

Sulphurets

M.N. Henderson

802850

Stewart
Wed 31 July 1991 on Stewart
cut w/ Rod & Bob. Peter (Jelda) (prob)
Thurs 01 Aug. Spring to Troy Ridge

Centroy Ridge (dubio 29E) - cut off 506
Bourser grey-black silt w/ 5% white
chert. ^{air strip} ~~limestone~~

So = 160/70

Si = 155/55

Bourser - no volcs no fossils
gradating above tuffaceous
of pajama beds

Salmon River char by some
volcanics in upper part & fossils
in lower part
Hb-phytic tuffaceous beds

* In Bourser - look for roads in
limestone with Carboniferous concretions

ASA 200 A9-11 Red Red MNH Ave
on Troy Ridge

Going to throw down section
Bourser - Salmon R - Mt Dillworth -
13 sth h - Mount R.

ASA-100 Upper Mtn Salmon River 200m
Pajama beds thin black siliceous plate
of white air fall tuff (no xls)

So = 195/83

Si = 188/90 ^{air strip} ~~over~~ ~~vent~~ ~~strip~~ ~~S&S~~
Pinal chry

fr 13



tuff is black
fresh

Possible sub-Toarcian mesophint.

fr 13 repeats Si always way up to E
(correct)

Plate ^E Tuff → Si = 145/72

So = 155/90

Must use sterount to calc So x Si

* cut w/ B Bourser very distinctive paj. beds
overlain by middle m with turbid

91H101 Toarcian bioclastic limestone buff
with layers only Salmon River

Bourser's "Toarcian unit" most fossil
rich unit between Pajama beds
& Mt Dillworth

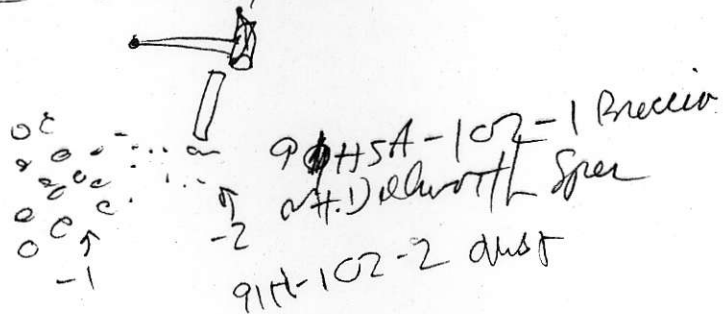
Fr 13 (out of sequence) - Rugged coral (Jr: Schlect)

* Weyla + Belemnites = Toarcian (near)
(deep ribbed
clams)

Trigonal pebbles have Radial
growth lines crossing course ribs
(Berry & Patton's special)

(see notes on p. 17)
 Dillworth and/or Bicalastic ls;
 + is volcanic breccia epichastre
 mild megacrysts under ls bed
 Dillworth ~ 20m thick here of tuffaceous
 lapilli to coarse breccia white/gray
 Maroon rocks typical of Beths Creek
 but good bedding & red structure best
 indicator of Beths Cr. beds
 Dillworth is dacitic here
 (see silica chrysolite at Mitchell-Treat)

Gr 14+15 Dillworth graded airfall tuff
 vein N w/ dust top ~ 4 m thick
 Many very plastic clasts indicate subaerial
 degm $S_0 = 0.02/70$

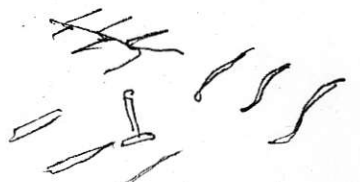


Lunch: Bouse Lk - no volcanics mudds, low silt/clastic
 Salmon River ^{D. Payson Beds}
 L. Bicalastic LS "Toarcian Beds"
 Mt Dillworth ^{Dust} ↑ 100-200 m emb.
 Breccia ↑ subaerial eruption vent

Below lunch strip seen + purple with thin
 welded tuff w/ fragments - entachitic
 $S_0 = 1.70/85$

Further down slope below welded tuff
 steeply dipping sinistral shear w/ rotated
 EEQV and cleavage w/ amygdaloidal
 lsbt fragmental unit in foreground

Pa 17+18 EEQV in maroon + green
 amygdaloidal breccia



Grading down thru 3m of amygd. breccias
 into red Beths Creek granule x bedded
 SS w/ lots of secondary structures 155
 dykes + veins + breccias
 of 19 disrupted red SS w/ dykes, sym-ax faults
 curving flame-like of dykes
 much in line of channels with
 red clay

Beths Creek very massive red with many
 granule beds w/ numerous 2 ft
 of phony dykes passing into
 Premier Porphyry - Chap by lse [] of
 + fumes [] PC and drilled ls HB PC



Pebble: Davis - Premier is extreme (vol breccia)
 1300 - " " intrus (Aogmatic/Cut
 # Do last flow by is bedding? stratigraphy)

Unakfow, green with volcanic breccia
fairly good cleavage in matrix and
~~discontinuity~~ veins in clasts good down-dip L

S₁ = 110°80' N side up

Cleavage is post-Premier, probably
Premier Cupp Dillworth. Chert
post Dillworth & probably related
to Carls-Skeena Fld Belt.

