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GEOCHEMICAL RECONNAISSANCE OF THE McCARTHY B-6 QUADRANGLE, ALASKA

By

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General summary

This report gives analyses of 10 altered zone, vein, and bedrock samples (table 1) and 15 stream-sediment samples (table 2) that have been analyzed for 30 elements by the six-step semiquantitative spectrographic method and for gold by the quantitative atomic absorption method. Locations of the samples are plotted on the accompanying generalized geological map (fig. 1). The samples were collected during 1967 in conjunction with geological mapping and related studies in the quadrangle. Despite the small number of samples, the analytical data should provide a framework for prospecting or for detailed geochemical sampling.

The McCarthy B-6 quadrangle includes part of the mountainous southern flank of the Wrangell Mountains and the lower reaches of the Kennicott Glacier in the northern one-third of its area and the extensive lowland of the Chitina Valley throughout its southern two-thirds. The physiography of the quadrangle strongly reflects glacier-related erosion and deposition. Bedrock exposures are confined to the mountainous upland and--much less extensively--to incised river valleys in the lowland. Quaternary surficial deposits, mainly of glaciofluvial and glaciolacustrine origin, mantle the lowland and are sporadically distributed in the upland.

The exposed bedrock consists of upper Paleozoic metamorphic rocks (restricted to a small area near the mouth of the Nizina River);

a thick Cretaceous sedimentary sequence, chiefly mudstone, shale, and sandstone, of shallow marine origin; upper Tertiary felsic hypabyssal rocks, mainly sills; a small stock of upper Tertiary intermediate intrusive rocks; and a few mafic dikes of Tertiary or Quaternary age. The Cretaceous rocks locally are baked and hardened near the Tertiary plutons. The generalized distribution of rock units is shown on figure 1. A detailed geological map of the McCarthy B-6 quadrangle by MacKevett and Smith is in final preparation.

Most of the altered zones are localized along steeply dipping faults in the upland, generally in or adjacent to Tertiary intrusive rocks. The altered zones range from less than a foot to about 20 feet in thickness. The quartz-rich veins, which also are proximal to Tertiary plutons, are between two and six inches thick. The bedrock samples represent Tertiary felsic or intermediate intrusive rocks from the northern part of the quadrangle. The large glacier-nourished trunk streams that traverse the southern part of the quadrangle were not sampled for stream sediments for two reasons: time limitations, and the ambiguous interpretative value of analyses of sediment samples from such an environment.

Many of the altered zone, vein, and bedrock samples revealed anomalous concentrations of metals. Most of the anomalous values are minor, but several may be significant and even some of the lesser anomalous values may be useful in suggesting areas for further exploration. The most notable anomalies include: copper, 2,000 ppm (parts per million); silver, 7 ppm; arsenic, 5,000 ppm; gold, 0.4 ppm; and

molybdenum, 50 ppm. The stream-sediment samples showed only a few minor anomalies, generally in boron, copper, or zinc.

In summary, the limited analytical data indicate that the areas near Tertiary plutons in the northern part of the quadrangle may merit exploration.

Procedures and treatment of data

The analyzed altered zone samples (table 1) include leached and discolored bedrock, fault gouge, and vein material. A descriptive list of altered zone samples follows table 1.

Standard procedures were followed in the collection and preparation of stream-sediment samples. Generally the samples were collected from the active stream channel; often, however, high-water deposits immediately adjacent to the active channel were collected. The samples were dried, sieved, and only the finer than 80 mesh (Tyler) fraction was analyzed (table 2).

The analytical data is given in percent or in parts per million (ppm). The precision of any single reported value is approximately plus 100 percent or minus 50 percent.

