Kunghit Island mylonite of the southern Louscoone Inlet fault system, Queen Charlotte Islands, British Columbia

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Abstract: The Kunghit Island mylonite (KIM) outcrops on western Kunghit Island on strike with the Louscoone Inlet fault system (LIFS). The mylonite lies within the Upper Triassic Karmutsen Formation and was metamorphosed to greenschist facies. Microscopic structures indicate this mylonite formed as a northwest striking, steeply to vertically dipping fault zone of oblique dip-slip movement with a sinistral strike-slip component. No evidence of dextral strike slip movement was found in the mylonite. A crenulation overprinting the primary foliation attests to a younger episode of north-south compression. Field relations bracket deformation between Early Jurassic and Late Tertiary time. The close association of Kunghit Island mylonite and other shear zones on strike with Louscoone Inlet fault system in the southern islands with plutonic rocks, suggests that deformation reflects intrusion of the San Christoval plutonic suite. Once established, Kunghit Island mylonite and other parts of Louscoone Inlet fault system could have accommodated later deformation.

Résumé : La mylonite de Kunghit Island affleure dans l'ouest de l'île Kunghit, dans le prolongement du système de failles de Louscoone Inlet. La mylonite se trouve à l'intérieur de la Formation de Karmutsen (Trias supérieur) et a été métamorphisée au faciès des schistes verts. Les structures microscopiques indiquent que cette mylonite est apparue sous la forme d'une zone de failles de direction nord-ouest et de pendage abrupt à vertical, à rejet pente oblique et à rejet longitudinal (décrochement) senestre. Aucun indice de décrochement dextre n'a été relevé dans la mylonite. Une schistosité de crénulation qui se superpose à la schistosité primaire atteste d'un épisode plus récent de compression nord-sud. Les relations établies sur le terrain situent la déformation entre le Jurassique précoce et le Tertiaire tardif. L'étroite association entre la mylonite de Kunghit Island et d'autres zones de cisaillement qui se situent dans le prolongement du système de failles de Louscoone Inlet dans les îles au sud d'une part et les roches plutoniques d'autre part suggère que la déformation témoigne de l'intrusion de la suite plutonique de San Christoval. Une fois établies, la mylonite de Kunghit Island et d'autres parties du système de failles de Louscoone Inlet ont pu être le siège d'une déformation ultérieure.

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INTRODUCTION

The Louscoone Inlet fault system (LIFS) is the longest fault system in the Queen Charlotte Islands (Fig. 1) and has been considered to be a dextral strike-slip fault (Sutherland Brown, 1968; Yorath and Chase, 1981; Lewis, 1991). An absence of unequivocally offset structures across the fault and the paucity of outcrop make characterization of fault system difficult. On western Kunghit Island a mylonite outcrops on strike with the southern extension of the Louscoone Inlet fault system. This mylonite was mapped and sampled in the summer of 1992, the aim being to determine its shear sense and to relate this information to the fault system.

The Louscoone Inlet fault system forms part of the system first defined by Sutherland Brown (1968) as the Rennell Sound-Louscoone Inlet fault zone, extending from Rennell Sound in the northwest to Howe Bay on Kunghit Island in the southeast (Fig. 1). Sutherland Brown postulated 19-90 km of dextral strike-slip movement along the system, with eastern block subsidence. This interpretation was based on restoring the separation of large scale structures assumed to have been adjacent on either side of the fault.

Yorath and Chase (1981) considered the Louscoone Inlet fault to be the dextrally offset southern extension of the Sandspit fault. Young (1981) considered the Rennell-Louscoone fault system to be a Cenozoic dextral wrench fault associated with plate tectonic interactions to the west. Both these studies were based heavily on Sutherland Brown's work (1968).

In 1987 the Geological Survey of Canada initiated the Queen Charlotte Basin Frontier Geoscience Project which resulted in key structural areas being mapped in greater detail, leading to modification of earlier ideas. Thompson et al. (1991) and Lewis and Ross (1991) found the Louscoone Inlet fault system to terminate south of Rennell Sound and not to be the southern extension of Sandspit fault. Lewis and Ross (1991) reported several mylonite zones in the Upper Triassic Karmutsen Formation and Kunga Group in the central islands. These zones are steeply dipping, northwest trending structures often with a northeast-side-up movement, based on field indicators and microstructures. They found no evidence for strike-slip faulting in northern and central Queen Charlotte Islands.