U-16 age of Premier is 189 and 195 Ma
Mt Dillworth 190 and 187 (Mitchell
gracies)

Although these tectonite look like post
Dillworth Mt Skeena fld, they strike EW
dip steep N and seem to be N side up

Good L-S tectonite w/ 2-3:1 elongate down
dip 25:1.0 in YZ

~ 3-40 m massive volcanic lavas
5-10 & up to 20 cm clasts

Pass down into Verrill's Upper
Siltstone unit SS-slate complex
no cgl

Station by chert by argite xls, tight upright
N-S folds, dm color, C.S. PC-rich ankerite
orange limy silt & black shales, ls fragment cgl.
"FR red package" of B.S. Ankerite

Short summary of Terry Ridge

Bonset Lake: Turbidites no volcanics brown grey, w/ls

Salmon River: esp. Pygama beds - tuff & argillite 5-10 cm (various)
base. Toarcian brown fossil-rich ls unit

Mt Dillworth: "Dust" tuff at top grading down into welded
tuff, air fall tuff v. massive dacite to rhyolite
Basaltic breccia (angular clast frags) at base

Betty Creek: cross bedded ss & silt (red) at top
w/ abundant de-water structures
dominated by epifaunal water-laid
tuffs & Breccias

Vank Rives: green weathering volcanic breccia

Stuhini: "Upper Siltstone unit"
FR-ER argillite x x 2 tuffs, dm color, upright folds & clog

NB Pillow lavas in Sulphur area may occur
above & below Dillworth dacite/rhyolite - this
association is typical of Eskay foci
(of Terry, Main, south area)

Colquhoun Eskay Ch. Section @ 212 m

0-140 m	28 pillow
High all And. Unit	tu tuffs
(= Salmon R. fm)	29 pillow
	cgl tuffs
contact zone	0-12 m Sulphur tuffs (Toarcian)
Mt Dillworth	Rhyo-dacite
3-150 m	
Fortwall Dacite	Basaltic breccia alt. interbed. (low - fine stone)
(= Betty Crk)	Tuff tuff/breccia/cgl/SS
Plembachia	Silt
50-200 m	cgl
Vank R. fm	v.lc andesitic ss & silt

Aug 2, 1991 arr Newark camp from Scotty Gold camp
 Good type section NW of Treaty Glacier
 from Stuhini - Brouser in center of 10413/9

People at Newark

Pilot: Richard Cook Meredith, Cathy helper

Geologists: Barry Way Mike Gladiolus
 John Bellamey Dave Visagie

Mark Tindahl

Jesse Margolis

Steve Roach

Mike Holmes

Bryon

Aug 3 91 Sat of job - rain till 5 P.M.

Martin (Mechanic/Carpenter)

Meredith & Cathy

Alteration types at Sulphurets

P1-QZ-Sericite = phyllic

Chlorite + Epidote ± CC = propylitic (P1/P2)

Biotite - K-spar = Potassic (Cu)

Albite = Sodium not mappable

Barite appears as laths in gash veins

Clay = argillitic

Yellow gossan = jarositic

Dark brown gossan = goethitic

Plate 10413 9-B

Sunday Aug. 4 clearing

Set out top of Mitchell glacier Photo 10-288

QZ-Ser-Sulfid. sect w/ QZ-SD-CC veins v. by

discordant to S₁, but some de/ve
 no idea of protolith - silica vol? maybe

91H-105 S₁ = 288/77 91H105-2 orient = S₁ = 300/90 fibrous veins
 ± S₁

Spec 91H54105 = QZ-SER SCST w/ disopy mineral CH

orient = S₁ = 300/85 cut hor + S₁ see fabric

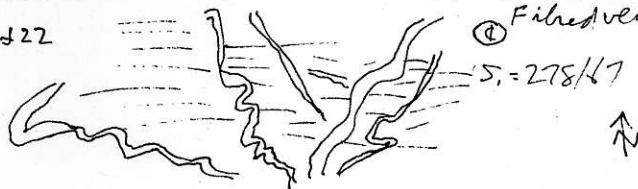
most veins are at large A to S₁ ∴ can't be too
 early though deformed. Sulfides in matrix + veins
 look for pressure shadows on matrix PY

coarse QZ stockwork by glacier w/ S₂ folding of
 S₁ at margin - but seems local

Good evidence of pure shear - veins are not systematically
 rotated - mainly buckled where @ 90° to S₁. Veins
 intersect // dip = Y direct? Fibres // strike of S₁ = X

ASA 200

R1/21+22



#123-25 (and roll) fibrous veins (QZ-SD) ⊥ S₁ w/ fibres //
 S₁ trace vein South



R2+1

Rotated fibrous vein

BRN SD fibre

91H106 aphanitic, unfoliated, possibly brecciated, dk green
smoothing mafic igneous rock - probably DORT
rather than BSLT. Rare Cu stain on joints

104898

Photo 19-290

91H107 Siliceified/Sulfidic-rich fault zone in Volc. Breccia
Fracture zone 170/70, 246/40

91H108 Monolithic Volc BRECA lt green angular clasts 2-5cm
in dk green matrix
weak spaced clog = S₁ = 295/80

Elevation 1455m

91H109 120/70 weak clog & flat plane of clast
Volc Breccia mauveish/pinkish clasts 2-10cm in
green matrix - all vfg

