889010

TULSEQUAH CHIEF

Sept. 21-24/90

GALENA-LEAD ISOTOPE INTERPRETATION

DATA FROM TULSEQUAH CHIEF PLOT IN A TIGHT CLUSTER NEAR DATA FROM MYRA FALLS. MYRA FALLS DEPOSITS ARE HOSTED IN SICKER VOLCANICS THAT MAKE UP PART OF THE WRANGELLIA TERRANE OF THE INSULAR BELT.

THE TULSEQUAH CHIEF VMS DEPOSIT IS HOSTED IN STIKINE ASSEMBLAGE ROCKS (STUHINI Gp.) THAT LIE ON THE EASTERN MARGIN OF THE COAST CRYSTALLINE BELT.

~~IF THE IS MOST LIKELY AGE OF~~

THE INTERPRETED MODEL AGE OF THE TULSEQUAH CHIEF DEPOSIT IS DEVONIAN - SIMILAR TO THAT OF THE MYRA FALLS VMS DEPOSIT (LATE DEVONIAN).

- THIS INTERPRETATION IS BY NO MEANS CONCLUSIVE, BUT THERE SEEMS TO BE A GOOD AND LIKELY CORRELATION BETWEEN MYRA FALLS DATA & TULSEQUAH CHIEF DATA DESPITE THE DIFFERENT TERRANES INVOLVED.