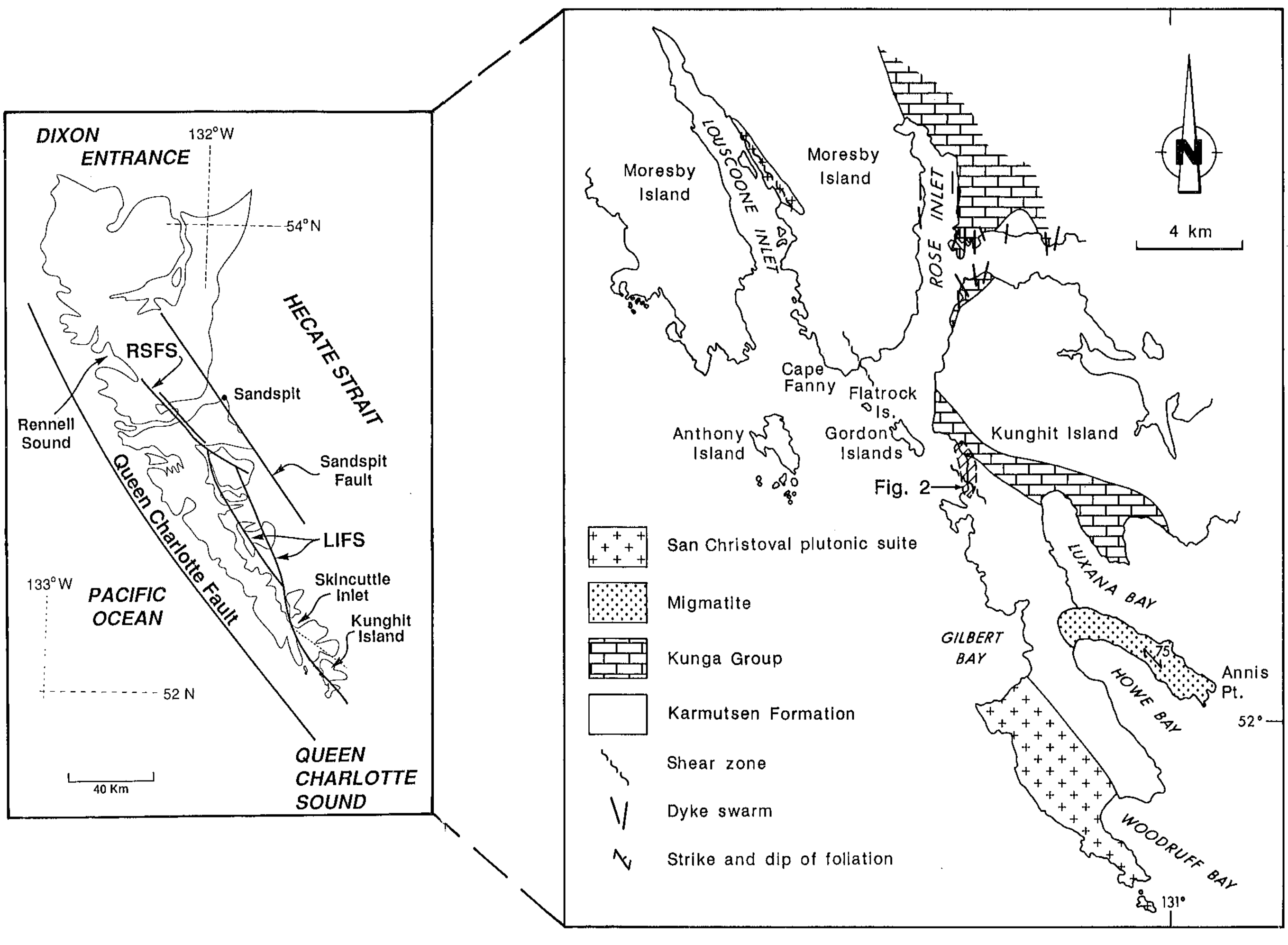

Figure 1. Map showing study area, major structures and regional geology of the Queen Charlotte Islands.

Lewis (1991) subsequently mapped part of the central Louscoone Inlet fault system in the vicinity of eastern Skincuttle Inlet and, on the basis of consistent structural fabrics in a mylonite, proposed dextral strike-slip faulting with at least 10-20 km of offset. He also proposed a model whereby strike-slip displacement decreases to the north with displacement taken up by extensional faulting to the east.

