Jas alun Jacover / date: Massive sulonde

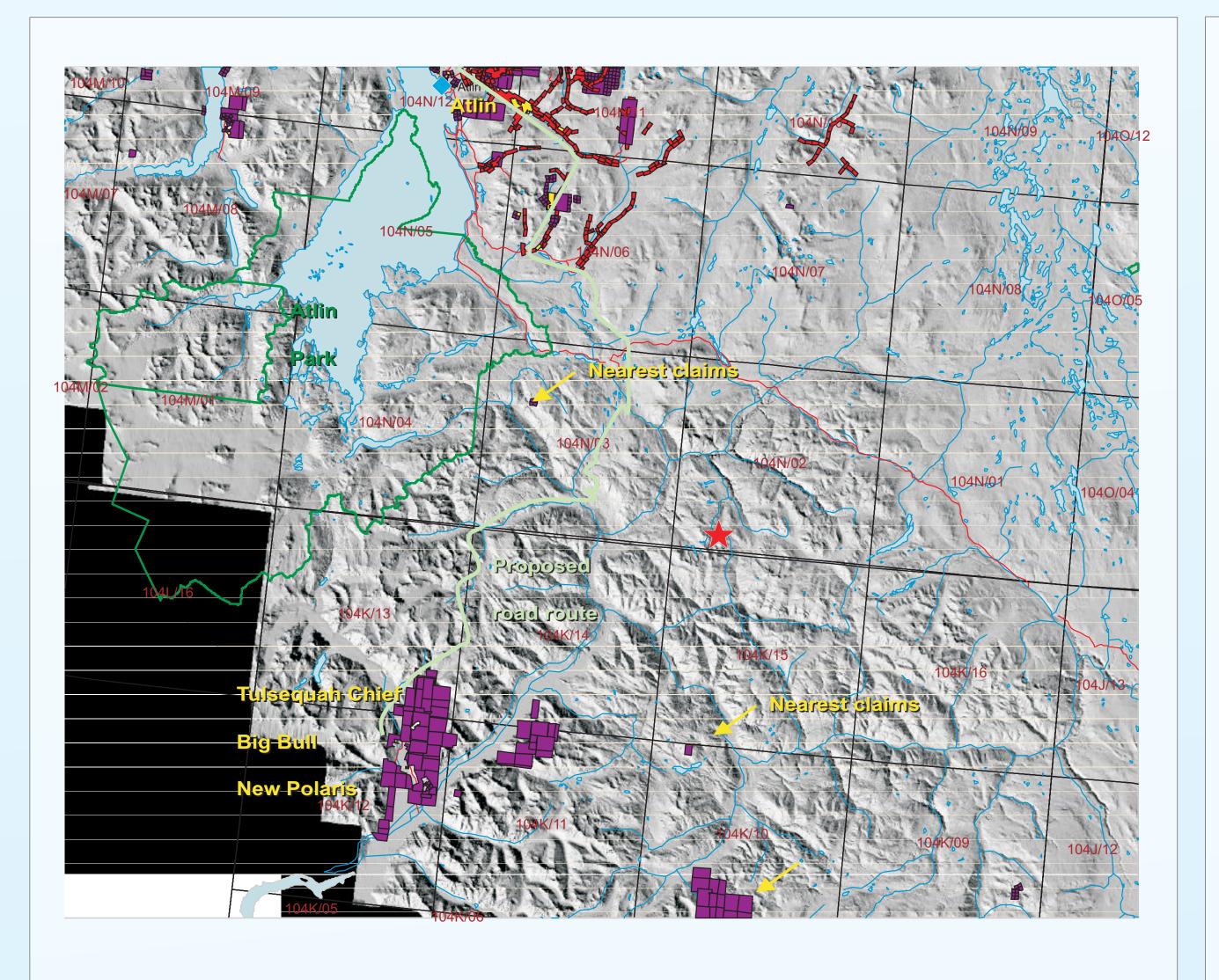
Introduction

Ministry of Energy and Mines personnel discovered new massive sulphide mineralization during regional mapping in the Atlin area. Called the Joss'alun occurrence, it was discovered as part of a mapping program conducted under the style of mineralization are preliminary.

joint federal and provincial Atlin Targeted Geoscience Initiative. The following description is based on less than one full day of fieldwork. Accordingly, observations regarding the geological setting and the

