SUMMARY OF FIELDWORK IN THE INGENIKA RANGE, NORTH-CENTRAL BRITISH COLUMBIA (94D/09; 94C/12)

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KEYWORDS: Regional geology, stratigraphy, Ingenika Range, Takla Group, Savage Mountain Formation, Ingenika Group, Swannell Formation.

INTRODUCTION

This report summarizes field data collected during 1987 in the Ingenika Range, north-central British Columbia. Fieldwork was conducted in rocks of the Takla Group and Ingenika Group. Each will be discussed separately.

TAKLA GROUP

The study area for the Takla Group is northwest of Johanson Lake, in the southwestern corner of the Ingenika Range (94D/09, Johanson Lake). Rocks of this area belong to the Upper Triassic Takla Group (Monger, 1977). Monger examined Takla rocks in the area of McConnell Creek and published a map at a scale of 1:125 000.

GENERAL GEOLOGY

The general geology of the study area is shown in Figure 1-17-1. Exposure is excellent along most ridge faces. Contour lines (20-metre intervals) are omitted along ridge crests to allow for clearer representation of the geology. Correlation across valleys is difficult because of the absence of marker beds. Although the region is cut by several northwest-striking high-angle faults, bedding has broadly consistent attitudes throughout.

STRATIGRAPHY

Rocks of the Takla Group are volcaniclastic, sedimentary and volcanic. The stratigraphic succession consists of approximately 2300 metres of interlayered breccias, tuffs and siltstones. Demonstrable lava flows were not identified.

The conformable succession (Figure 1-17-2), although interlayered and repetitive, may be divided into several units

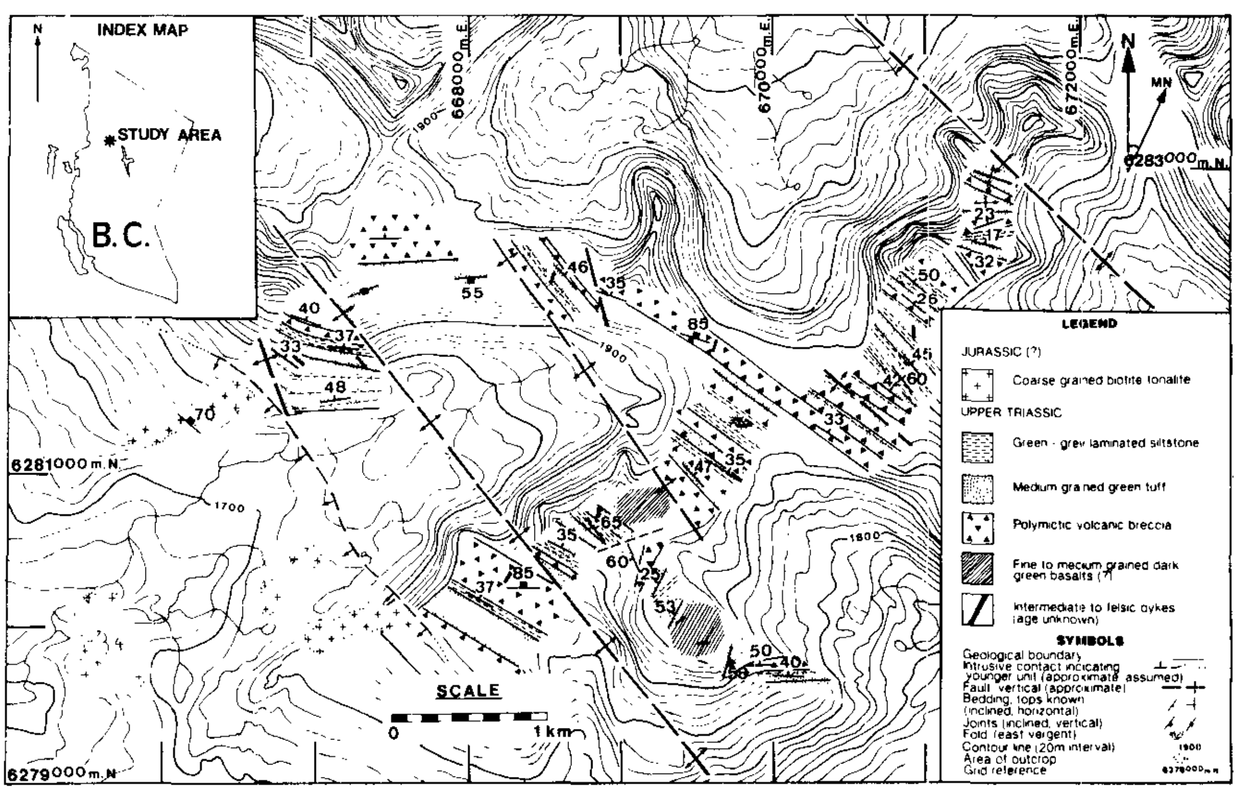

Figure 1-17-1. General geology of Takla Group rocks north of Johanson Lake.