In the summer of 1992 field work was undertaken to examine the southern part of the fault system, with the portion that passes through northern Kunghit Island receiving particular attention (Fig. 1). This paper outlines the results of this work and was done as an undergraduate research project.

REGIONAL GEOLOGY OF QUEEN CHARLOTTE ISLANDS

Queen Charlotte Islands are a group of some fifty islands located off the west coast of Canada. The following outline of the regional geology is taken from Lewis et al. (1991). The geology can be expressed with reference to four major stratigraphic packages. The lowermost package is unnamed Permian strata and Upper Triassic Karmutsen Formation basalt, Upper Triassic to Lower Jurassic calcareous and clastic sedimentary rocks (Sadler, Peril, and Sandilands formations of Kunga Group), and Lower to lower Middle Jurassic clastic sedimentary rocks (Maude Group). This package was folded during a southwest directed shortening event in the Middle Jurassic. Unconformably above these strata is the second package, of Middle to Late Jurassic calc-alkaline volcanic strata of Yakoun Group and epiclastic sediments of Moresby Group. In Late Jurassic time the region experienced block faulting and widespread plutonism. The elongate San Christoval plutonic suite (SCPS) trends northwest on the west side of the islands and consists of diorite and quartz diorite. On the east side of the islands, Burnaby Island Plutonic Suite forms small individual plutons of gabbro, diorite, quartz monzonite, and trondhjemite. Isotopic data indicate that both these plutonic suites were emplaced and uplifted in Middle to Late Jurassic time (Anderson and Reichenbach, 1991).

The third stratigraphic package consists of clastic sediments of Longarm, Haida, Skidegate, and Honna formations and records marine transgression in Cretaceous time (Haggart, 1991). In Tertiary time extensive calc-alkaline volcanism produced the Masset Formation, the fourth and youngest stratigraphic package. Closely associated in time and space with the Tertiary volcanic rocks is the Kano plutonic suite, which occurs as small intrusions and north-striking dyke swarms throughout the islands (Souther and Jessop, 1991). Active Tertiary structures are northwest- to northeast-striking faults such as the Sandspit and Louscoone faults, along which dextral strike-slip faulting has been suggested to have occurred. The dominant northerly trend of the dykes indicates a component of east-west extension.

GEOLOGY OF THE KUNGHIT ISLAND MYLONITE

This mylonite outcrops on western Kunghit Island (Fig. 1) along a rugged shoreline open to the Pacific Ocean. One narrow area on the south margin of the zone allows approach and landing suitable for small craft such as a Zodiac. Continuous intertidal exposure trends north for about 2 km with a width of 7-20 m. Beach gravels and dense forest obscure exposures inland. Average orientation of the foliation throughout the mylonite zone is 140°/80° east. Mineral lineations in the plane of the foliation plunge from 12-56° northwest with the majority plunging 35-40° north-northwest. Shoreline orientation provides an oblique transect through the mylonite zone. Kunghit Island mylonite can be divided into five northwest trending zones on the basis of lithology and structure (Fig. 2).

Mesoscopic structures

Domain 1, in the south, is made up entirely of pillow basalt and pillow breccia of the Upper Triassic Karmutsen Formation. Although deformed in a brittle manner with quartz and calcite veining, primary volcanic depositional features such as pillows are recognizable. Bedding is oriented 126°/47° southwest, in agreement with attitudes on surrounding shoreline exposures. Domains 1 and 2 are separated by an 8 m wide area of no exposure, immediately north of which lithologies dip southeast; it is unknown whether there is a gradation in lithology and deformation or a major discontinuity between the two domains.

Domain 2 extends for about 250 m across strike and comprises mafic schist with minor limestone, sandstone, and elongate pods of felsic plutonic rock. The mafic schists appear to have been derived from the Karmutsen Formation, but it is not certain if they were originally pillowed flows, and thus a continuation of the rocks to the south, or if they were a different volcanic facies such as massive flows. Limestone and sandstone lenses, with uncommon crinoid ossicles, are interstratified with Karmutsen Formation in this area. They are considered to be part of Karmutsen Formation for two reasons: the sedimentary lithologies do not appear similar to either Sadler or Peril formations; and Sutherland Brown (1968) reported interstratified beds of limestone and clastic sediments with crinoid ossicles within Karmutsen Formation elsewhere in the islands.