Tectonic Setting

Location



The Joss'alun discovery is located approximately 75 kilometres by air, outheast of the placer mining town of Atlin. Access is by helicopter, which can be chartered in Atlin. Closest road access is a very rough, fire abatement road that ends at Kuthai Lake, 30 km northwest of the occurrence. The occurrence is about 22 km from the proposed Tulsequah road route. Atlin is 92 km south of the Alaska Highway, and 182 km from Whitehorse, which is the nearest major center with a national airport. Nearest tidewater is Taku Inlet, about 70 km to the southwest.

was discovered 75 km southwest *+lin within oceanic crustal rocks or . exceed 3m in strike length and are u to 90 cm thick. The mineralizati occurs in a series of outcrops exposed over 225 m.

ineralization within a $\sim 10 \times 3$ area near the center of the zone are: grab samples: 6.88%, 9.77%, 7.459 6.65% (for nalyses, see table 1). Chalcopyrite has been observed i

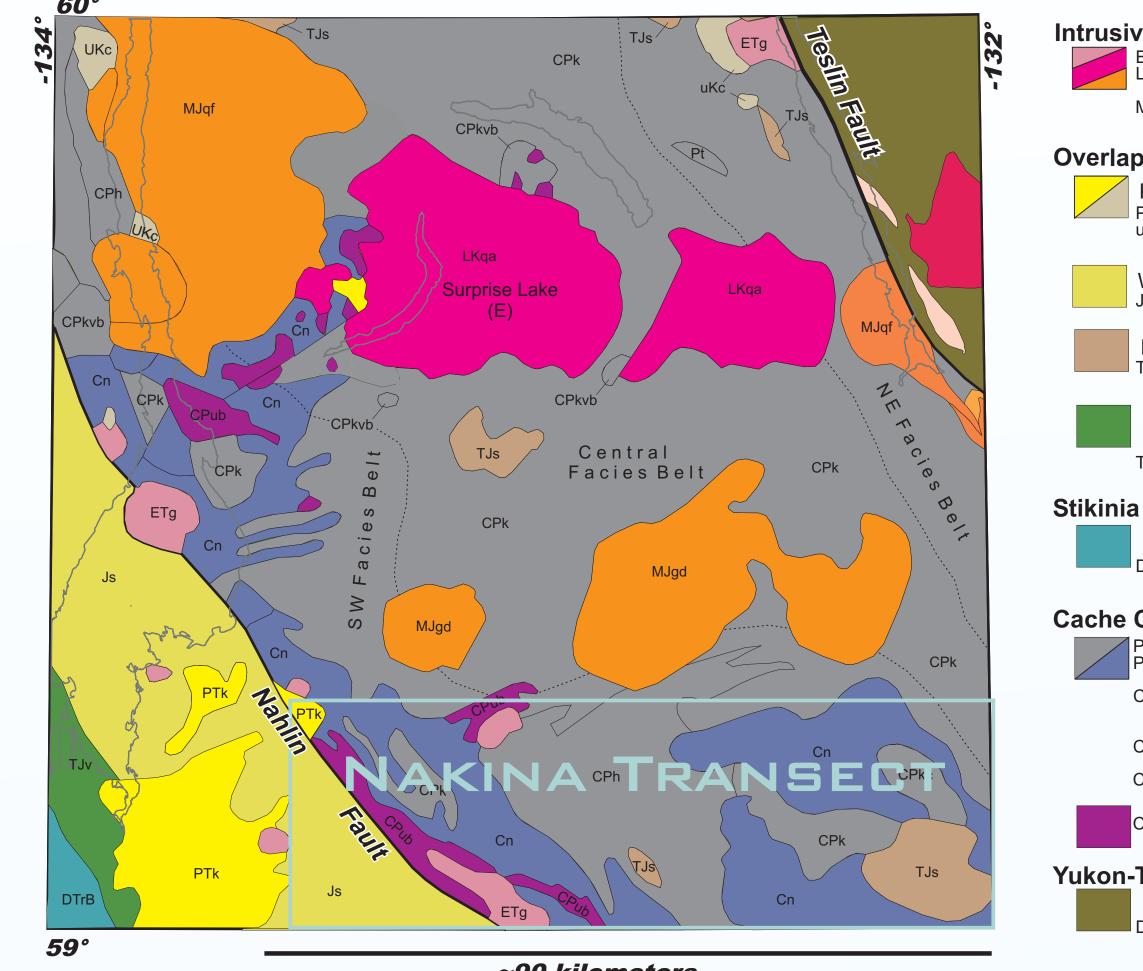
Abstract

trongest in the \sim 10x30 m discover

the trend of the host rocks in the

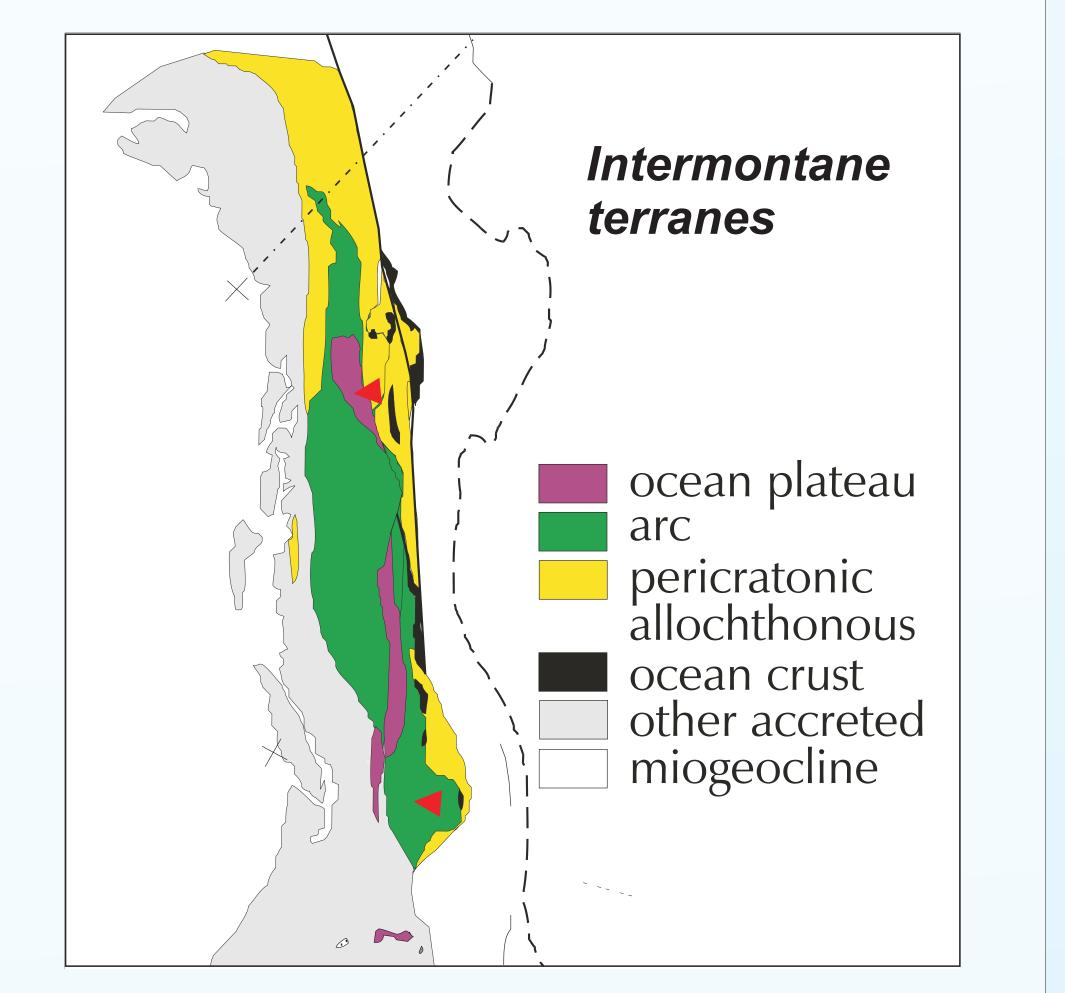
covery zone. Host rocks are domin terrain or localized derivation. Hos - age equivalent to the Kutcho arc. Geochemical character of rocks sampled in the area compar with host volcanics at Kutcho Creek. Within the northern Cache Creek terrane these rocks are region tensive, comprising one of the most common rock types in the Atlin area Mihalynuk et al., 2002; English et al.,

