIARY)
	Tv	LAVAS AND ASH-FLOW TUFFS (OLIGOCENE)
Tr	Tri Trn	RHYOLITE FLOWS AND DOMES (OLIGOCENE)
	Tri Trs	RHYOLITE PLUGS, STOCKS AND SILLS (OLIGOCENE)
	Tas	ANDESITE SILLS AND DIKES (OLIGOCENE)
	Tql	QUARTZ LATITE DIKE OR SILL (OLIGOCENE?)
	Ta	ANDESITE SILLS (OLIGOCENE?)
	Trsd	RHYOLITE SILLS AND DOMES (OLIGOCENE?)
	Ks	ANDESITE DIKES AND SILLS (UPPER CRETACEOUS)
	Kal Kq Tps	QUART MONZONITE, GRANITE, MONZODIORITE AND DIORITE (UPPER CRETACEOUS)
	Klf	QUARTZ LATITE DIKES OF COPPER FLAT (UPPER CRETACEOUS)
	Kv	ANDESITIC FLOWS OF COPPER FLAT (UPPER CRETACEOUS)
	Ks	BEARTOOTH QUARTZITE (UPPER? CRETACEOUS)
	Pzu	UNDIVIDED SEDIMENTARY ROCKS (PALEOZOIC)
	pEu	UNDIVIDED GRANITIC AND HORNBLENDIC ROCKS (PRECAMBRIAN)

CONTACT--Dotted where concealed

FAULT--Dashed where approximately located; dotted where concealed. Where known, ball and bar on the downthrown side. U, upthrown side; D, downthrown side

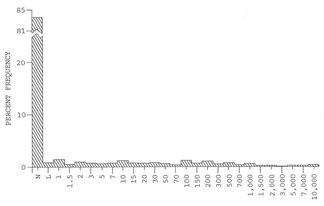
ANTICLINAL AXIS--Showing crestline. Dashed where approximately located

Geochemical Explanation

NONMAGNETIC (NM-1) FRACTION--Isopleths approximately delineate source basins of stream sediments containing anomalous amounts of silver the nonmagnetic (NM-1) fraction. Hachures indicate low areas within anomalies; queried where control is lacking. Numbers indicate silver content in the nonmagnetic (NM-1) fraction of stream sediments in parts per million

Silver--≥0.5 ppm

Silver-->100



HISTOGRAM SHOWING SILVER DISTRIBUTION, NM-1 fraction

Number of samples, 1,102; N, metal value in sample is below spectrographic detection limit; L, metal detected in sample but value is below the lowest spectrographic standard for this metal.

DISCUSSION

This map shows the distribution of anomalous silver in the nonmagnetic sample fraction (NM-1) plotted on a base which includes sample localities, topography, and generalized geology from Hedlund (1975a, b). It is part of a series of maps for several metals that accompany this folio. Distribution of silver values are shown on the accompanying histogram.

Sample type

The sample material consists of that portion of pan-concentrated stream sediment having a specific gravity greater than bromoform. Prior to bromoform separation, magnetite was removed from the pan concentrate with a hand magnet and discarded. The remaining heavy minerals were then separated magnetically into a magnetic and nonmagnetic (NM-1) fraction. The magnetic fraction is that portion of such material not magnetic at 0.1 ampere, but magnetic at a 1.0 ampere setting on a Frantz isodynamic Separator (forward slope 25°, side slope 15°). The nonmagnetic (NM-1) fraction is one that is not magnetic at a 1.0 ampere setting.

The major mineral composition of the nonmagnetic (NM-1) fraction was determined visually with a binocular microscope. The nonmagnetic (NM-1) fraction is composed dominantly of light-colored rock-forming accessory minerals and epitaxy and secondary ore minerals.

spectrographic analyses are reported within geometric intervals having the boundaries 1,200, 830, 560, 380, 180, 120, and so on in ppm, but are shown in the histograms by approximate geometric midpoints such as 1,000, 700, 500, 300, 200, 150, and 100. Precision of a reported value is approximately plus or minus one interval at 68 percent confidence, or plus or minus two intervals at 95 percent confidence.