Average foliation in this domain trends northwest and dips approximately 40° northeast and is best developed in the mafic schists and limestones. Overprinting the foliation is a crenulation with fold axes plunging up to 55° east. Crenulations have an amplitude of about 1 cm and wavelength of 3-4 cm. Locally, rods developed in limestone and sandstone, and pencil structures, formed by the intersection of bedding and foliation, occur trending east. Aplitic material occurs as unfoliated 0.25-1.0 m wide veins intruded parallel to the foliation. The mafic schists grade northward into the dense, well foliated mafic rock of domain 3 over a distance of about 100 m.

Domain 3 is everywhere composed of a mylonite: dense, dark green rock with a well developed and consistent northwest striking foliation, dipping steeply northeast to vertical. Locally the mylonitic foliation is folded into S and Z folds. For most of these rocks the earliest recognizable foliation is evident as parallel streaks of different mineral composition. Mineral lineations consistently plunge 40° northwest. In places, poorly developed feldspar and epidote porphyroclasts, 0.2-3.0 cm across, occur along the foliation. Boudins, 2 cm wide, extend parallel to the lineation in places. Crenulations were not observed. Moving northward into domain 4 the mylonitic foliation becomes discontinuous over a distance of 150 m.

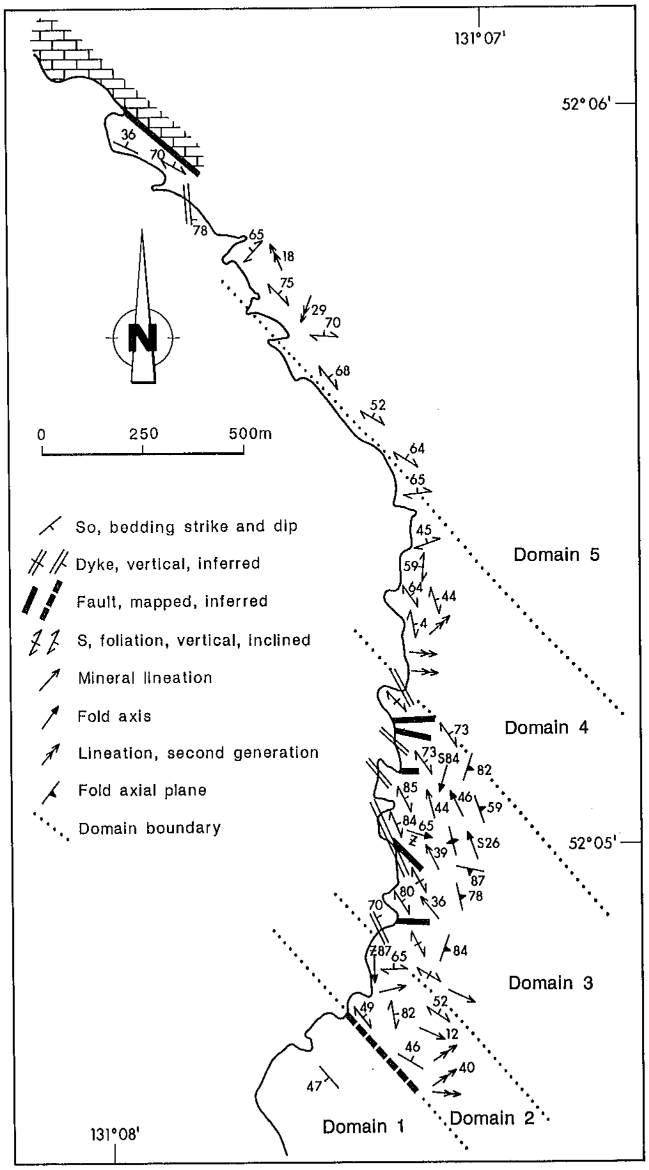

Figure 2. Geology and mesoscopic structure map of the Kunghit Island mylonite. Patterned area at north end is Kunga Group, remainder of map area is Karmutsen Formation.

Domain 4 consists of discontinuous mylonite and crenulated schists. Mylonitic rocks have the same character as in domain 3 although foliation is more variable striking 060-190° and dipping from 4-70° north or northeast. Interbedded with mylonitic rocks are crenulated mafic schists with fold axes trending east. In some places the earliest recognizable foliation has a very shallow dip. Although no faults were discovered in outcrop, the rocks in this domain seem contorted because of the variable foliation attitudes. Small amounts of dioritic rock occur within this zone, exhibiting a poor foliation. Domain 4 extends for about 500 m across the strike of the northwest foliation and grades into domain 5.