Regional Geology



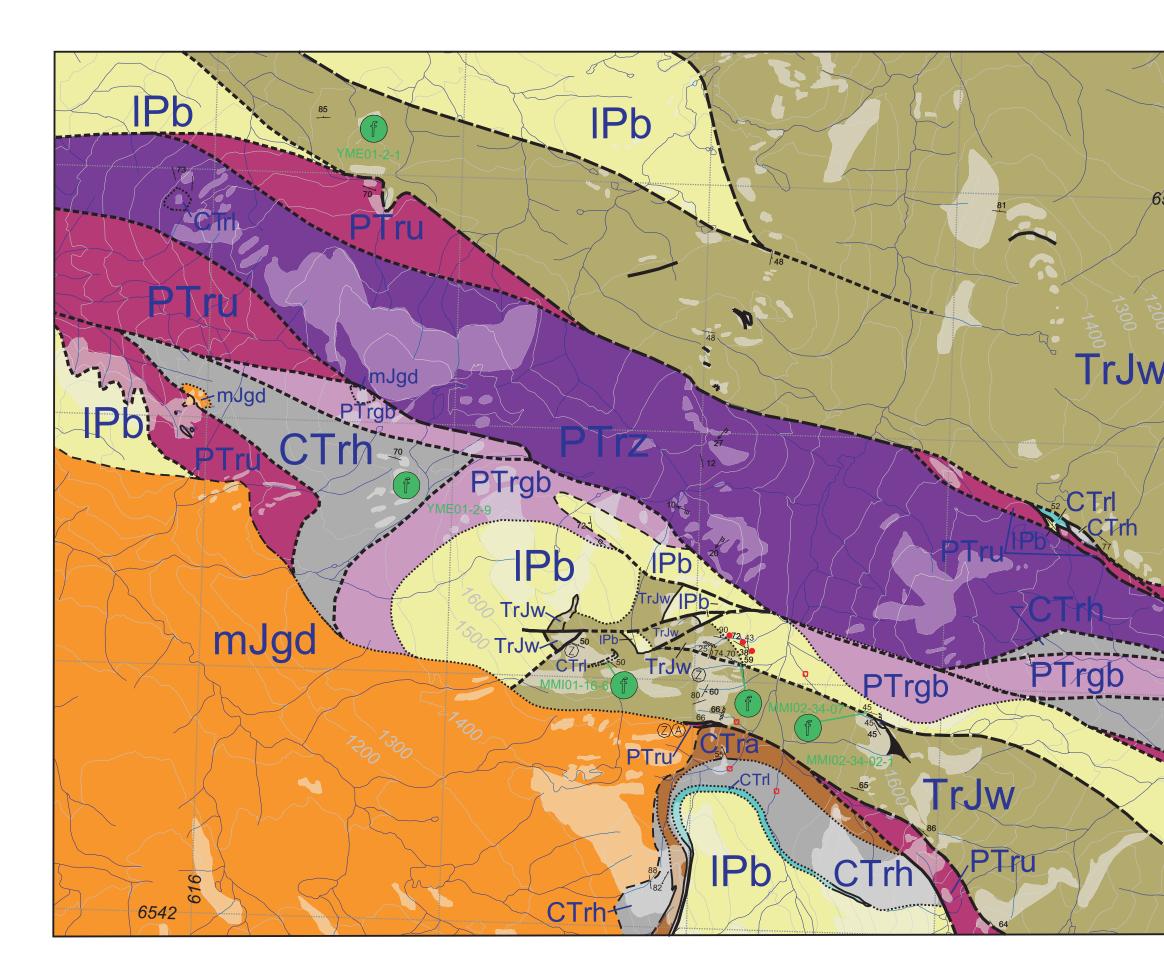
~90 kilometers

Joss'alun Area Geology and Geochronology



Rocks of the Intermontane Belt can belts of increasingly m exoltic origin. Rocks shown in yellow are underlain by pericratonic strata with ties to North America. Rocks in green are volcanic arc ranes containing fossils that ndicate some separation from North America. Rocks shown in ourple are oceanic crustal strata o he Cache Creek Terrane (including Nakina area). Some of th ermian and Triassic fossils within the Cache Creek Terrane, like the spiral fusulinid and conodont jaw

plate shown above (from: Monger, 1975; Orchard et al., 2000), occur how these exotic rocks came to rocks has been the focus of severa tectonic models. One explanation Cache Creek terrane in oroclinal



Layered Rocks √arboniferous - Early Jurassi Cache Creek complex Jw Mid Triassic to Early Jurassic accre-tionary prism, quartz-bearing wacker minor volcaniclastics, ultramafite; olistostromal in parts

CTrl Carbonate: mainly Mid Carbon-iferous to mid Middle Permian limestone, commonly massive IPb Mafic volcaniclastic rocks - mainly lapilli - ash tuffite & pillow breccia Igneous Rocks and Metamorphic Serpentinite: common relict harzburgite; lesser matrix to polymictic melange