Silver concentrations that are one spectrographic reporting interval above the highest values in the background range of the various lithologies within the map area, are defined as anomalous. Silver detected as less than (L) by the spectrographic method in the nonmagnetic (NM-1) fraction is considered anomalous. In most instances a sample anomalous in silver is anomalous in at least one of the other seven elements shown in this map series. Silver values in the nonmagnetic (NM-1) fraction range from not detected (N) to 10,000 ppm within the map area. Silver was found in anomalous concentrations in 179 or 16.4 percent of the 1,102 samples collected.

Geochemical implications of sample fractions

High metal concentrations in the nonmagnetic fraction (NM-1) occur where primary and secondary ore minerals are exposed at the surface and mechanically enter the stream bed.

Descriptions of anomalies

silver appears to be associated principally with the quartz latite dikes intruding the andesite and, to a lesser degree, the quartz monzonite stock itself. A minor silver anomaly occurs in the jasperoidal limestones in the north, which are also cut by quartz latite dikes.

The main portion of the silver anomaly in the Copper Flat area is located approximately 1 mi (1.6 km) to the south of the Copper Flat stock exposure and coincides with the central and northern portions of a pronounced aeromagnetic high centered some 2 mi (3.2 km) south of the same intrusive.

To the south, minor silver anomalies occur in the Wilson Ranch area (southeastern corner of the map). These represent the northern end of the Lake Valley mineralized area located immediately to the south of the map margin.

The most extensive silver anomalies occur in the central portion of the map (T. 16-18 S., R. 8-9 W.). In this area lead and molybdenum values delineate a broad, genetically interrelated and structurally controlled system of anomalies. This system forms a roughly rectilinear pattern consisting of nearly east-west and northwest-northeast linear trends. The two trends intersect in the vicinities of Noonday Peak, PA Mountain, Seven Brothers Mountain, Log Cabin Peak, and Ladrone Canyon. Geochemical anomalies are generally most extensive and intense in these areas. Silver anomalies delineate only portions of this system. The eastern margin of the anomaly system, the Pierce Canyon fault zone, is indicated by parallel belt of silver anomalies, extending from Noonday Peak to Cross-O Mountain, delineates the western boundary of the anomaly system along the Grandview fault and its extension.

East-west components of the anomaly system are only intermittently indicated by silver anomalies occurring in the vicinities of the Pine Spring Mountain, P. A. Canyon, Thompson Cone, Seven Brothers Mountain, and the Gray Eagle Mine.

In the north, extensive and intense silver anomalies form a semicircular pattern extending from Cross-O Mountain in the west, eastward to the town of Kingston then northwest to the headwaters of Mineral Creek. This pattern is duplicated to some degree by every element plotted in this map series. The highest silver values in this area occur in samples collected in Ladrone Gulch and Mineral Creek. An aeromagnetic high-low couple in the area of the Pickett Spring headwaters is centrally located with respect to the geochemical anomaly pattern. In the west-central portion of the map an ill-defined, intermittent and low-level zone of anomalies occurs just to the south and parallel to a number of rhyolite porphyry intrusives and northwest trending faults.

The Rose Mine area (southwestern corner of map) includes the uplifted block on the southwestern side of the Mimbres fault and extends northward to the edge of the outcrop area. This area, strongly anomalous in Pb, Mo, and Cu, contains only a few weak and peripheral Ag anomalies. Samples collected immediately to the

REFERENCES

Alminas, H. V., and Watts, K. C., 1977, Interpretive geochemical map, Hillsboro and San Lorenzo quadrangles exclusive of the Black Range Primitive Area, Sierra and Grant Counties, New Mexico: U.S. Geol. Survey Misc. Field Studies MF-900 G.

Alminas, H. V., Watts, K. C., Griffitts, W. R., Siems, D. L., Kraxberger, V. E., and Curry, K. J., 1975, Map showing anomalous distribution of tungsten, fluorite and silver in stream-sediment concentrates from the Sierra Cuchillo-Animas Uplifts and adjacent areas, southwestern New Mexico: U.S. Geol. Survey Misc. Inv. Map I-880.