Domain 5 is distinguished by the disappearance of mylonitization, a decrease in schistosity, and the appearance of primary bedding. Lithologies are Karmutsen Formation mafic schists of variable schistosity and poorly to moderately foliated rocks of Triassic Sadler and Peril formations. Schistosity strikes approximately northwest. Weak crenulation fold axes of variable orientations are overprinted on this schistosity. In the north end of the map area bedding in Karmutsen Formation is oriented 115°/36° east and is in fault contact with Kunga Group. This fault trends 132°/80° east and displays no indicators of sense of past movement.

Brittle faults and dykes are found throughout Kunghit Island mylonite. Faults are 10-60 cm wide, trend consistently easterly, and have vertical to subvertical dips. Most of these faults are marked by an orange weathering, fine grained fault gouge. Slickensides or offset indicators are absent on these faults. All dykes trend northwest with vertical to subvertical dips, their orientation parallel and subparallel to the mylonitic foliation they have intruded. These dykes are 1.0-1.5 m wide with fine grained, intermediate to mafic, aphyric to feldspar-phyric, unfoliated lithologies.

Microstructures

Thin sections were made of oriented samples chosen to give a survey of all rock types through Kunghit Island mylonite and were cut parallel to the mineral elongation lineation and perpendicular to the foliation to reveal the kinematic plane. Structures such as winged porphyroclasts, S & C foliations, and C', or extensional crenulation cleavages, were sought in this study and are described below. Virtually all thin sections show well-developed foliations: a pervasive, closely spaced foliation called the C1 foliation, and a less well-developed C2 foliation spaced 0.5-10 mm apart.

A thin section from domain 1 shows a brecciated fine grained, dark brown lithology with interstices filled with glass or calcite, epidote, and quartz. Breccia fragments are 0.25-0.40 mm across, generally too fine grained to optically determine the mineralogy. No foliation is visible in thin section. This sample is interpreted to be a fractured pillow breccia.

Domain 2 has the most variable lithology of all domains and includes carbonate, plutonic and mylonitic rocks. Carbonate rocks consist of recrystallized calcite grains and quartz porphyroclasts with symmetric and asymmetric pressure shadows of quartz and calcite fibres. C1 foliation trends 087°/50° north and is delineated by opaque matter. Spaced approximately 0.5 mm apart, the C2 foliation trends 063°/54° north and is also delineated by opaque matter. C2 intersects C1 at an average angle of 24° in the kinematic plane with sinistral geometry. Plutonic material is medium grained quartz diorite of hornblende, plagioclase, and quartz, highly altered to chlorite and epidote in places. Small fractures containing breccia fragments cut the quartz diorite. Some plagioclase grains show a slight bending of their twin lamellae indicating a small amount of ductile deformation. No foliation is present in thin section. Mylonitic rocks are fine grained with quartz, epidote, chlorite, and hornblende. C1 foliation is oriented 126°/83° southwest and is marked by acicular hornblende, tabular epidote, and opaque matter. C2 foliation is spaced 0.5 mm and is oriented 099°/68° south. C2 intersects C1 in the kinematic plane at an angle of 28° with sinistral geometry. Porphyroclasts of epidote, hornblende and feldspar have pressure shadows of fibrous quartz, calcite, and chlorite grains. About 25% of the porphyroclasts have asymmetric delta pressure shadows indicating sinistral shear; the remainder having symmetrical or ambiguous pressure shadows.

All sections from domain 3 have very similar mineralogy and structures. Mylonitic foliations are well developed and marked by bands of equant quartz and calcite, tabular epidote, acicular hornblende and chlorite, and opaque minerals. Most quartz occurs as recrystallized equant grains 0.025-0.1 mm across showing a small amount of undulose strain. Pervasive C1 foliation has an average trend of 145°/86° south and the C2 foliation spaced from 0.25 to 0.75 mm apart has a trend of 063°/54° north to 126°/70° southwest. The two intersect in the kinematic plane at an angle of 24-28° with sinistral shear geometry in all thin sections (Fig. 3).