Spec Volc BRECA orient = S₁ = 110/90 - cut LS, ck
for finite strain in clast

Discrete shear plane w/ slickensided QZ on
surface

Plane = 210/29 striat 002@14 Top to South
reverse shear

91H110 Silicified sulfidic QZTE el = 1460m
Spec CKH S₁

Orientation = 270/85 possibly S₁ (cut L)

OR foln in altered rock

(i.e. S₁ is post-mineralized)

Rock here w/ "101" in 3' mox. paint, orange

Photo 10-139-B

on 5.08.91 Fog n ridges

1170m get out in creek Photo 11-304

91HSA-111 (3 each) shales & SS cut by near-vert
withring dykes from 10cm - 2m wide, making
up 30-40% of seq. Dykes fractured as much as
host rock

Dyke = 255/55, 280/80, 260/83

Bedding = 155/70

Spec dyke orient, 180/80 (cut ⊥ face &
see if sheared // S₀)

Dyke is PC porphyry in centre - aphanitic
margin w/ foliation

-2 Spec of dyke margin orient = 095/90 = 180
(cut ⊥ foln in hor plane)

91HSA-112 Clear thin 90% aphanitic dyke (one opt
of vesiculated dyke)

Cut dyke w/ red screen 255/65
most fracture are E-W w/ subhor slide
shale + brown lining

! S₀ in black/silt 140/82. NO S₁

fibred ver. in dyke 120/45 LS 280/60
no obvious shear sense

91HSA-113 thin w/ thin 40% polydyke (PC porphyry center?)
dykes > 3m wide) and black silt

Good slicks on spaced 1m apart discrete shears
in dyke Shear = 190/73 LS = 290@70

dyke cuts = 300/80 cut ⊥ joint see shear sense
Spec PC porphy dyke w/ fibred ver. orient 100/1 = 285/90

Lunch stop 1550m

91HSA114 LS bed 170/65 highly foliated &
reclined in cut w/ PC porph dyke
looks like shear // bedding in 1/2-1m bed

Specs to mylonite fol. = 200/65 $L_m = 280 @ 60$
- 2 spec ls w/ porph fossil fragments

91HSA-115 just over top of cirque! congl w/ ls, chert,
ss, silt frag - no obvious volc clasts
 $S_0 = 210/57$

Graded cgl \rightarrow ss = 150/70 faces E
coastal ss matrix up to 10cm ANDS only
green clast ls, ss, silt, black chert,
No obvious flattening of clasts

91H116

Circ PC porph dyke = 290/60, 115/70
 $S_0 = 160/70$

Spec PC porph dyke w/ dior MO? (CP?) also HB letter

R: 124 debris flows
 $S_0 = 130/70$
view SOUTH

91H117 Cgl debris flows w/ red clasts 2-10cm in ss
matrix + some ss interbeds

Sequence is obvious

$S_0 = 175/50$

possible clast, silt joint, are unisp. sp.
cut can't measure. Clast not flattened

Spec: Singular m.g. HB Q2 DORT clast 10cm dia.

91H118 Lebriflours w/ m-size boulders and interbeds
SS w/ x beds facing EAST
 $S_0 = 190/70$ overturned
N.B. no dykes for last 200m up slope

R2 F5 view SW across cirque towards
Sulphur ridge

(1m)
91H119 Grey SS & Black Shale (2-5cm)
 $S_0 = 175/78$
172/85 faces E (flame structure)

91H120 Black & grey SS & Slt's well bedded w/ minor
pebble cgl
 $S_0 = 180/65$

elevation = 1810m

91H121 lt grey silty-argillite thin bedded (water hard top?)
 $S_0 = 340/30$ $S_1 = 235/80$ - pencil chert
Spec: $S_0 = 337/35$

★ Did we cross axis of W vergent overthrust a/c?
★ Faces E (S out)

R2 F6-7 Panette w/ fog view SE w/
Mitchell reefed to left

Summary: we think is almost fold of beds is
pre-dykes - only way to rationalize post-dyke
foliation is if slip vector is in plane of dykes
and I don't see this. Also dykes not
foliated (lots of fractures w/ slickens but
no fol.).

Tues 6 Aug 1961

1013-9-13

on top of ridge N of Mitchell Glacier

91H122 Photo 12-328

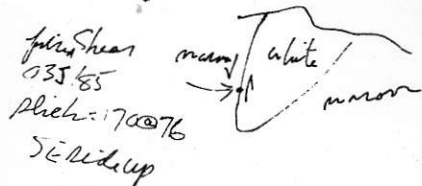
R2 #7-12 shots for cores & stuff Dilworth
white tuff over maroon Betty Ck.

Lopilli (above)

91H123 crite between grey tuff & maroon Lopilli tuff
S₁ spaced clog = 194/84

- 1 maroon Lopilli tuff - looks old & clastic
 - 2 white Lopilli tuff seen on fresh
- both collected 10' above & below crite

91H124 Sheared crite between maroon & white tuff
Dip as SLN!