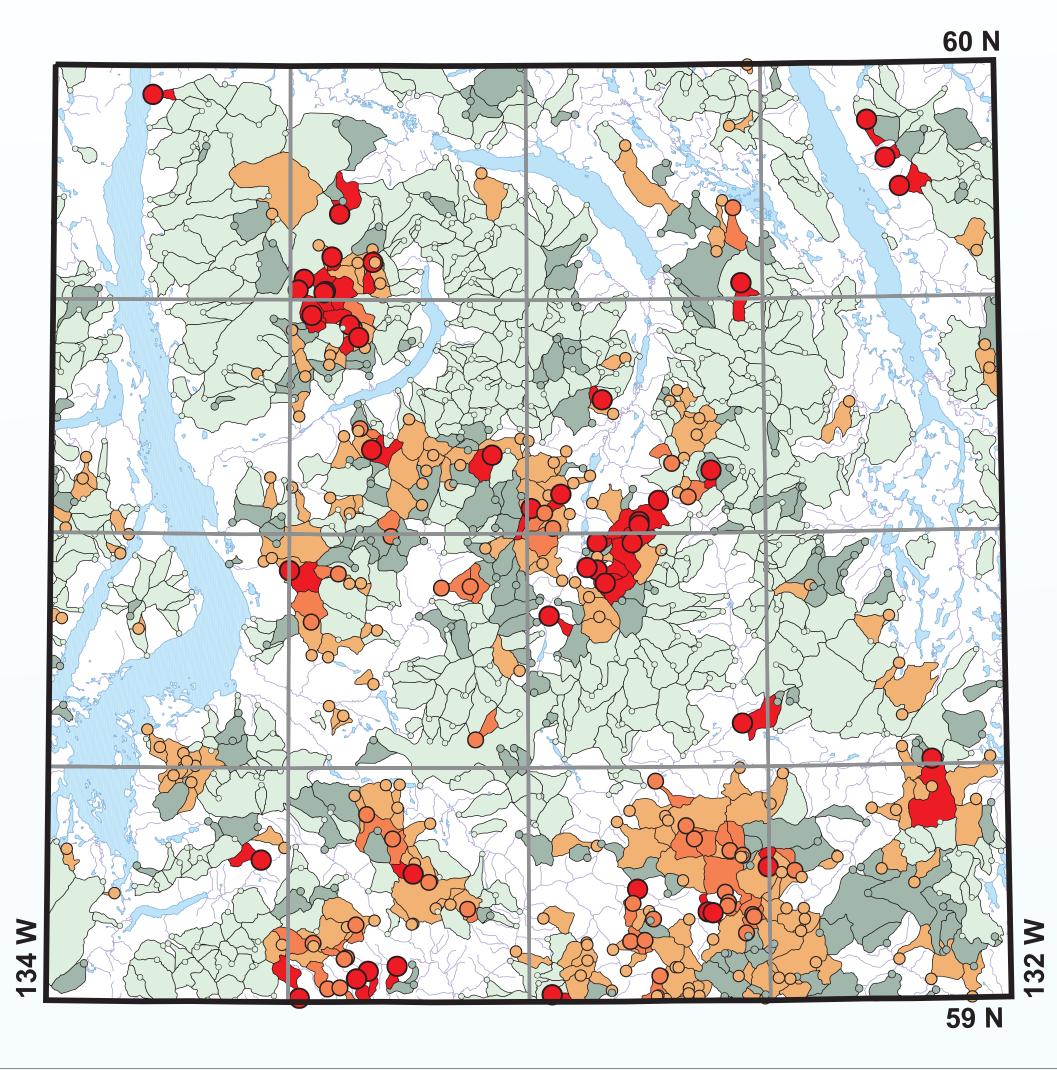


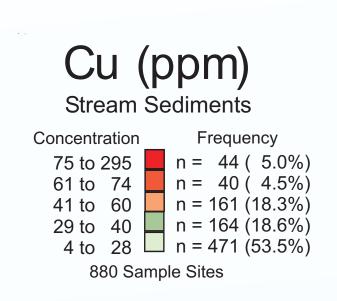




Stream sediment Cu





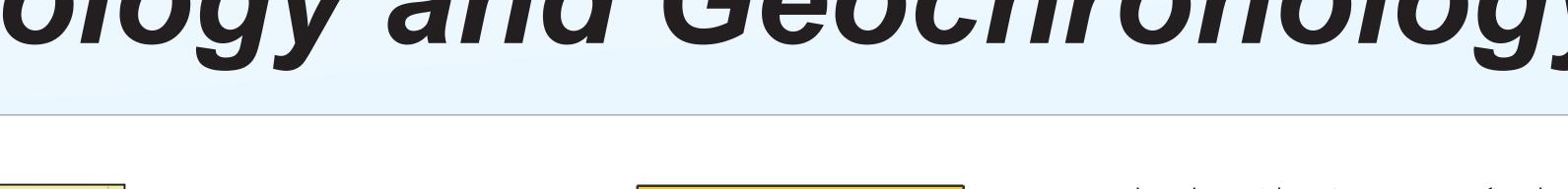


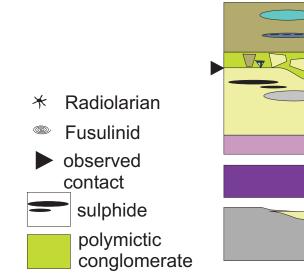
Cu in Joss'alun drainage

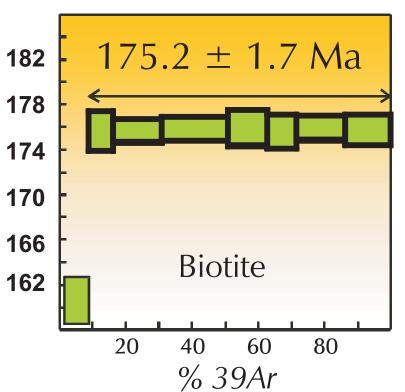
RGS copper values in the Similar host rocks display
Similar RGS values.











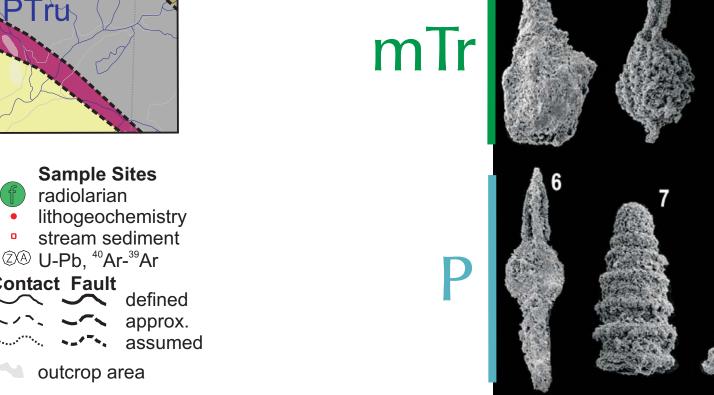
derivation from a magmatic source rocks of a limited age range. suggest that both are formed in juvenile (tholeiitic) intraoceanic arcs. ages from the Kutcho arc, host to the Kutcho Creek massive sulphide suggested by Aitken (1959).

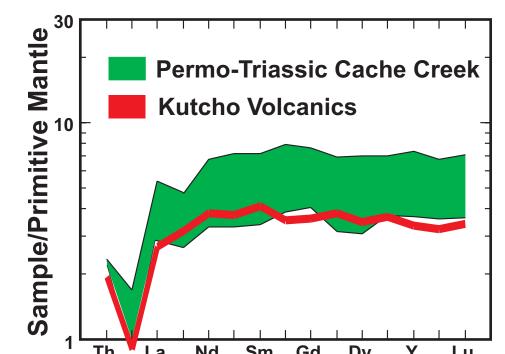
Host rocks at the Joss'alun Discovery are mafic volcaniclastic strata with intercalations of tuffaceous and ferrugenous chert and laminated micrite. Lithologically similar rocks are widespread in the Atlin area where they are interbedded with chert as young as Middle Triassic

Ferrugenous chert within the host strata are of Permian age. SEM photomicrographs of the extracted radiolaria are shown below Overlying coarse, quartz-rich clastic strata contain proximal, fault scarp debris including granitoid boulders and ribbon chert of Middle Triassic age (see below). Super High Resolution Ion Microprobe (SHRIMP) analysis of detrital zircon grains extratcted from the clastic unit reveal a Latest Permian to Early Triassic source terrain age. The

distribution of spot ages with respect to the Permo-Triassic boundary is deposit, which is geochemically similar to most of the volcanic rocks in shown below. Such a unimodal source reflects very local derivation or the Nakina area (see figure below). Geochemical descrimination plots

