UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Sample location and analytical data for samples collected and analyzed as of June 1, 1982, in the eight thirty minute divisions of the Butte 1° x 2° CUSMAP Quadrangle, Montana

by

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Chapter A

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards

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INTRODUCTION

A regional geochemical survey consisting of 5640 samples was conducted in the Butte 1° x 2° CUSMAP quadrangle, during the summers of 1979 and 1980. Samples collected included rock, stream sediment, soil, and panned concentrate. This report is a listing of these samples by coordinates and the data for analyses performed, divided into eight chapters representing thirty minute segments of the quadrangle (Fig. 1).

SAMPLE COLLECTION TECHNIQUES

The rock samples were taken mostly from outcrop, but mineralized float rock samples were taken when found, to evaluate any potential mineral deposits. The stream-sediment samples consisted of the minus-177-micrometer (80-mesh) fraction of drainage sediments, as this fraction is most apt to have metal adsorption on fine clay-size particles. The soils were air-dried and sieved to pass through a 177-micrometer (80-mesh) screen, to concentrate the possibly metal-enriched, fine, clay-fraction particles. The panned-concentrate samples were usually panned on-site to enhance the detection limit by a factor of 500 times, but in some instances, when water was unavailable, the sample was bagged and panned later.

ANALYTICAL TECHNIQUES

All samples were analyzed by a six-step semiquantitative emission spectrographic method (Grimes and Marranzino, 1968). Most panned concentrates and other selected samples were analyzed for gold by an atomic-absorption procedure (Thompson and others, 1968). Most of the rock and stream-sediment samples were also analyzed for Ag, Bi, Cd, Cu, Pb, Sb, and Zn by a partial digestion and extraction atomic absorption procedure (Viets and others, 1979).

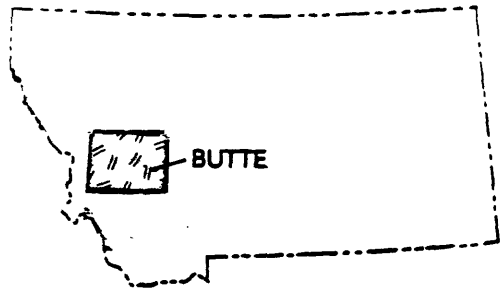
RESULTS

The analytical data are shown in the accompanying chapters. Each chapter represents one thirty minute by thirty minute segment of the Butte 1° x 2° quadrangle and consists of three tables containing the geological coordinates and all the analytical data of samples collected in the segment. Rock sample analyses are shown in Table 1 of each chapter. Panned concentrate samples are shown in Table 2 and stream-sediment samples in Table 3 except chapter E and I where no stream samples were collected.

EXPLANATION OF TABLES

Values shown are in parts per million except Fe, Mg, Ca, and Ti, which are in percent. Symbols used are: >, greater than the upper limit of determination; N, not detected at lower limit of detection; <, an uncertain amount present below the lower limit of determination. Analyses for elements prefixed by S were made by the 6-step semiquantitative spectrographic method. Concentrations of these elements are reported in order of magnitude of the series 1, 0.7, 0.5, 0.3, 0.2, 0.15, and 0.1, which represent approximate midpoints of group data on a geometric scale. Elements prefixed by AA were determined by atomic absorption. The generally used limits of determination for each element are given in table 1. Some of the values listed in the tables may be below these limits due to the use of a larger than usual sample weight in the analytical procedure.

STUDY AREA



ANALYSES OF SAMPLES AVAILABLE AS OF JUNE, 1982
BUTTE 1° x 2° CUSMAP QUADRANGLE

B 221 r 494 s 261 p	C 109 r 377 s 237 p	D 21 r 158 s 91 p	E 43 r 19 p
F 486 r 711 s 784 p	G 322 r 327 s 369 p	H 78 r 275 s 220 p	I 30 r 7 p

47°00′

46°30′

46°00′

114°00′ 113°30′ 113°00′ 112°30′ 112°00′

FIGURE 1. Chart of samples analyzed and location map of study area

Table 1.--Limits of determination

Element	Limit		Method
Fe	0.05	%	Spectrographic
Mg	0.02	%	Spectrographic
Ca	0.05	%	Spectrographic
Ti	0.002	%	Spectrographic
Mn	10	ppm	Spectrographic
Ag	0.5	ppm	Spectrographic
As	200	ppm	Spectrographic
Au	10	ppm	Spectrographic
B	10	ppm	Spectrographic
Ba	10	ppm	Spectrographic
Be	1	ppm	Spectrographic
Bi	10	ppm	Spectrographic
Cd	20	ppm	Spectrographic
Co	5	ppm	Spectrographic
Cr	10	ppm	Spectrographic
Cu	5	ppm	Spectrographic
La	20	ppm	Spectrographic
Mo	5	ppm	Spectrographic
Nb	20	ppm	Spectrographic
Ni	5	ppm	Spectrographic
Pb	10	ppm	Spectrographic
Sb	100	ppm	Spectrographic
Sc	5	ppm	Spectrographic
Sn	10	ppm	Spectrographic
Sr	100	ppm	Spectrographic
V	10	ppm	Spectrographic
W	50	ppm	Spectrographic
Y	10	ppm	Spectrographic
Zn	200	ppm	Spectrographic
Zr	10	ppm	Spectrographic
Th	100	ppm	Spectrographic
Cu	1	ppm	Atomic absorption
Pb	1	ppm	Atomic absorption
Zn	1	ppm	Atomic absorption
Ag	0.05	ppm	Atomic absorption
Cd	0.05	ppm	Atomic absorption
Bi	1	ppm	Atomic absorption
Sb	1	ppm	Atomic absorption
Au	0.05	ppm	Atomic absorption

REFERENCES CITED

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

Thompson, C. E., Nakagawa, H. M., and Van Sickle, G. H., 1968, Rapid analysis for gold in geologic materials, in Geological Survey Research: U.S. Geological Survey Professional Paper 600-B, p. B130-B132.

Viets, J. G., Clark, J. R., and Campbell, W. L., 1979, A rapid, sensitive, partial leach and organic separation for the determination of Ag, Bi, Cd, Co, Pb, Sb, and Zn by atomic absorption spectrometry [abs.]: Association of Exploration Geochemists, Basin and Range Symposium, Tuscon, Arizona, April 9-10, 1979, Program and Abstracts, p. 32.