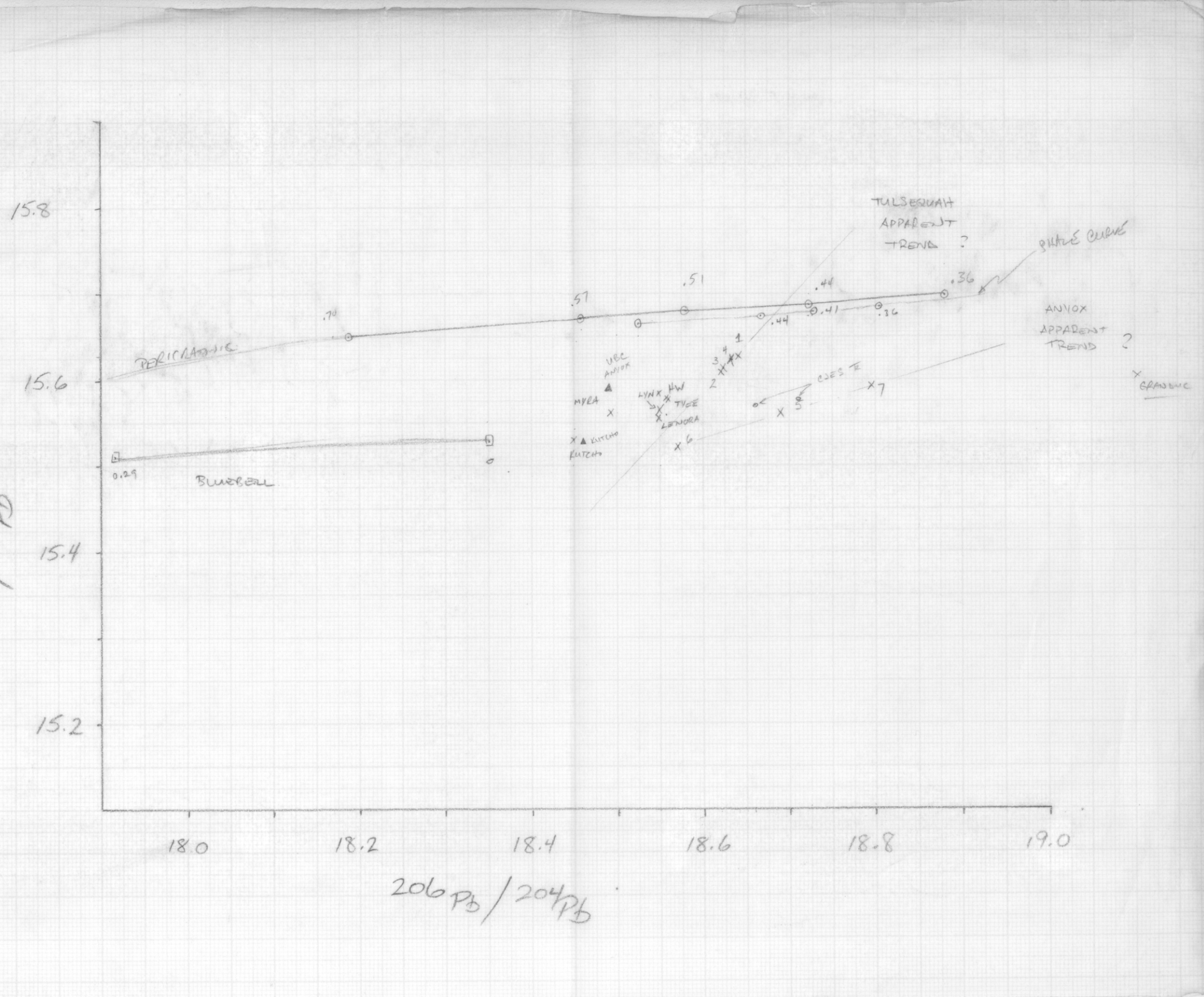
TOM

I had a good chat with Colin about this stuff + he is interested in running some galena at his lab at UBC - OK with you? ~~I guess~~ Could the survey provide him with the necessary samples? Bob.

Nov. 27th

Bob,
Need to check GSC files (pubs.) re - any publication ~~from~~ from Tulsequah Chief. - Also should check Colin's Lead Table

Tom


15.8
15.6
15.4
15.2
18.0
18.2
18.4
18.6
18.8
19.0
206 Pb / 204 Pb
TULSEQUAH APPARENT TREND ?
BLUE CURVE
ANVIOX APPARENT TREND ?
PERICRATONIC
BLUEBELL
0.29
.70
.57
.51
.44
.41
.36
UBC ANVOX
MYRA
LYNX HW
TVCE
LENORA
KUTCHO
CJES E
GRANDUC
1
2
3
4
5
6
7

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Your file Votre référence

Our file Notre référence

March 11, 1985

Tom Schroeter
District Geologist
B.C. Ministry of Energy, Mines
and Petroleum Resources
Bag 5000
Smithers, B.C.
V0J 2N0

Dear Tom:

Sorry to take so long to reply to your query about Pb isotope results. I checked my files and found that we have results on specimens from you for Tulsequah Chief but the samples that we analyzed from Anyox were from Bob Sharp. Nevertheless, results for both areas are as follows:

Tulsequah – (samples from T. Schroeter)

	208/204	207/204	206/204
KQ-82-147	38.325	15.628	18.641
KQ-82-147A	38.251	15.608	18.621
(repeat)	38.270	15.612	18.624
KQ-82-147B (py-rich)	38.302	15.623	18.634

Anyox – (samples from R. Sharp)

KQ-82-149 (#6 Zone - gn)	38.267	15.562	18.691
KQ-82-149 (#6 Zone - sp)	38.064	15.521	18.570
KQ-82-150 (Bonanza - py)	38.389	15.592	18.795