Feldspar (albite) forms delta porphyroclasts with asymmetric to symmetric pressure shadows, most of which indicate sinistral shear (Fig. 4). One thin section shows several symmetric feldspar porphyroclasts fractured at high angles (70-90°) and extended parallel to the trace of the C1 foliation. Interstices between these formerly joined feldspar fragments are filled with relatively coarse grained (0.25-0.5 mm) undulose strained quartz. Elongation measured by displacement of fractured pieces ranges from 16-35% with an average elongation of 24%.

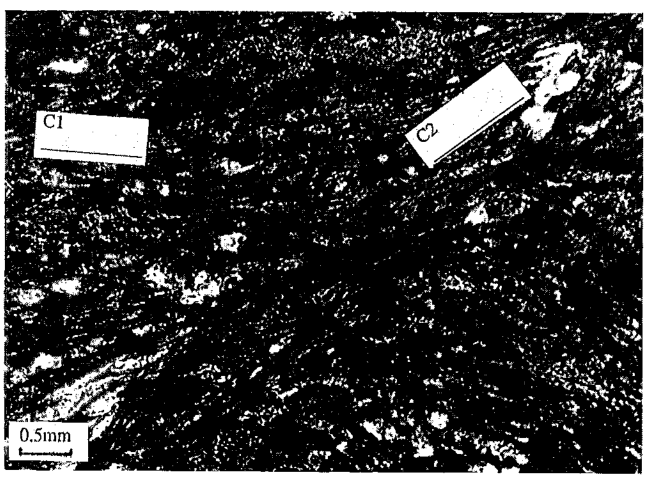

Figure 3. Photomicrograph of mylonite in domain 3 showing C1 and C2 foliations intersecting to give sinistral shear sense. Foliations are marked by acicular hornblende, epidote, chlorite and quartz grains. Plane light, north is to the top.

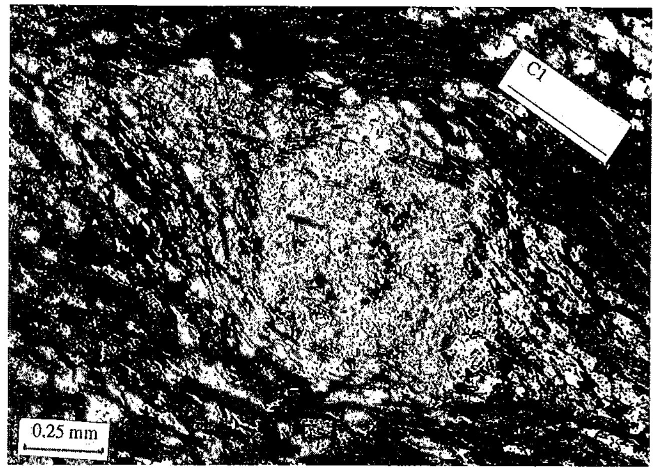

Figure 4. Photomicrograph of feldspar porphyroclasts in domain 3. Pressure shadow tails are composed of quartz, epidote, and calcite. C1 foliation is visible in the groundmass of hornblende, epidote, chlorite and quartz. Plane light, north is to the top.

Most of the thin sections from domain 4 have the same mineralogies and foliations as in domain 3. Sinistral shear is indicated by C1 and C2 foliation geometries and by offset grains along microfractures.

No thin sections were examined from domain 5 because mesoscopic structures show a drastic decrease in deformation and primary bedding is visible.

DISCUSSION

Kunghit Island mylonite is a shear zone with penetrative foliation that parallels its margins. Deformation increases from both sides toward the centre, from undeformed volcanic and sedimentary rock through crenulated schists to mylonite.

Some of the most helpful and obvious structures in a mylonite are the C-S fabrics. Kunghit Island mylonite's foliation and compositional bedding strike subparallel to each other, which explains the paucity of mesoscopic and microscopic C-S fabrics. Almost all sections show a dominant foliation, slightly wavy in places, which is interpreted to be the C and the S fabrics together and is called the C1 foliation. Some sections, especially from domain 3, the shear zone centre, have a second foliation, the C2 foliation, which is interpreted to be an extensional crenulation cleavage (Platt and Vissers, 1980). Extensional crenulation cleavages mark ductile shear bands which have the geometry of Reidel shear fractures. These ductile shear bands, or C2 foliation surfaces, intersect the C1 foliation in the same way C-S fabrics do, allowing the sense of shear to be determined. Intersections of C1 and C2 foliations in all the mylonite specimens indicate sinistral shear.