Table 1.--Analyses of altered zone samples from the McCarthy B-6 quadrangle, Alaska

[Analyses by semiquantitative spectrographic methods, except for Au which was analyzed by quantitative atomic absorption methods. Analyses reported to the nearest number in the series 1, 0.7, 0.5, 0.3, 0.2, 0.15, 0.1, and so forth. N = not detected; L = detected but below limit of determination; - = no analysis. Semiquantitative determinations by E. L. Moiser and D. J. Grimes. Atomic absorption analyses by W. L. Campbell, M. S. Rickard, and R. B. Tripp. Looked for, but not detected: Bi, Cd, Mo, Sb, Sn, W, and Zn. Exceptions: Bi, 15 ppm, in Mk325; Mo, 50 ppm, in Mk298; Sb, 100 ppm, in Mk116, and less than 100 ppm in Mk325; W, less than 50 ppm in Mk325; Zn, 500 ppm, in Mk325. Sample locations are shown in figure 1.]

Field No.	Lab. No. ACI-	Percent				Parts per million											Field No.
		Fe	Mg	Ca	Ti	Mn	Ag	As	Au	B	Ba	Be	Co	Cr	Cu	La	
Mk116	066	7	7	10	0.15	1500	L	1500	-	15	200	N	15	100	30	N	Mk116
118	067	3	0.3	0.2	0.2	500	L	500	-	20	300	1	N	N	20	50	118
264	142	5	0.5	20	0.15	N	N	N	-	20	1000	1	10	20	100	20	264
288	157	3	1.5	0.3	0.5	N	N	N	0.02	20	1000	L	5	70	100	20	288
298	158	5	0.7	0.05	0.5	N	L	N	0.04	L	700	N	7	100	150	20	298
322	169	3	0.7	1.5	0.3	200	2	200	0.2	L	200	L	15	50	300	N	322
323	170	1.5	0.7	1.5	0.15	L	L	L	0.06	N	200	L	10	20	200	N	323
325	171	1.5	1	1.5	0.5	5000	7	5000	0.4	10	150	L	10	30	150	20	325
Sj223A	080	15	5	10	0.7	N	N	N	-	50	300	L	70	300	150	N	Sj223A
227	081	20	3	2	0.2	N	1.5	N	-	N	100	L	70	500	2000	N	227
Limit of determination																	
		0.05	0.02	0.05	0.001	10	0.5	200	0.02	10	5	1	5	5	5	20	

Table 1.--Analyses of altered zone samples from the McCarthy B-6 quadrangle, Alaska--Continued

Field No.	Lab. No. ACI-	Parts per million								Field No.
		Nb	Ni	Pb	Sc	Sr	V	Y	Zr	
Mk116	066	L	70	10	7	1000	70	L	20	Mk116
118	067	10	5	L	L	150	20	15	300	118
264	142	L	20	10	10	500	70	20	30	264
288	157	L	30	10	15	200	100	15	100	288
298	158	L	20	10	15	100	200	15	150	298
322	169	L	20	70	7	500	70	10	100	322
323	170	L	20	N	7	100	70	10	L	323
325	171	L	30	150	7	150	70	15	150	325
Sj223A	080	L	150	L	20	200	200	20	50	Sj223A
227	081	L	300	L	10	150	50	10	30	227
		Limit of determination								
		10	2	10	5	50	10	10	20	

Description of altered zone samples given in table 1

(All samples are grab samples of representative material unless otherwise noted. Sample locations are plotted on the accompanying map, figure 1.)

Field No.	Description
Mk116	Altered zone approximately 4 feet wide that parallels Tertiary felsic dikes.
Mk118	Altered zone approximately 20 feet wide in Tertiary felsic intrusive rocks.
Mk264	Altered fault gouge zone approximately 15 feet wide in Cretaceous shale.
Mk288	Iron-stained fault zone in Cretaceous shale.
Mk298	Altered fault zone approximately 1½ feet wide in Tertiary felsic porphyritic intrusive rocks.
Mk322	Selected sample of altered Tertiary intermediate intrusive rock.
Mk323	Selected sample of quartz vein approximately 6 inches wide within Tertiary intermediate intrusive rocks.
Mk325	Selected sample of quartz vein approximately 2 inches wide within Tertiary intermediate rocks.
Sj223A	Selected sample of altered Tertiary felsic intrusive rock.
Sj227	Altered zone approximately 6 inches wide in Tertiary felsic intrusive rocks.