...2

Canada

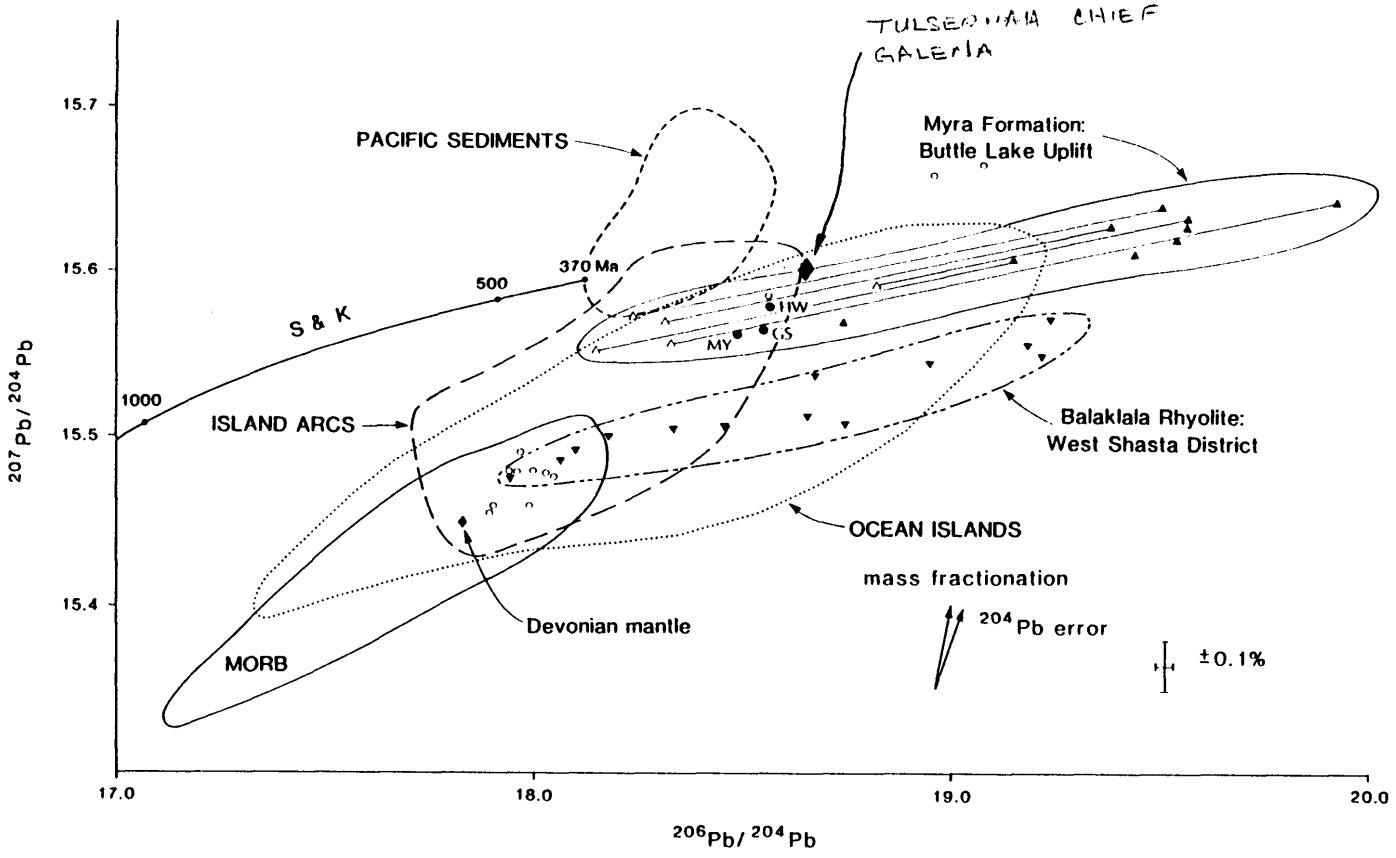


FIG. 3. $^{207}Pb/^{204}Pb$ vs. $^{206}Pb/^{204}Pb$ plot of galena (solid circles: Table 3), present-day whole-rock (solid triangles: Table 2), and initial ratios at 370 Ma (open triangles: Table 4) from Buttle Lake anticlinorium. Galena (open circles) and whole-rock (inverted triangles) analyses from the Paleozoic volcanogenic ore deposits of west Shasta district, California, are taken from Slawson (1983) and Doe *et al.* (1985). A solid diamond marks the estimated composition of Devonian mantle (Doe *et al.* 1985). Major fields of whole rocks from modern MORB's ocean islands, and ocean sediments are taken from the literature as follows: MORB's (Church and Tatsumoto 1975; Brévart *et al.* 1981; Vidal and Clauer 1981); ocean islands (Sun and Jahn 1975; Sun 1980; Tatsumoto 1978; Weis 1983); island arcs (Oversby and Ewart 1972; Church 1976; Meijer 1976; Kay *et al.* 1978); Pacific sediments (Church 1976; Sun 1980; Vidal and Clauer 1981). These fields have been adjusted for 370 Ma lead evolution using the growth curve of Stacey and Kramers (1975), marked "S & K".

rection, using *u* values obtained by isotope-dilution methods where possible. Some samples of the Island Intrusions are corrected using *u* values for which the uranium concentrations were determined by gamma-ray spectroscopy. All of these *u* values have been multiplied by a factor of 1.0935 to be consistent with *u* values for which the uranium was determined by isotope dilution (Andrew 1987).