91H125 1/3 welded tuff w/ anastomosing spaced S₁
age of 2 last w good S₁

R2 #17-18 Anastomosing spaced S₁ in 14 Dilworth
Lopilli tuff view N S₁ = 195/80

91H126 white 11/16 welded tuff w/ spaced S₁
S₁ = 178/75

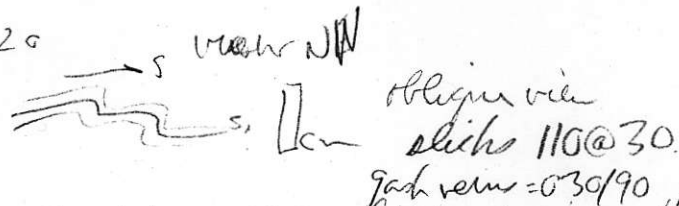
Elevate 2090m

1H127 crossed snow 39m from pillow th into
overlying crumpled siltstone grey agglomerate
veined 'phyllonite'

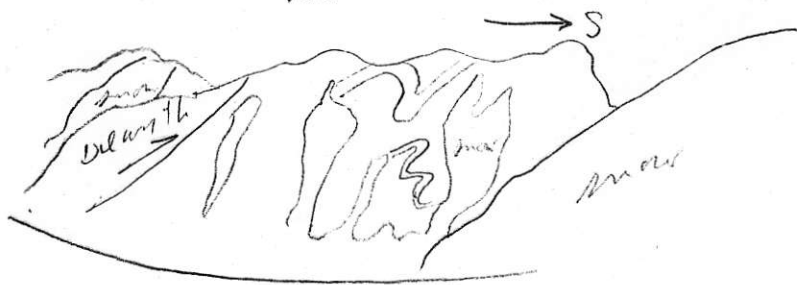
S₁ = 250/42, f.dax pilled S₁ = 250/15

Spec orient = S₁ = 265/40
crumpled S₁ is asymmetrical SE vergent

RIF 19-20



#22-24 View NE of cliffs w/ Dilworth
over Barzel Lk
1/250 + 1/500



1H127 + 30m up slope in red with thin, f. rubble
volc-clastic cgl + x bedded coarse granular
S₀ = 290/29 E v p9 (rounding talus, vesicular
B.S.L.T. clasts, cert)

Acly/sch pair #28L = 225/45 f.dax = 030/15
fibred BPQV = 240/25 f.dax = 280/5 v. v. E

1H128 Black slate w/ 5m few carb laminae well cleaved
S₁ = 220/45 strike = 310/45
S₀ = 270/40

late Spec for lithochem 5' above buff tuff 30m

1H129 Grey silt/SS above black slate

S₀ = 255/50

S₁ = 070/90 SE vergent

Roll 2 frames to end aerial views
of valley walls around S. Treaty
Glacier.

Plotted 104B-9-B
Aug 91 9/10 warm front coming - RLB 1-8 slides in well
(@ R-17) elev. 2330m Good contact plate
91HSA-130 Shear plane w/ filler in orange
w/ red s. phos green with very PC polyphos flow
290/27 fibre 320 @ 15 top to SE

~~Spec R-17~~
very massive looks intrusive
but Red says flow - OK & 2m any g. m. l.
& CA after Augite + L2 - prior PX + tuff

~~Spec R-17~~
RQ9-63A spec

also red with volc breccia w/ BSLT flow
5-20 cm

R2F 9-10 basic breccia w/ jasper in cavities

Clearage 330/80 Evergent ^{2m} w/ red siltstone
cut shear || S₀ = 005/60 - clear zone
@ cutc w/ PX + tuff above

Photo 12-333

91HSA-131 Basic volc breccia w/ hrs Red, Green,
Brown, Grey
cutc & overlying white withing RHYO 5' Dilworth
Shear 150/40 L₁ = 220 @ 40
S₀ = cutc ~ 330/25 also 290/65 faces N ^{folitic} & redded tuff
~~Spec~~ R2F has spec RHYO

Brown fossil ls lens above RHYO ~ 2m thick
overlain by more RHYO & then mafic tuff &
Pygama Beds S₀ = 285/75, S₁ = 260/60
Spec fossil has ls

- 1 Spec Cgl RHYO tuff Niented faces N
- 2 Spec Pygama bed

91H132 white within black tuff 20-30m thick
form spins over grey thin bedded silts
 $S_0 = 300/50$

Spec for petrology.

- 2, 5 Spec PV shale/shale/silt above Tuff

91H5A-133 Brown within carb cemented silts +
in te. bedded ^{grey} argillite

$S_0 = 272/40$ XB SS faces N

S_1 (fac cleav) = 265/60

$S_0 \times S_1 = 090 @ 00$ South vergent

Spec lower bed of petrology.

R2 (20-25 pm diam) from N \rightarrow W from
Sta 132 on high ridge @ 2250m el.

Summary: Had trouble setting up set out place w/ hand
and Mariette (had to rope down steep snow slope to
icefield). Lovely stratigraphy section:

① ? to high

② thin bedded silts + brown within ls - several hundred metres

③ 20-30m white within black tuff

④ Thin bedded silts grey + black up to 100m

⑤ Black + white laminated tuffs + silts (Pygmy beds 30-40m)

⑥ Mafic tuff 2-3m

⑦ Limestone lens near top of Rhyr-dac (Belam., clams)

⑧ Rhyr-dacite flow: 10-20m

⑨ Volcanic Breccia: amygdaloidal + PX xl boulders some
jasper cement. lots of inclusions

Thurs 8 Aug Rain heavy all into till 1400,
thaw in Muzzle downstream from 1500m
to BJ lineament.