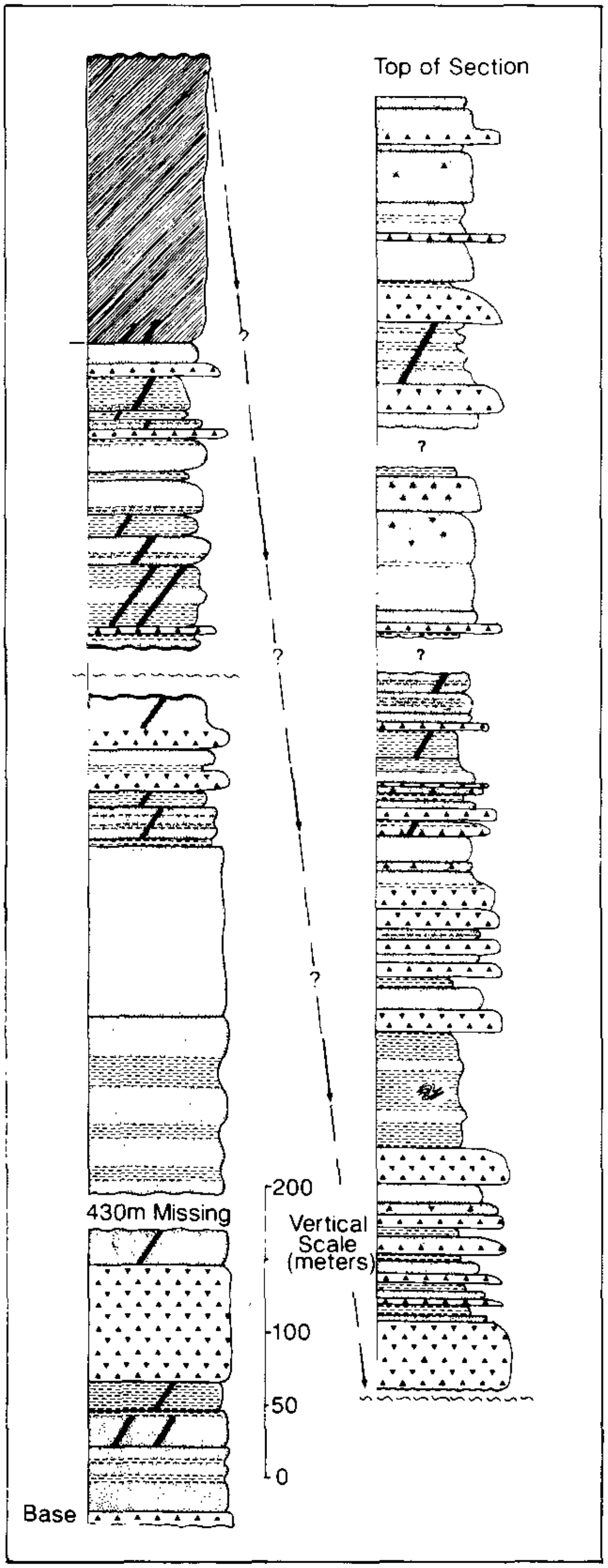

Figure 1-17-2. Generalized stratigraphic column of approximately 2300 metres of Takla rocks in a northeast transect across the area. The top of the section is bounded by a high-angle northwest-striking fault, while the base of the section is terminated by a tonalitic intrusion. Correlation across faults is highly speculative. Lithology symbols as in legend of Figure 1-17-1.

based on the occurrence of volcanic breccias and the fining upwards of sediments above them. A typical unit has a base of green volcanic breccia, of mafic to intermediate composition, that commonly contains phenocrysts of amphibole and plagioclase up to 2.5 centimetres long. Breccia fragments are subrounded to subangular and are both sedimentary and volcanic in origin. Sedimentary fragments include buff-coloured carbonate and fine-grained green siltstones that may be internally laminated. Volcanic fragments appear to be intermediate in composition. Many contain plagioclase phenocrysts up to 0.5 centimetre long and have a typical brown-green-weathered surface. Fragments of the fine-grained green volcanic matrix of the breccia are also present, indicating internal brecciation during flow. Fragment sizes range from a few centimetres to 45 centimetres in diameter, with the majority being less than 10 centimetres. The breccia units vary from 5 to 80 metres in thickness and although the breccias do not appear bedded, they frequently show rough grading from base to top.