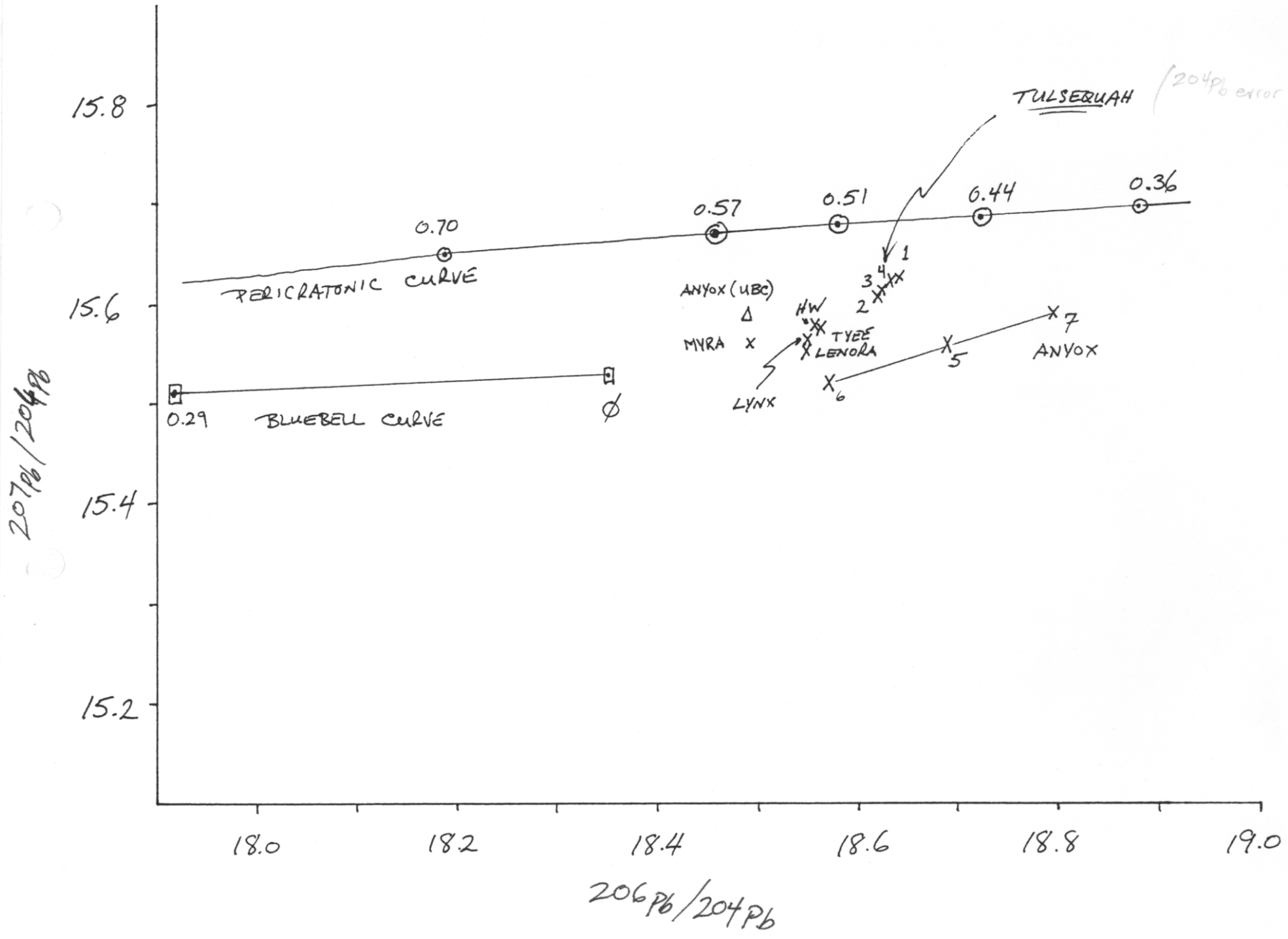
The initial ratios for the Island Intrusions have a linear trend in both the $^{207}Pb/^{204}Pb$ versus $^{206}Pb/^{204}Pb$ and $^{208}Pb/^{204}Pb$ versus $^{206}Pb/^{204}Pb$ plots (Figs. 5, 6). This linear relationship can be shown to be more significant for the initial ratios than for the present ratios by comparing correlation coefficients. The correlation coefficients for the present ratios (excluding galena from Island Copper) are 0.94 and 0.89 for Figs. 5 and 6, respectively. Initial lead ratios display improved correlation coefficients of 0.95 and 0.96 despite the overall shortening of the length of the lines (Figs. 5, 6). Closed-system addition of radiogenic lead to the rocks from 190 to 0 Ma has tended to obscure the original linearity.