91H134 E side of BJ Lineament at neck
massive brown within SS to E of BJ.

$S_0 = 015/90$ cgl (1-2cm) in SS

$S_1 = 000/90$ w. versent $S_0 \times S_1 = 90^\circ$

Spec cgl w. shale clasts
orient 015/90 = S_0

west of BJ argillite

$S_0 = 160/25$

$S_1 = 025/70$

$S_0 = 230/15$

$S_1 = 050/85$

Fri Aug 9 Rain + fog - back on BJ car side
w/ Tom (arrived yesterday) looking at beds
same Sta 14134. Conglomerate and SS
(probably ~~over~~ overpressured on deep
deuterian fracture, SS dykes) hard to tell
facing. Some sparse fine granite pebbles in
massive SS, but cgl beds gully all chert,
shale clasts.

generally striking $000 @ 90$

cleavage subparallel & seems to get stronger towards
granite to East

These are draped beds.

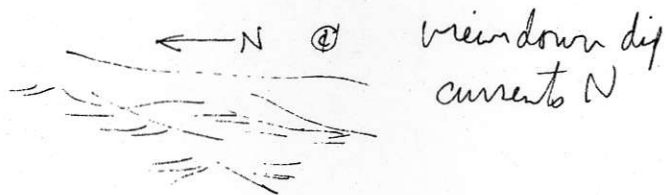
100m E of BJ Lin. was at least some in cgl SS
R3724 sp. petrology fabric is 1cm and vein in ϕ 25 versent
 $S_1 = 120/85$

91H140 High energy current deposits w/ climbing ripples, antidunes. Very thixotropic (flames ss dykes). Black argillite, grey ls., brown siltstones. No cleavage, some extent veins in brown competent bed, one horse one graben (both w/ cc veins conforming tectonic sign)

Currents not necessarily directed

S₀ = 168/185

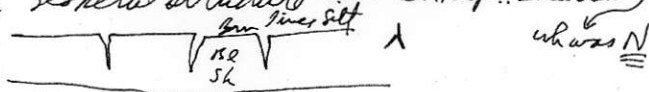
R3/31-32 climbing ripples & turbulent bed forms



R33-37 Graded SS beds w/ black shale clasts



wedge-shaped silt-filled cracks in black shale skeletal structures also @ 11 dip: ± current, where N



R38-39 also cc-filled tension cracks in competent brown silt

ext. vein = 100/90

B.P. cc gouge-filled slickensided bed w/ side up

91H141 PC plusie sandstone w/ inclusion of black argillite
Glu. ls. very friable withed out face here
Spec for petrog. of PC prep

cut w/ of ss to west (no volc clasts)

S₀ = 180/73 climbing ripple face E
current is South

91H142 vertical beds w/ elliptical sparry cc concretions in S₀

S₀ = 140/82

Spec brown ls w/ sparry cc concretions

5000 MA 191 CAUU on note at head of S. Treaty 7H.
 20 exposures from center of fold on E-facing ridge
 91HSA143 lt grey with grey, sh grey fresh f.g. ? ANDS silt
 photo 13-345 w/ few interbeds/layers of rusty siltstone/SS
 2100m S₀ = 030/55 also shale rip-ups

- 1 Spec SS w/ plant fossils some coal, pro clam
- 2 Spec Grey ANDS? silt - comp. m. shell no chill

R3 frame 21 plant fossils on bedding surface

- 3 w calc at top of QZ granule? cgl? tuff
- # 7-3m white with grey? tuff beds w/ 1m
- 5/8 sh interbeds (with pinkish brown in places)
- Tuffs are red, brownish look like
- beds above calc with the or red to S where
- ! + I were 3 days ago.

91H144 walked north along arête, passed across cutc
 on west of ridge from white/grey massive
 tuff?/SS into grey/black sh silt/clay w/
 grey-white/m. massive hard SS lenses + beds
 plant fossils in grey silt above 1m SS bed
 S₀ = 275/30 in SS/sh cutc
 S₁ in black shale = 250/50 pencil clng very irregular
 from place to place

91H145 1.5m 'rice-rippie' cgl bed granules
 dist supported QZ + chert only - no volc
 flags
 Spec

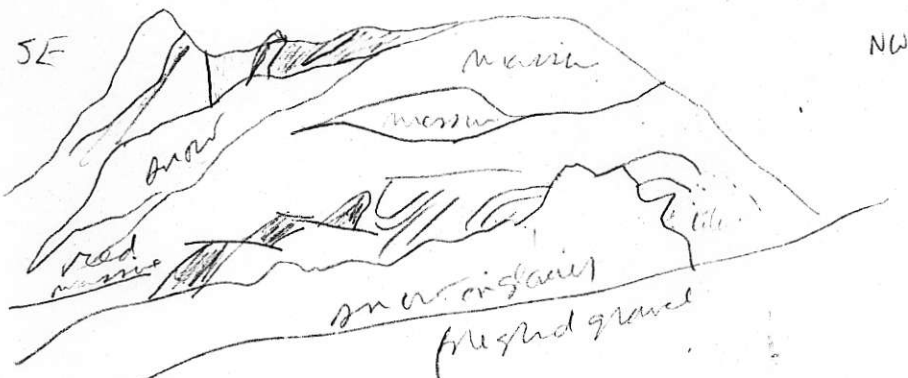
Small KP overall w/ 90H534-540

91HSA-146 Marzetta SS
 current NW → SE (plate cast on base of
 returned SS bed) (collected for outside about
 strata)

