British Columbia Geological Survey
Geological Fieldwork 1974

GEOLOGY OF GERMANSEN LAKE AREA

(93N/10)

By H. D. Meade

(Graduate Student, University of Western Ontario)

The investigation of the Takla Group volcanic sequence in the Germansen Lake area is part of a comparative study of the mineralogy of the Takla volcanic rocks and the adjacent Hogem and Germansen batholiths. This study will be completed as a Ph.D. thesis at the University of Western Ontario, and has been, in part, supported by the British Columbia Department of Mines and Petroleum Resources. The following represents a preliminary report on field work done during 1974.

GENERAL GEOLOGY

Regional mapping by Armstrong and Thurber (1945) south of Germansen Lake outlined the Germansen batholith in contact with rocks of the Upper Triassic Takla Group and Upper Paleozoic Cache Creek Group. The contact of the Germansen batholith and Takla Group rocks is well exposed in this area, and outcrop permits construction of a part geological section of the layered rocks.

TAKLA GROUP VOLCANIC ROCKS

Foliated and unfoliated rocks of the Takla Group are juxtaposed by a major east-trending fault, which follows part of Olson Creek and continues eastward through a major break in a north-trending ridge (Fig. 11). North of the Olson Creek fault, the rocks are augite andesite porphyry and feldspar porphyry flows, flow breccia, coarse pyroclastics, and dykes overlain by a few thin beds of waterlain tuff that dip 60 to 75 degrees to the northwest. The tuffs provide the best attitudes as the andesites are structureless except for brecciation and altered flow tops.

South of the fault, and between the fault and the batholith, grey-brown to grey-green hornblende plagioclase andesite with interbedded pyritic tuff horizons overlie a predominantly sedimentary and metavolcanic section. Within these andesites, hornblende alignment and schistosity show variable development, and are best observed on weathered surfaces. The interbedded siliceous tuff units are 2 to 10 feet thick, more sheared than the andesites, and contain abundant limonite after pyrite. At least 200 feet of thin-bedded argillite, siltstone, chert, limestone, and silicified tuff underlie the andesite. They are described as they occur in a fault gully, between Olson Creek fault and the batholith, which forms a linear depression in the aforementioned north-trending ridge. In this sedimentary section, black pyritic chert units are interbedded with 6 to 18-inch-thick grey limestone units and are gradational to grey to brownish, very fine-grained tuff and siltstone units, and contain up to 1 per cent of very fine-grained disseminated pyrite. The abundance of biotite in thin sections of the tuffs and siltstones gives a brownish colour

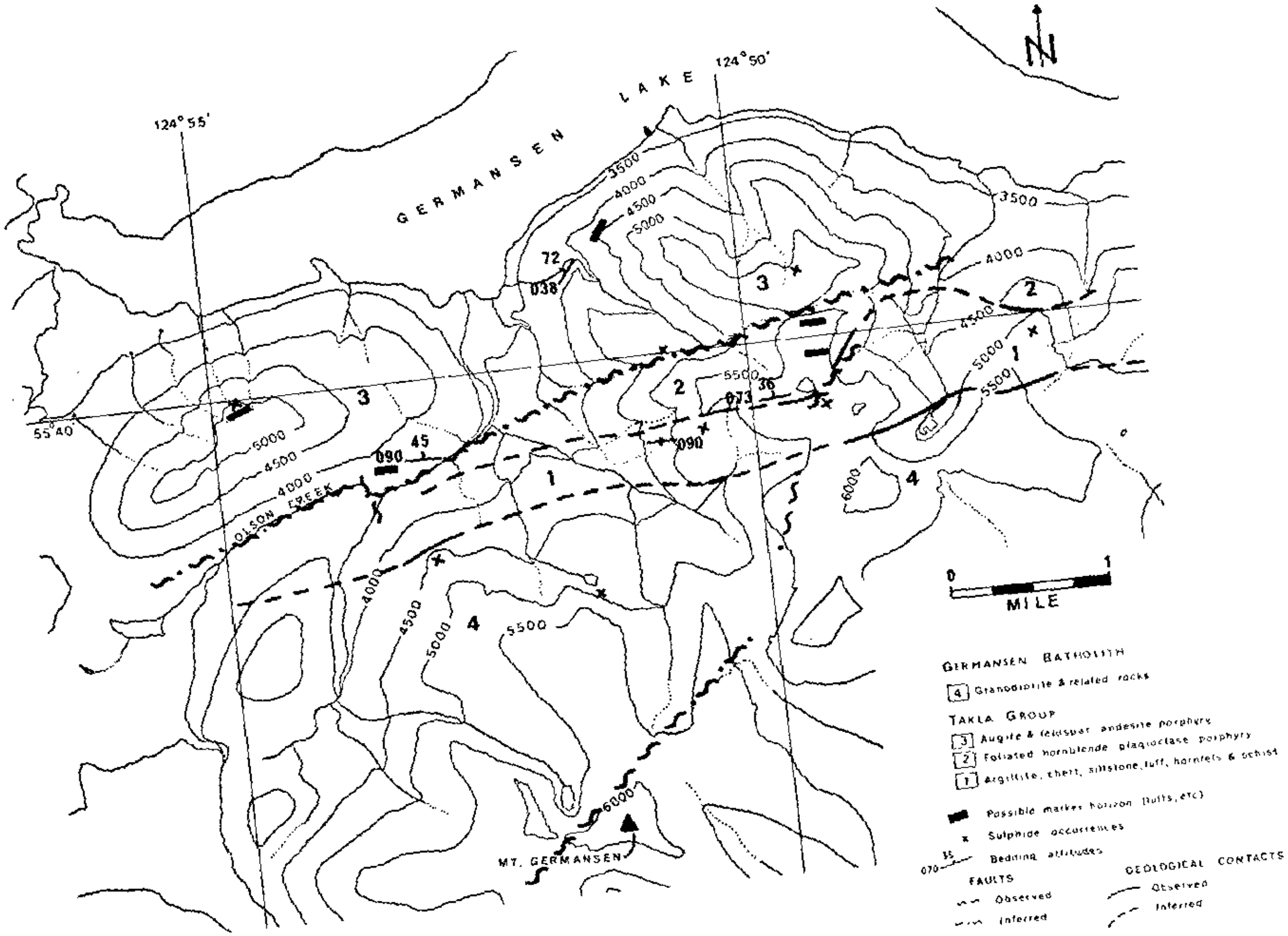

Figure 11. Generalized geology, Germansen Lake area.