Initial lead-isotope ratios for two of the Bonanza Group volcanic rocks follow the same trend as those of the Island Intrusions in both $^{208}Pb/^{204}Pb$ versus $^{206}Pb/^{204}Pb$, and $^{207}Pb/^{204}Pb$ versus $^{206}Pb/^{204}Pb$ plots, supporting a comagmatic origin for these two rock units. Bonanza Group volcanic rocks have lower $^{207}Pb/^{204}Pb$, $^{206}Pb/^{204}Pb$, and $^{208}Pb/^{204}Pb$ ratios than plutonic rocks of the Island Intrusions.

Isotopic ratios of galena from the Island Copper porphyry deposit near Port Hardy lie within the same array as the initial ratios of both Bonanza Group volcanics and Island Intrusions, indicating a comagmatic origin for the mineralization. This supports the Jurassic age for the deposit determined by Rb–Sr age determination (Armstrong *et al.*, in preparation) and by K–Ar on biotite from the Rupert Inlet stock (Northcote and Robinson 1972).

Generalized plots of data from various tectonic environments are shown in Figs. 5 and 6 with the lead data for the Island Intrusions and Bonanza Group volcanics. Direct comparison cannot be made between the lead-isotope initial ratios and modern tectonic environments, so the modern lead-isotope fields have been projected back 190 Ma using the Stacey and Kramers (1975) growth curve. Island Intrusions and Bonanza Group volcanic lead data overlap the fields for both ocean islands and island arcs. The slope of the array in the initial lead data for the Island Intrusions and Bonanza Group volcanic rocks is parallel to the slope of similar arrays for many ocean islands but is less than the usual slope of linear arrays for island arcs.

Initial strontium ratios are in the range 0.7033–0.7042


15.8
15.6
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19.0
207Pb/204Pb
206Pb/204Pb
TULSEQUAH
(204Pb error ?!)
0.70
0.57
0.51
0.44
0.36
PERICRATONIC CURVE
ANYOX (UBC)
MYRA
HW
TYEE
LENORA
LYNX
ANYOX
0.29
BLUEBELL CURVE
1
2
3
4
5
6
7

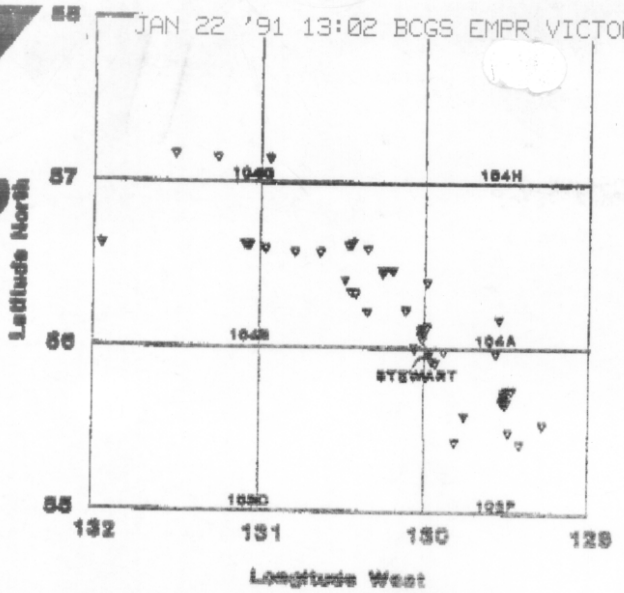


Figure 1: Location of analyses and deposits in Tables 1 and 2, Stewart - Iskut area, northwestern British Columbia.