S₀ = 210/70 faces E
 Slices on S₀ west side up 315 @ 68

R3 123-26

Panorama of cliff face toward NE series of 4
 frames from SE → NW



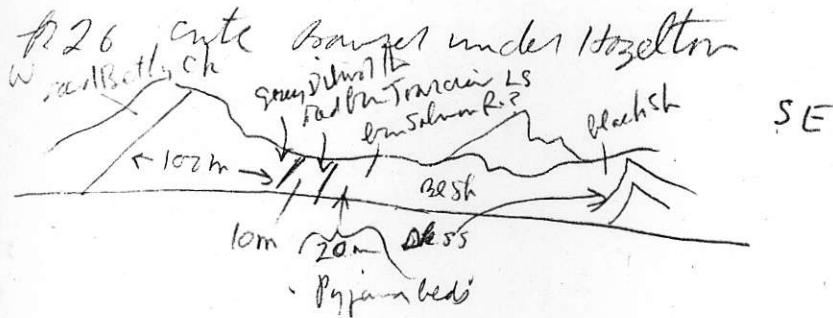
LS #1 Tantalus

91HSA-147
 Cutc w/ black shale over 2m Brk LS of w/calcite
 and then alternating 3m white + 6m tuff
 S₀ in felsic tuff = 200/60
 Spec-1 bas 1m 0-20m above fossil bed (clams, ammonites, Belemnite, Bryozoa)
 into red tuffs, gran size (w/calcite)
 (1m aphanitic @ top of section by fossil bed)
 to 2-3cm at cutc w/ red tuff, then
 red + green tuffs (avg lithic size increase
 to 5-10cm) to end of arête

14-147-2 bas fossils -3 lens x tuff interbeds/fossils
 Summary walked down dip & down section
 thru Bowser Lk → Torcia bed → white Dd w/ sh
 red Betty Cp

911410 Spec red/white green tuff
(black)

- 1 lg. dust grey tuff
- 2 PC x 2 tuff
- 3 green/red HB-PC-hillside tuff



fr 27 Newhawk Camp

Mon 12 Aug 91 30m to 40m
CAVU calm warm
BC 1:60000 photo S2018 No. 048+049
91149 R3 fr 28 A30 trend of roll
Vanougen from set out S-W-NW



See polaroids in
Tuffal
Cophers of orange within matrix + all
white granitic angular clasts 2-4cm diam.
'Dillworth' (lgst 7cm)
So = 205/20
+ 100m thick tuff beds > 10m avg each unit

Spec Tuff (red matrix) with angular 1-2cm dat
fresh surface is green

9114150 White 'dust' tuff capping ridge
elev. 1980m

So = 190/22
10m below ridge crest is purple/green vesicular
lava w/ brown limestone fragments
pos fossiliferous
Spec: vesicular lava w/ pres belemnite
fragment of cc-filled vesicles

R1/p1-2-3 M.N.H. look for fossil
frags in lava flow T. W. W. G. L.
west wall in background

20 - dust tuff down cliff
 1980m white tuff top of ridge
 20m vesic (red fossils)
 20m white Delworth tuff (angular white
 clast 2-4cm)
 20m grey tuff
 1930m al. discollement
 55 silt
 black

151 massive of grey siltstone (clay in front)
 S₀ = 254/50 no clay in fossil ocp
 elev 1540m - came down snow slope to
 west near ice field ocp doesn't show on top
 shows on 1:10000 photo BC 048

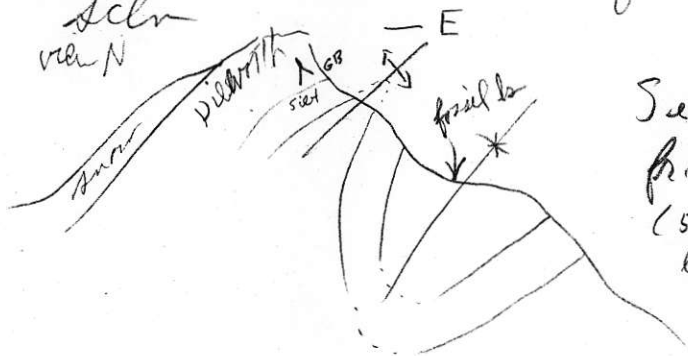
52 below 151 'Delworth' red matrix / white
 clast-tuff / fault cuts a red vesic lava
 at 070190 strike = 070 @ 00 S side to W
 (dip 10°)
 S₀ = 270/20 ~~100~~ ~~grated~~ channel in
 Delworth tuff w/ small lapilli

fossil float from above Delworth w/ plant debris
 ammonites, pelecypods

91H153 cuts white lapilli tuff w/ overlying green
 S₀ = 295/12
 Spec Green lapilli tuff
 4cc vesicles
 green lapilli tuff

91H154 Fossil wash ls bed ~1m thick
 grey silt & black shales below
 Delworth grey white tuff