and sometimes a felty appearance. This may be the result of contact metamorphism related to the batholith approximately 1,500 feet to the south. On the north wall of the gully the cherts, tuffs, and siltstones have a fracture cleavage parallel to compositional layering, which is disrupted by minor faults and intruded by dykes. These rocks dip approximately 35 degrees to the northwest, but down slope to the east in the gully, strikes are more easterly and dips are steeper. This change in attitude suggests a northward-plunging anticline. South of a holofelsic monzonite dyke that intrudes the axis of the gully, sedimentary rocks that are lithologically similar to those of the north wall, have a well-developed cleavage parallel to axial planes of isoclinal folds and compositional layering. Slaty cleavage and hinges of isoclinal folds have been buckled, forming open folds and warps; fold axes of both fold systems plunge shallowly to the west. In thin section, mica parallels the axial plane of microscopic folds and is subparallel to bedding. Flow folds in recrystallized limestone lenses and pre-lithification slump structures in cherts also occur. In other areas and nearer the batholith in this area, these predominantly sedimentary rocks tend to be more micaceous and schistose.

Descriptions of the Takla Group do not include occurrences of tight folding, fracture cleavage, and schistosity (Armstrong, 1949, p. 56; Roots, 1954, p. 159); but Paterson (1974) notes that siltstones near faults exhibit good fissility parallel to bedding. Penetrative deformation in these sedimentary rocks suggests that they belong with lithologically similar foliated and folded Upper Paleozoic rocks of the nearby Manson Creek belt. Alternatively, these rocks are similar in lithology to argillite, limestone, and tuffaceous siltstone that form the base of the Takla Group in the Dewar Peak area (Monger and Paterson, 1974). If conodonts are obtained from limestone samples, the age of this folded wedge should be defined.

GERMANSEN BATHOLITH

Intrusive rocks of the Germansen batholith clearly intrude the volcanic and sedimentary rocks, and are predominantly foliated, leucocratic biotite granodiorite porphyry cut by minor aplite and holofelsic quartz monzonite and monzonite dykes. Away from the batholith contact, alignment of biotite and other mineral grains forms a northeast-trending, steeply dipping regional foliation in the granodiorite. Weakly foliated granodiorite is gradational to the protoclastic peripheral zone of the batholith which contains pegmatite dykes, holofelsic granite, mafic schlieren, and crosscutting quartz veins. This contact zone dips 30 to 70 degrees out from the central part of the batholith. Hornblende-rich schlieren is gradational to mafic xenoliths, and both schlieren and holofelsic granitic patches are elongate in the plane of the protoclastic foliation. Graphic granite pegmatites containing muscovite and biotite occur as sheets, 15 to 20 feet thick, gradational to 1 to 2-foot-thick quartz veins. They are spatially associated with the contact zone of the batholith and are generally conformable with the foliation. Quartz veins and 30-foot-wide granitic dykes intrude along the cleavage planes of schistose volcanic and sedimentary rocks near the batholith contact. K-Ar age determination on a sample of granodiorite from near Mount Germansen is not yet available.

DISTRIBUTION OF METAL OCCURRENCES

Local concentrations of fine-grained disseminated pyrite and pyrrhotite are ubiquitous in the massive and fragmental andesites; the more abundant sulphide-bearing areas are shown in Figure 11. The aforementioned tuff horizons in hornblende plagioclase andesite porphyry south of the Olson Creek fault are particularly pyritic. Thin sulphide-bearing quartz veins occur along the cleavage planes of argillites and tuffaceous siltstones in the sedimentary rocks that parallel the batholith contact. Armstrong and Thurber (1945, p. 15) noted that a number of quartz veins in this area, and on the east end of Germansen Lake, contain minor amounts of copper, gold, and silver. Within this same sedimentary section there are thin-bedded, pyritic, carbonaceous black cherts and siliceous tuffs. These are chemical sediments similar to the auriferous sulphide facies of distal exhalites described by Ridler (1970, 1973) in the Noranda-Kirkland Lake area. These chemical sediments have been produced by exhalative activity associated with volcanism, and are observed to have a close spatial and stratigraphic relationship with base metal massive sulphide and gold-quartz vein deposits. In this regard, Olson Creek, Twenty Mile Creek, and other creeks draining Takla Group rocks have produced placer gold since the early 1900's.

Very few occurrences of base metal sulphide minerals have been found in the granodiorite. Most fractures are barren or contain a thin coating of chlorite. Disseminated pyrite is common in the protoclastic contact zone, and an area south of Olson Creek contains up to 3 per cent pyrite. Granite pegmatites and associated quartz veins contain minor amounts of disseminated pyrite, chalcopyrite, and a few flecks of fine-grained molybdenite. Most quartz veinlets and veins are barren of sulphide minerals. The exhalites are probably the most attractive exploration target and may be the source of placer gold that occurs in nearby creeks.

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