The volcanic breccias commonly grade into sand-sized green tuffs, which display apparent igneous textures in outcrop. The tuffs may show excellent bedding with upward-facing graded beds, or they may exhibit little variation in grain size or be entirely devoid of phenocrysts. These tuffaceous layers range in thickness from several centimetres to 115 metres, and pass upwards into demonstrable clastic sediments with graded beds and sedimentary laminations.

The sedimentary units are dominated by very fine-grained, green, well-laminated siltstones with stratigraphic thicknesses of up to 30 metres. Minor carbonaceous sandstone beds, 1 to 30 centimetres thick, occur rarely with siltstone layers. The siltstones commonly exhibit rusty weathering due to the presence of pyrite, which in some areas defines bedding. Although sulphides are concentrated in sedimentary layers, minor pyrite is present in most of the rocks.

INTRUSIVE ROCKS

The strata are cut by abundant intermediate to felsic dykes and sills, typically 1 to 3 metres wide. Intermediate dykes are commonly green or grey amphibole and plagioclase porphyries. The grey to buff-coloured felsic dykes may contain amphibole needles, biotite blobs and quartz eyes. Dyke attitudes are highly variable, but there are several with the same attitude as a prominent fracture set.

Massive mafic igneous rocks in the middle of the stratigraphic section are green in colour, and contain small amphibole and plagioclase phenocrysts. Grain sizes increase from fine to medium grained away from the inferred contacts, which are faulted in several cases. Intrusive relationships are not apparent and there is no compelling evidence for flow origin. These mafic bodies may be fine-grained gabbroic sills or basaltic flows.

A coarse-grained, biotite-rich, tonalitic pluton outcrops in the westernmost part of the map area. Intrusive relationships are evident in local host rocks. However, the contact is highly fractured and epidote rich, indicating reactivation by fault movements. Jurassic to Tertiary granitic plutonism has been extensive in Takla rocks (Monger, 1977). It is likely that the tonalitic intrusion is of a similar age.

DEFORMATION

Rocks of the Takla Group are cut by several major northwest-striking vertical faults. Rocks in these fault zones are highly fractured, contain epidote and quartz veining, and sometimes have a vertical shear-fabric developed parallel to the fault. Lithology and bedding remain relatively consistent across these boundaries.

Fracturing is extensive. Although there is a wide range of attitudes, a fairly consistent set of fractures has an average orientation of 015°/55° southeast. Two small folds with easterly vergence are present in siltstone layers in the central part of the map area.

INTERPRETATION

The Takla assemblage in the study area is indicative of formation in a submarine environment. The green colour and pyroclastic nature of the rocks characterize them as Lower Takla Group (Lord, 1948). Monger and Church (1977) divided the Lower Takla into the lower Dewar Formation dominated by tuffs and volcaniclastic sediments, and the upper (and sometimes time equivalent) Savage Mountain Formation dominated by flows. The base of the Savage Mountain Formation is defined by the first appearance of volcanic breccia. The study rocks are assigned to the Savage Mountain Formation based on this criterion.

Monger (1977) suggests that a volcanic centre near Sustut Peak could account for the 3000 metres of Savage Mountain stratigraphy in which flows predominate over volcaniclastics. It is likely that the study rocks represent a distal facies of the Upper Triassic volcanism that occurred in this area.

The thick breccia-based units of the Savage Mountain Formation probably represent submarine flows containing phenocrysts, that underwent autobrecciation and incorporated other volcanic fragments from pyroclastic sources as they moved along the seafloor. The ambient sedimentation reflected in the tuffaceous and sedimentary horizons may have been predominantly epiclastic. The depositional environment of these rocks was clearly close to a major active volcanic region.

Follow-up work will include detailed microscopic examination to determine the exact character of the Takla rocks, as well as geochemical analysis of some of the flow units, tuffaceous units and dykes.