S₀ = 250/85
 looks like overturned limb of steep isochine
 sch
 view N



See photos
 p 8-12
 (5-7 Mariette
 looking (down))

+500m N on ridge cuts black silt w/ graded
 grey lapilli tuff above RWV w/ fossils
 S₀ = 255/22
 Fossil ferns Tuff beds (pelec. gast. plant)
 Spec 91H154-1

-2 lovely lapilli tuff beds
 from cuts w/ underlying grey
 siltstone

-3 spec Pyj. bed with clasts with 2-4cm beds
 20m fossil Tuff overlain by pyram beds

80 1.10m
 7/11/53 Brn seds lsd over pyrron bed
 + over lsd by fossil tuff w/ lots of Belemnites
 S₀ = 110/15
 Bedding seems to wander along ridge
 east

Cute grey silt/black shale & pyrron clay
 under orange matrix white lapilli
 siltstone tuff

(Plog 90-x-R-338)

S₀ = 280/53 = pyrron clay also in north
 silt.

overlay by pyrron beds & making up
 (siltstone tuff only 2m thick here.)
 into v. spongy thin beds

S₀ pyrron beds = 090/21

Pyrron beds have brown w/ thin carb
 at base grading up into aphanite in bituff

Spec Pyrron bed w/ carb cement

- 15 spec cut road at base of Dilworth

S₀ try pyrron beds 230/30

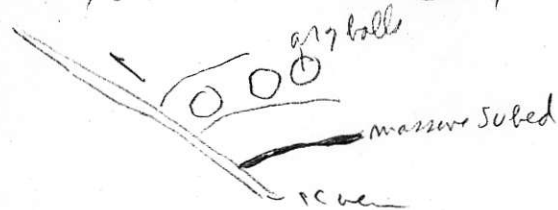
Pyrron beds + 60m thick

Summary: Dilworth/Tarcing/Pyrron beds along ridge
 lines horizontal and in valleys on both
 sides. This could be hinge of SE versed
 fold mappe because 100m dip seems
 to be repeated 2-3 times on valley wall
 - must photo in AM looking downstream

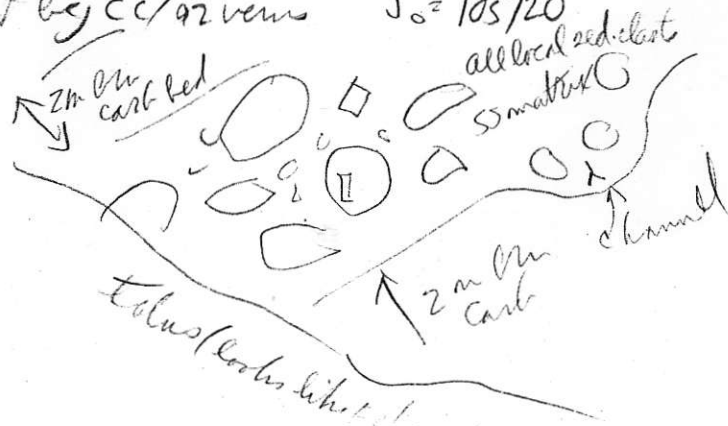
13 Aug (Tue) CAJU on knipple glacier
 to south of road
 (went over to Tom Williams & photogeoph
 face of Cluffee river yesterday
 frames 8-12)

Blowup of photo

9/11/56 Pyritic massive sulphid beds, black shales,
 black silt, thin bedded 5-20 cm
 brn with ^(beds fresh) carbonate beds, balls of argillite
 "Enkan Creek facies"
 S₀ = 355/28, S₁ = 290/80
 Fault 285/55 slicks = 315 @ 27



9/12/56 thick bedded sulphidic tuff
 9/14/56 debris flow w/ brn with carb
 boulders & black argillite blocks
 cut by cc/92 veins S₀ = 105/20



up slope 10m reverse shear w/EE&V
in or within carb bed

916



sep surface is fault
w/ veins of stichensiderite
fault = 000/52 slicks = 062@25 variable
can't tell shear sense

up slope 100m $S_0 = 050/40$ w/ grey + brn
within massive sands & silts
(Rusty beds up slope are sandy at
base - can't reach top)

Bedded sulphides are ~1cm thick 100% S_0
w/ disseminated S_0 in shale matrix

91H5A-156-1 chip sample at E end of sep
from stratiform P bed

- 2 chip sample 20m NE from bedded S_0
 - 3 chip sample 40m NE from bedded S_0
- Section containing bedded S_0 is >20m thick
(dips under talus to N)

NB many BPCC veins and extension fractures
are not mineralized, but mm wide fractures
≈ S_0 are sulphidic

20m NE of 1H156-3 are locally interfolial folds
in sulphidic bed



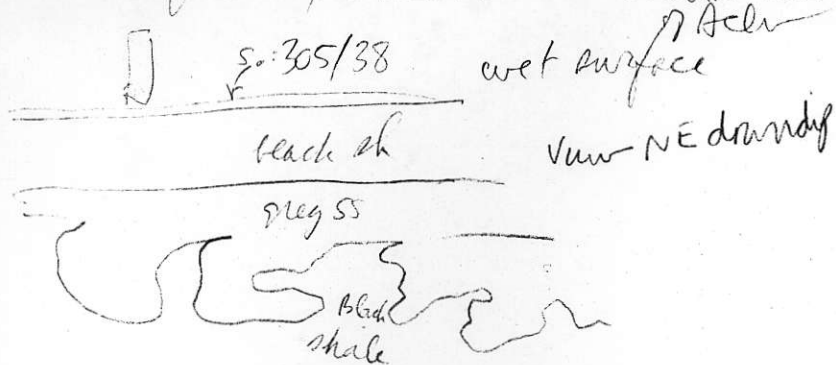
Also many ~~more~~ chevron South vergent

