Geochemical results, sample localities, and descriptions of some rocks from the Proterozoic Kilbuck terrane, Goodnews quadrangle, southwestern Alaska

by

Thomas P. Frost¹, Jerry M. Motooka², Leon Bradley²

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¹ Spokane, Washington
² Lakewood, Colorado

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As part of the Alaska Minerals Resource Assessment Program Bethel Project, samples for geochemical analysis were collected from the Goodnews C-6 15' quadrangle, in the vicinity of Thumb Mountain. These samples are from presumed Proterozoic rocks of the Kilbuck terrane (Box and others, in press). The ages of some of the quartz veins is poorly constrained; some or all may be considerably younger than Proterozoic in age. The geochemical results and sample localities are reported in table 1, and sample descriptions are reported in table 2.

Analytical techniques

Rock samples were analysed by a semiquantitative, visual direct-current arc emission spectrographic (AES) technique adapted from Grimes and Marranzino (1968). The 35 elements Ag, As, Au, B, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, Ge, La, Mg, Mn, Mo, Na, Nb, Ni, P, Pb, Sb, Sc, Sn, Sr, Ti, Th, V, W, Y, Zn, and Zr were determined in samples analyzed by this method. Results in table 1 are in parts per million, except for Ca, Fe, Mg, Na, P, and Ti, which are in percent.

Mercury was determined in the rock samples by a continuous-flow, cold-vapor atomic absorption (AA) technique similar to that described by Kennedy and Crock (1987). The samples were digested with nitric acid and sodium dichromate in a closed Teflon vessel. Elemental mercury vapor was produced with a hydroxylamine hydrochloride/sodium chloride and stannous chloride in a continuous flow system that feeds directly into an atomic absorption spectrophotometer (Wilson and others, 1987). Concentrations were calculated based on calibration curves generated by analysis of high-purity standard solutions. Results in Table 1 are in parts per million.

Gold was determined by a flame atomic (AA) absorption technique (Hubert and Chao, 1985). Gold was separated and concentrated by extraction into methyl isobutyl ketone. Detection limit for the technique is 0.05 ppm.

Silver, As, Au, Bi, Cd, Cu, Mo, Pb, Sb, and Zn were analysed by inductively coupled plasma-atomic emission spectroscopy (ICP) using the method of Motooka (1988). Samples were digested using hydrochloric acid-hydrogen peroxide digestion followed by extraction and aspiration directly into the plasma with diisobutyl ketone. Detection limits and results are shown in table 1.

Discussion

The analytical results from the amphibolite facies metamorphic rocks are low in all elements indicative of mineralization. However, one quartz vein (88AMM13B) contains detectable gold. No other elements in the sample are anomalous.

The gold reported in the quartz vein sample suggests a local source for at least some of the gold in small placer prospects in Snow Gulch and Tyone Creek (Cobb and Condon, 1972; Hoare and Cobb, 1977), which are underlain by Precambrian rocks similar to those near Thumb Mountain (Hoare and Coonrad, 1978).
References


Hubert, A.E., and Chao, T.T., 1985, Determination of gold, indium, tellurium, and thallium in the same sample digestion of geological materials by atomic absorption spectroscopy and two step solvent extraction: Talanta, v 32, p 383-387.


Table 1. Analytical results and sample localities table. All results in parts per million except as indicated. ND, not detected. L preceding value indicates element was detected but not quantifiable. See text for analytical technique.
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Table 2 - sample descriptions

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