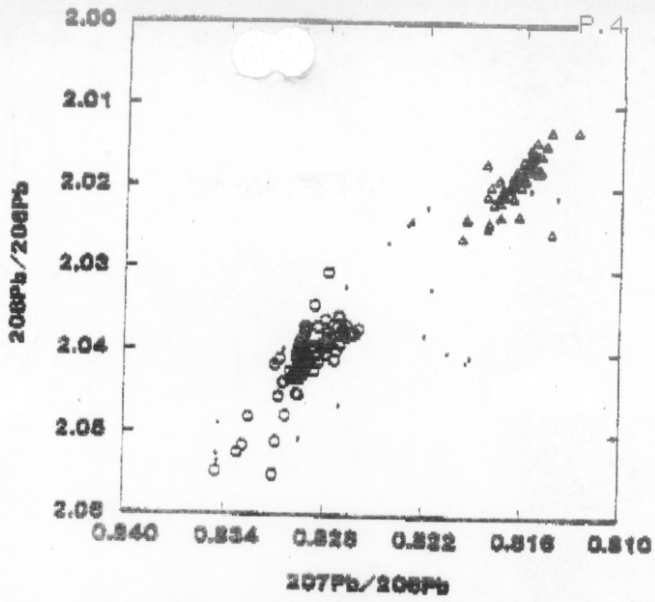
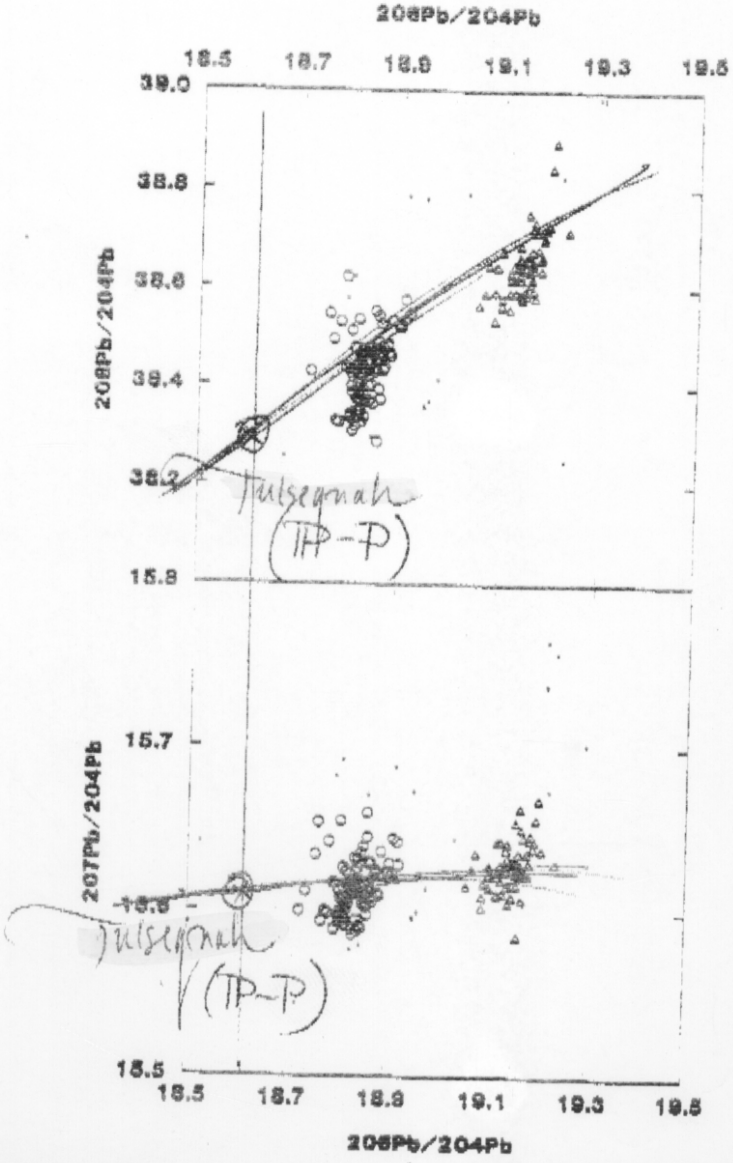


Figure 3: Lead-lead plot of galena lead isotopes as defined in Figure 2. However, different ratios are plotted. This plot minimizes effects of ^{204}Pb error.



from Joanne Nelson

Figure 2: Lead-lead plots of galena lead isotopes from mineral deposits in the Stewart - Iskut area. The data plot in two clusters. Circles represent Early Jurassic, gold-silver-base metal mineralization that is coeval with the Hazelton Group. Triangles represent Tertiary, silver-lead-zinc±molybdenum deposits generated by granitic intrusions. Dots represent analyses that cannot be assigned or are of poor quality. See also Figure 3.

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March 11, 1985

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...2 > original missing.

Canada

From: Ralph Thorpe (GSC - Ottawa)