Table 2.--Analyses of stream-sediment samples from the McCarthy B-6 quadrangle, Alaska

[Analyses by semiquantitative spectrographic methods, except for Au which was analyzed by quantitative atomic absorption methods. Analyses reported to the nearest number in the series 1, o.7, 0.5, 0.3, 0.2, 0.15, 0.1, and so forth. N = not detected; L = detected but below limit of determination. Semiquantitative determinations by K. J. Curry. Atomic absorption analyses by A. L. Meier, R. A. Miller, and T. A. Roemer. Looked for, but not detected: Ag, As, Bi, Cd, Mo, Sb, Sn, and W. Sample locations are shown in figure 1.]

Field No.	Lab. No.	Percent				Parts per million												Field No.
		Fe	Mg	Ca	Ti	Mn	Au	B	Ba	Be	Co	Cr	Cu	La	Nb	Ni	Pb	
Sj248s	ACF 389	7	1.5	1.5	0.7	1000	L	50	1000	1.5	15	100	70	20	L	30	10	Sj248s
249s	390	7	1.5	0.5	0.7	700	L	70	1000	1	15	100	100	L	10	50	10	249s
250s	391	7	2	1.5	0.7	700	L	70	1500	1	15	200	100	20	L	70	15	250s
251s	392	7	2	2	0.5	700	L	50	1000	L	15	100	70	L	L	30	15	251s
252s	393	7	2	3	0.7	700	L	30	700	L	15	150	30	L	L	30	L	252s
253s	394	7	2	0.7	0.5	1500	L	100	700	L	20	150	70	N	L	50	20	253s
254s	395	5	1.5	2	0.5	700	L	30	500	L	15	150	30	L	L	30	15	254s
255s	396	7	3	3	1	1000	L	15	500	L	20	300	100	L	L	70	10	255s
256s	397	10	2	3	1	1500	L	50	700	L	20	200	70	L	L	50	15	256s
257s	398	1.5	1	10	0.15	150	L	70	700	N	N	100	30	N	L	30	L	257s
258s	399	5	1.5	7	0.7	500	L	100	1000	1	10	150	70	20	10	50	15	258s
259s	400	7	1.5	1.5	0.7	700	L	100	700	L	20	200	30	L	10	50	15	259s
260s	ACI 951	10	1.5	0.7	0.7	700	L	70	700	L	20	200	70	L	10	70	15	260s
261s	952	7	1.5	0.3	0.7	700	L	70	1000	1	15	150	50	20	15	30	15	261s
262s	953	5	0.7	3	0.5	700	L	150	700	L	10	100	30	L	10	30	10	262s
Limit of determination																		
		0.05	0.02	0.05	0.001	10	0.02	10	5	1	5	5	5	20	10	2	10	

Table 2.--Analyses of stream-sediment samples from the McCarthy B-6 quadrangle, Alaska--Continued

Field No.	Lab. No.	Parts per million						Field No.
		Sc	Sr	V	Y	Zn	Zr	
Sj248s	ACF 389	15	300	150	15	L	150	Sj248s
249s	390	15	150	150	15	L	150	249s
250s	391	15	300	150	15	L	200	250s
251s	392	15	300	150	15	L	150	251s
252s	393	20	300	200	15	L	100	252s
253s	394	20	150	200	20	300	150	253s
254s	395	15	150	100	10	N	100	254s
255s	396	20	700	200	15	L	100	255s
256s	397	20	200	300	30	L	100	256s
257s	398	7	1500	70	20	N	30	257s
258s	399	20	700	200	20	L	150	258s
259s	400	20	150	200	15	L	150	259s
260s	ACI 951	20	150	300	15	L	150	260s
261s	952	20	150	200	15	L	150	261s
262s	953	10	300	150	15	L	200	262s
Limit of determination								
		5	50	10	10	200	20	