Table 1. Type and number of porphyroclasts developed in sample from Kunghit Island mylonite

Domain	Sample No.	# of Sinistral	# of Dextral	Comments
2	9	2 fair	2 fair	many symmetric
3	26	3 good, 2 moderate	0	
3	2	13 good	0	
3	5	1 good, 2 fair	2 fair	many symmetric
3	7	4 good	2 fair	
3	12	4 good	0	

Porphyroclasts are best developed from feldspar grains and exhibit delta pressure shadows of quartz, calcite, and some epidote. Most porphyroclasts show sinistral shear although there are a few which show dextral shear. Dextral varieties are always poorly to moderately developed and are accompanied by ambiguous or poorly to moderately developed sinistral porphyroclasts (Table 1).

The vast majority of quartz grains are equant with an angle of mis-match between lattices always greater than 10°, making them discrete grains. Thus all quartz was recrystallized during deformation. Most of these recrystallized quartz grains exhibit a small amount of undulose extinction, suggesting deformation continued after recovery. Recrystallized quartz occurring with fractured feldspar grains indicates deformation was accommodated by semi-brittle processes.

Crenulation is visible in outcrop only in schistose rocks. The mylonitic rocks presumably are too competent and dense to show it, although in thin section they do show a second foliation. C2 foliation is interpreted to be a second shearing foliation, or extensional crenulation foliation. Microscopic C2 foliation strikes 060-126° and dips 50-70°. Although this attitude agrees with the trend of crenulation axes in outcrop (050-110°), it is not certain if the two are related to the same event. Crenulation can be viewed in two ways: as a later response to the same deformation episode but one wherein the strain axes have rotated; or as a later, unrelated episode of deformation with new strain axes. Mesoscopic buckling crenulation indicates the local maximum compressive stress axis plunged gently south. In Skincuttle Inlet, Lewis (1991) mapped mylonites and found an overprinting crenulation with east trending axes. Possibly the crenulation in Skincuttle Inlet and in Kunghit Island mylonite are due to the same event.

Vertical to subvertical, east-striking brittle faults attest to a later stage of brittle deformation in this region, related or unrelated to the mylonitization event.

Mineralogy of Kunghit Island mylonite comprises feldspar, quartz, opaques, chlorite, epidote, and clinoamphibole, mostly hornblende with minor actinolite, metamorphosed at moderate to high greenschist facies conditions. Presence of amphibole and chlorite grains growing into and along the C surfaces, and quartz and epidote porphyroblasts, indicates deformation also occurred at greenschist facies. Peak temperatures were presumably 400-450°C and pressure about 2-6 kb. Hydrous mineralogy and pressure shadows indicate fluids were present during metamorphism.

Shear zone margins strike 140° and their dip can be taken as the dip of the mesoscopically visible foliation, which is about 80° northeast. This geometry indicates the local maximum compressive stress axis was plunging gently west. Asymmetric pressure shadows in thin section indicate that the plane of flattening was oriented at a small and variable angle, 0-25°, to the shear planes. Because the shear planes and strain axes are not orthogonal to each other, Kunghit Island mylonite is considered a product of non-coaxial strain.

STRUCTURAL GEOLOGY OF THE SOUTHERN QUEEN CHARLOTTE ISLANDS

Mapping of the southern Queen Charlotte Islands in the summer of 1992 revealed other shear zones on strike with the Louscoone Inlet fault system (Fig. 1). On the east shore of Louscoone Inlet a shear zone strikes northwest and consists of schistose Karmutsen Formation and foliated quartz diorite. This shear zone is traceable through Cadman Point and then southeastward inland, where it is hard to recognize. To the south, no shoreline exposure of deformed rocks occurs until immediately east of Cape Fanny where a 0.5-2 km wide zone of schistose Karmutsen Formation and foliated plutonic rock outcrops. This outcrop is on strike with Kunghit Island mylonite. Flatrock and Gordon islands, which lie just south of the strike of this shear zone and Kunghit Island mylonite, contain undeformed Karmutsen Formation, although Gordon Islands has a few northwest trending brittle fault zones. Taken together, the data suggest the Kunghit Island mylonite is a segment of the Louscoone Inlet fault system.