Alminas, H. V., Watts, K. C., Siems, D. F., and Kraxberger, V. E., 1977a, Map showing anomalous copper distribution in stream sediment concentrates, Hillsboro and San Lorenzo quadrangles exclusive of the Black Range Primitive Area, Sierra and Grant Counties, New Mexico: U.S. Geol. Survey Misc. Field Studies Map MF-900 D.

_____1977b, Map showing anomalous molybdenum distribution in stream sediment concentrates, Hillsboro and San Lorenzo quadrangles exclusive of the Black Range Primitive Area, Sierra and Grant Counties, New Mexico: U.S. Geol. Survey Misc. Field Studies Map MF-900 E.

_____1977c, Map showing anomalous zinc distribution in stream sediment concentrates, Hillsboro and San Lorenzo quadrangles

Grimes, D. J., and Marranzino, A. P., 1968, Direct-current arc and alternating-current spark emission spectrographic field methods for the semiquantitative analysis of geologic materials: U.S. Geol. Survey Circ. 591, 6 p.

Harley, G. T., 1934, The geology and ore deposits of Sierra County, New Mexico: New Mexico Bur. Mines and Mineral Resources Bull. 10, 220 p.

Hedlund, D. C., 1975a, Geologic map of Hillsboro quadrangle, Sierra and Counties, New Mexico: U.S. Geol. Survey Open-File Rept. 75-108.

_____1975b, Geologic map of San Lorenzo quadrangle, Sierra and Grant Counties, New Mexico: U.S. Geol. Survey Open-file Rept. 75-109.

_____1977a, Geologic map of the Hillsboro and San Lorenzo quadrangles, Sierra and Grant Counties, New Mexico: U.S. Geol. Survey Misc. Field Studies Map MF-900 A.

_____1977b, Mineral resources map of the Hillsboro and San Lorenzo quadrangles, Sierra and Grant Counties, New Mexico: U.S. Geol. Survey Misc. Field Studies Map MF-900 B.

Kuellmer, F. J., 1955, Geology of a disseminated copper deposit near Hillsboro, Sierra County, New Mexico: New Mexico Bur. Mines and Mineral Resources Circ. Bur. Mines and Mineral Resources Circ. 34, 46 p.

_____comp., 1956, Geologic map of the Hillsboro Peak thirty-minute quadrangle: New Mexico

Watts, K. C., Alminas, H. V., and Kraxberger, V. E., 1977, Map showing areas of detrital fluorite and cassiterite, and the localities of rock samples, Hillsboro and San Lorenzo quadrangles exclusive of the Black Range Primitive Area, Sierra and Grant Counties, New Mexico: U.S. Geol. Survey Misc. Field Studies Map MF-900 H.

Watts, K. C., Alminas, H. V., Nishi, J. N., and Crim, U. C., 1977a, Map showing anomalous tungsten and gold distribution in stream sediment concentrates Hillsboro and San Lorenzo quadrangles exclusive of the Black Range Primitive Area, Sierra and Grant Counties, New Mexico: U.S. Geol. Survey Misc. Field Studies Map MF-900 I.

_____1977b, Map showing anomalous lead distribution in stream sediment concentrates, Hillsboro and San Lorenzo quadrangles exclusive of the Black Range Primitive Area, Sierra and Grant Counties, New Mexico: U.S. Geol. Survey Misc. Field Studies Map MF-900 J.

_____1977c, Map showing anomalous bismuth distribution in stream sediment concentrates, Hillsboro and San Lorenzo quadrangles exclusive of the Black Range Primitive Area, Sierra and Grant Counties, New Mexico: U.S. Geol. Survey Misc. Field Studies Map MF-900 K.

Weissenborn, A. E., 1948, A new occurrence of belvite [New Mexico]: Am. Mineralogist, v. 33, nos. 9-10, p. 648-649.

MAP SHOWING ANOMALOUS SILVER DISTRIBUTION IN STREAM SEDIMENT CONCENTRATES, HILLSBORO AND SAN LORENZO QUADRANGLES, EXCLUSIVE OF THE BLACK RANGE PRIMITIVE AREA, SIERRA AND GRANT COUNTIES, NEW MEXICO

By

H. V. Alminas, K. C. Watts, D. F. Siems, and V. E. Kraxberger

1978