INGENIKA GROUP

Fieldwork in the Ingenika Group was conducted in the Ingenika Range 24 kilometres north of Aiken Lake, in the area of Cutbank Creek (94C/12, Orion Creek). Rocks in this region belong to the Upper Proterozic Swannell Formation (Mansy and Gabrielse, 1978). Although previous work has resulted in subdivision of the Swannell Formation into discrete units (Mansy, 1986), we have found subdivision in the area of Cutbank Creek to be difficult, as there are no marker beds. The Swannell Formation consists of monotonous sequences of mica schist (muscovite ± biotite), garnet mica schist (garnet + muscovite ± biotite), quartzose schist (quartz + muscovite ± garnet ± biotite) and metaquartzite (± muscovite ± biotite). These rock types are interbedded and have both gradational and sharp contacts. Graded quartzose beds consistently show upward-facing younging directions. Individual beds range in thickness from 50 centimetres to tens of metres.

DEFORMATION

The polyphase deformational history of the area begins with southwest-closing recumbent (F_1) folds with northwest-trending fold axes. These folds are recognized only in relatively competent quartzose units. Local facing data support southwesterly vergences for the folds. F_1 folds have an axial-planar schistosity and garnet growth was associated with D_1 deformation. The S_1 schistosity was later crenulated about northwest-trending axes. This crenulation event was associated with the growth of well-developed rolled garnets that show westerly vergence, and a strong crenulation lineation. Numerous late-stage southwest-vergent tight folds were observed folding the crenulated S_1 schistosity in quartzose units. West-directed thrusting associated with D_1 deformation is evident near Orion Creek.

Mesoscopic northeast-vergent F_2 folds have the same northwest axial attitudes as F_1 folds and crenulations. D_2 garnet was observed overgrowing mylonitic fabrics in a D thrust.

A later, regional-scale deformation has been documented by Mansy (1986) and involves the development of a metamorphic antiform around a northwest-trending axis. Schistosity and fracture data indicate cylindrical folding about this axis (Figure 1-17-3).

Subsequent research will involve detailed microscopic and microprobe examination to determine the complex rela-

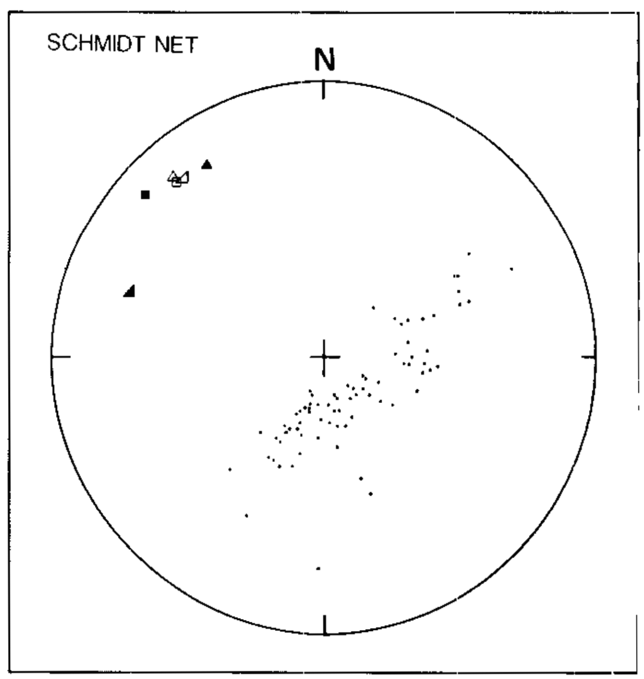

Figure 1-17-3. Stereonet plot of structural data from Swannell Formation. Symbols: □, average fold axis of southwest-vergent F_1 recumbent folds; •, poles to schistosities; ▲, average fold axis of tight southwest-vergent late F_1 folds; ◭, average crenulation lineation; ■, average fold axis of northeast-vergent F_2 folds; △, fold axis of major anticline; ◢, fold axis of fractures.

tionships between the deformation and metamorphism of the area.

ACKNOWLEDGMENTS

We thank Andrew Hynes for his invaluable guidance and assistance in the field and for his review of the manuscript. We also acknowledge Northern Mountain Helicopters Ltd. for logistical support during the field season. The fieldwork was supported by a Natural Sciences and Engineering Research Council grant to A. Hynes, as well as by the British Columbia Ministry of Energy, Mines and Petroleum Resources.

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