Angular clasts up to ten (or more) metres across require local A minimum age for the clastic unit is provided by intrusion of the derivation. Latest Permian to Early Triassic felsic magmatism within the latest synkinematic Nakina River stock at \sim 175 Ma (above left). This Cache Creek complex is indicated. SHRIMP ages overlap the known new 40Ar/39Ar age agrees with the geologically indicated age

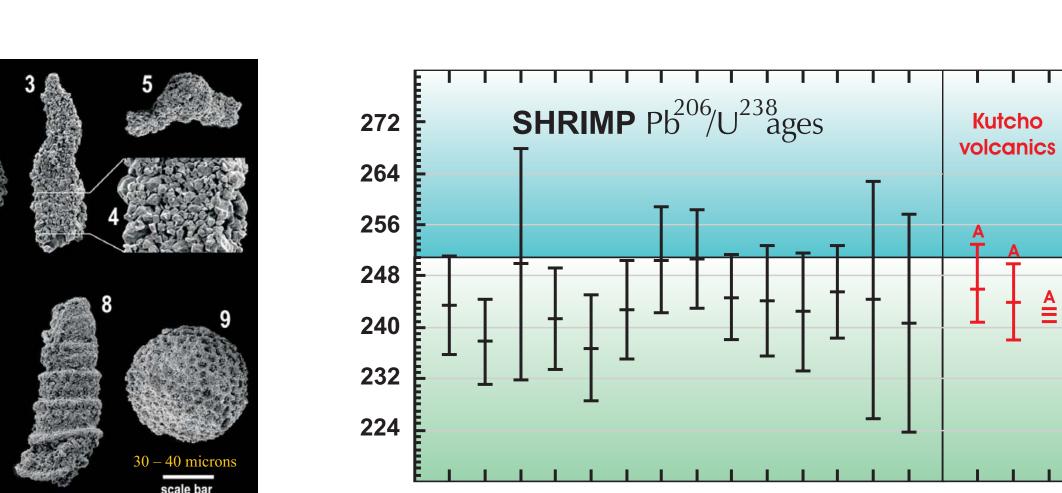




Sample Sites radiolarian

^{②ᢙ} U-Pb, ⁴⁰Ar-³⁹A

outcrop area







element SAMPLES grab3 90 cm chi 35 cm chi

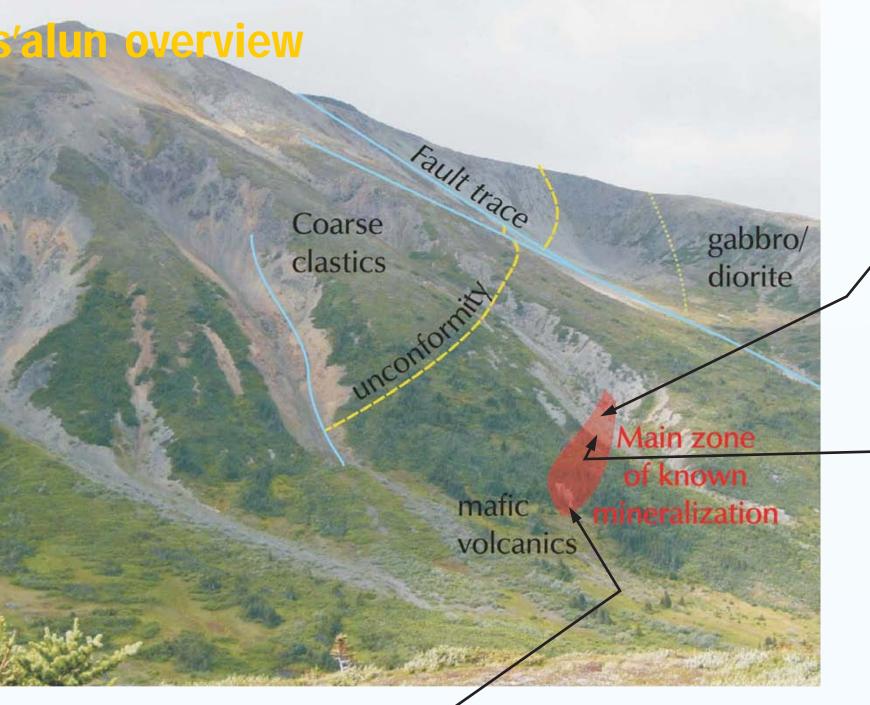
Mineralization

Mineralization consists of a series of stacked lenses of semimassive chalcopyrite and lesser pyrite, which are hosted by a dominantly mafic volcaniclastic unit interpreted to have formed a submarine setting. Lens thickness ranges up to approximately 1m. Thicknesse 30cm are more typical. Lateral extent of the lenses is difficult to determine due to the generally

low and rubbly nature of th outcrops. However, some are exposed for more than 3m ulphides in the lenses appea brecciated. Bedding within the mafic volcanic unit is not everywhere obvious, but the lenses appear to be concordant. to 5cm thick) are clearly mode of genesis are undetermine at this time.