Southeast of Kunghit Island mylonite is the Luxana Bay migmatite forming the peninsula south of Luxana Bay. The northern and northwestern shores of Luxana Bay consist of undeformed to moderately schistose Karmutsen Formation and Kunga Group rocks. Shoreline exposures toward Annis Point comprise schistose Karmutsen Formation grading into a dark green mylonite and then into a migmatite. Foliation in the migmatite has a constant attitude of 130°/75° northeast. The southernmost part of Kunghit Island is underlain by undeformed diorite, the Woodruff Bay segment of San Christoval plutonic suite (Anderson and Reichenbach, 1991).

TIMING

Timing of deformation of Kunghit Island mylonite is constrained by the ages of lithologies affected by the deformation. The Kunghit Island mylonite is principally in Upper Triassic Karmutsen Formation, supported by the fact that its mineralogy is the characteristic assemblage of greenschist facies metamorphism of mafic rocks. Foliation of Kunga Group sedimentary rocks in domain 5 has the same attitude as the mylonitic foliation in domain 3, thus the two foliations are assumed to have developed in response to the same event. Deformation must have occurred after Late Triassic or Early Jurassic time.

Several groups of dykes belonging to the Middle Eocene to Middle Miocene Carpenter Bay dyke swarm occur on northern Kunghit Island (Souther and Jessop, 1991). Lithologies of dykes cutting Kunghit Island mylonite and their proximity to the above mentioned dyke groups suggest they are also part of the Carpenter Bay swarm. Because dykes in the mylonite are unfoliated they provide an upper limit to the age of the deformation event(s) responsible for the mylonitization and the crenulation. Field relations therefore suggest deformation occurred between Early Jurassic and Late Tertiary time.

Kunghit Island mylonite is thought to be a southern extension of Louscoone Inlet fault system because it occurs on strike with that feature. The time of deformation bracketed by field relations in Kunghit Island mylonite are in agreement with ages cited for activity along Louscoone Inlet fault system: Sutherland Brown (1968) considered the Louscoone Inlet fault system active in Cretaceous time because Honna and Longarm formations were thicker in the faulted area, whereas Lewis (1991) considered the fault system to be active from Triassic to Tertiary based on ages of rocks affected by faulting.

Pods of weakly deformed quartz diorite in Kunghit Island mylonite as well as the close association of Karmutsen Formation with foliated quartz diorite in Louscoone Inlet and with the migmatite of southern Luxana Bay, suggest deformation is related to intrusion of the San Christoval plutonic suite (SCPS) in Middle to Late Jurassic time. Alternatively, the northwest striking attitude of the mylonite suggests it may be a result of the Middle Jurassic southwest directed contractional event recorded elsewhere in the Queen Charlotte Islands (Thompson et al., 1991). Once established, Kunghit Island mylonite may have become a zone of weakness which was exploited to accommodate strains from subsequent tectonic and structural events.

Irving et al. (1992) determined that the Queen Charlotte Islands were tilted 9-16° towards the north and northwest in Tertiary time based on the paleomagnetism of Tertiary dyke swarms. Accounting for this tilt, mineral lineations in Kunghit Island mylonite would have plunged from 24-31° northeast suggesting the mylonite had a moderate strike-slip component.

CONCLUSIONS

Kunghit Island mylonite is a northwest striking, steeply dipping fault zone recording oblique dip-slip movement with a component of sinistral strike slip formed within Karmutsen Formation. Deformation occurred at greenschist facies conditions and was accommodated by semi-brittle processes. The mylonite's orientation suggests that the local maximum stress axis responsible for mylonitization plunged gently west. Crenulations visible in outcrop indicate a post-mylonitization event with a local maximum compressive stress axis plunging shallowly toward the south.

Kunghit Island mylonite is a southern segment of Louscoone Inlet fault system and field relations bracket the age of deformation between Early Jurassic and Late Tertiary time, in agreement with ages of Louscoone Inlet fault system activity cited elsewhere. No evidence is found to support the theory that Kunghit Island mylonite is a dextral strike-slip feature. This does not rule out the possibility of dextral strike-slip faulting on other Louscoone Inlet fault segments, or in Kunghit Island mylonite prior to the mylonitization event. Once established Kunghit Island mylonite and Louscoone Inlet fault system probably accommodated later strains. The mylonite may have formed in response to the southwest directed shortening event in Middle Jurassic time and/or as a result of San Christoval plutonic suite intrusion in Middle to Late Jurassic time.

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Geological Survey of Canada Project 870070