35 cm chip is 6.65% Cu 90 cm chip is 3.3% Cu





Mineralization is exposed at and pelow tree line in low, rubblerewn outcrops within and south of a shallowly incised creek valley Mineralization farthest northwest 's a 30 cm wide, copper stained and gossanous zone on the orthern side of the creek cut near JTM 620271E 6544371N, EPE: 4m (EPE = estimated position error). Mineralization can be traced across the area with massive sulphide lenses (UTM 620381E 6544322N, EPE: 5m) to a very low, chalcopyrite-veine

outcrop amongst the trees and brush. Here, at UTM 620460E 6544252N (EPE: 10m), discordant halcopyrite veins (3-4 cm thick) crop out in an isolated outcrop, upon which several pieces of fistsized float of semi-massive ulphide were resting. . South of his point, mineralization lisappears beneath valley cover However, blebs of chalcopyrite occur within mafic breccia at approximately the same tratigraphic level across the valley about 1 km to the east-southeast.

According to MINFILE, the nearest known mineralization is more than 10 km to the southeast in the Tulsequah map area. It is a series of galenasphalerite-chalcopyrite-bearing quartz veins in presumed Late Triassic submarine volcanic rocks of the Stuhini Group (Inklin:Yeth Creek; 104K022). Within the Atlin map area, the nearest mineral occurrences are: an asbestos occurrence (17km; Focus Mountain; 104N071); a magnesite occurrence (19km; Sloko River: Nahlin Fault; 104N 083), and a limestone occurrence (20km; 104N094; Nakina River). There is no obvious sign of previous work at the Joss'alun discovery. The Tulsequah mine is located 50 km to the southwest.

Representative ICP-MS analyses

Т	Mo	Cu	Pb	Zn	Ag	Ni	Со	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca
S	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%
	4.19	68830.7	9.42	629.1	3279	24.7	578.7	996	17.68	50.4	< .1	153.3	< .1	0.5	0.73	2.32	2.19	104	0.02
	2.65	97698.56	6.22	276	983	11	287.1	1065	17.22	5.6	< .1	191.4	< .1	1	0.98	0.15	1.75	154	0.06
	4.09	74502.47	8.3	293.3	1032	17.2	272.1	821	14.71	14.2	< .1	114.4	< .1	8	0.67	0.76	0.49	106	0.33
nip	3.65	33509.12	4	165.1	841	17.1	320.5	1257	18.62	28.9	< .1	95.1	< .1	0.6	0.16	0.94	0.65	229	0.04
nip	3	66465.67	2.72	241.7	1391	32.1	641.2	1338	20.83	39	0.1	111.5	< .1	0.5	0.29	0.68	0.92	206	0.03
•																			
	Р	La	Cr	Mg	Ba	Ti	В	Al	Na	К	W	Sc	ΤI	S	Hg	Se	Те	Ga	Sample
	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	%	ppb	ppm	ppm	ppm	gm
	0.014	< .5	27.7	1.62	1.7	0.014	< 1	2.56	0.003	< .01	2.8	8.9	0.2	7.24	471	169.8	6.61	9.2	15
	0.018	< .5	7.3	2.23	12.5	0.058	< 1	3.39	0.001	0.01	1.3	8.5	0.02	2.8	108	44.2	2.02	10.8	15
	0.013	0.6	14.1	1.2	7.1	0.079	< 1	2.38	0.001	< .01	2.5	4.9	0.17	3.5	435	204.9	12.46	7.9	15
	0.022	0.6	19.4	3.06	5.2	0.036	< 1	4.31	0.001	< .01	0.5	12.6	0.06	3.4	369	102.3	3.9	18.7	15
	0.024	< .5	94.9	3.76	10	0.033	< 1	4.65	0.001	< .01	0.3	14.4	0.09	4.3	270	108.5	3.56	18.7	15