91H157 Black sandy/silt matrix debris flow w/ blocks
 $S_0 = 230/10$ of S_0 within carb

91H158 Beds above debris flows 1-3 m massive SS
w/ 20cm black silt/shale interbeds
w/ BPCC filled stichensiderite veins
of orange & white CC
 $S_0 = 170/15$ RWU slickensides 320@15
flames show facing and S directed curv
also good channels & load casts
gash veins indicate top to Southeast

91H159 Thick bedded brown w/ thin black fine carbonate rich
mass flow beds, SS, silts, fine crinoid
VSD (flames, channels, loads) RWU
Actw upper limb
 $S_0 = 200/50 = BPQV$ slickensides 305@50
? minor white calcite veins
 S_0 20m up hill = 215/88 VSD (frees SE) 315/25 S_0 320@20
Spur slickensided vein of QZ-CC w/ & S wall rock
min 215/60 = S_0 $L_5 = 130@50$ Top to South

159 cont'd for 17-19 lead structure on RWU limb



Spec 159-2 siltstone w/ BP carbon/QZ vein
So = 025/43 RWU

fault cuts east to east w/ grey lg tuff w/
diss PX to west making huge SSS

Gruse plane = 023/90 lineat ~~to SW~~
to SW

P/H/KO Sulphidic Gray Tuff faulted against
Bowser L2 cgl, ss, silt, sh w/ no volc frag

LC Spec 302 same as tuff

Data on fucking awful air photo are all
too far NW - The fault parallels to
streams draining the glacier above us.

Bedded fragmental gossan = 045/90
w/ massive SU

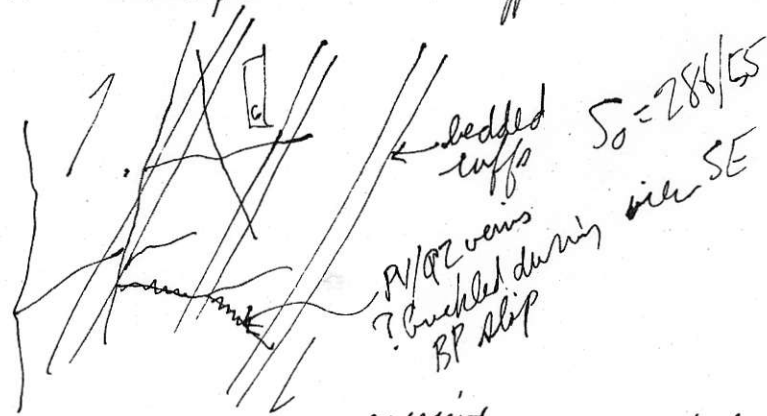
Spec 160-2 sulphide veins + disseminations in bedded
fragmental rock (collected 20m ^{below} glacier front.)

North of the fault all of the rock are sulphidic
to the south, the sediment are not altered at
all and contain no volcanic clasts

North of fault 1st rock is massive ophanitic
felsite, followed down-dip by massive
volcaniclastics, & then 5-1m thick
beds of tuff breccias & lapilli tuffs
that are very well bedded green weather.
The sulphidic alteration is very
discordant - cuts across bedded green
volcanic beds

So in volc. tuff beds = 358/80, 315/80 very
m-m-cyl. folds - very small to m-op no
time to crop - deepy mass.
vols seen to get finer grained to N
and have lots of BP carbonate laminas
- looks like maybe some fossils but
too broken up to tell.

#120 Photos Sulphide/ veinlets cutting
thin bedded green & brown tuffs



- north of glacier tongue massive green volc breccia/tuff

14-08-91 CAVU swing back to Knippels Glacier
on N side

Blow up piece of photo

91HSA-161 Green blocks of Pt lava w/ red matrix
very angular clasts 2/m diam.
P-C xls + light green ANDS like frag
lot of spherical red beading around
fractures in green blocks
possibly explosion breccia

$S_0 = 185/30, 010/80, 196/30$ (tuff bed),
 $230/60$ (tuff)

fr 21,22 Blocky And Breccia colour varies
from red to pale green and pale purple
but comp is PC porph w/ aphanitic matrix

$S_0 = 240/40$ - flow layering

fr 23 flow layered ANDS & porph breccia

91H162 ^{green} tuff bed 5m thick w/ very irregular
base infilling around breccia blocks
and rather flat top w/ flattened vesicles
 $S_0 = 290/60$ RWU

Spec vesicular tuff (welded?) chammudules
matrix = $S_0 = 300/70$ (~~matrix~~ on joint = 100/33)

91H163 Bomb breccia w/ angular clasts of
pale PC porph w/ inclusions of dk green
fg. Pt porph w/in red PC porph matrix
Have 24 block-in-block H&B PC porph breccia
Spec w/ 3 varieties of lava: red, brown grey
PC porph

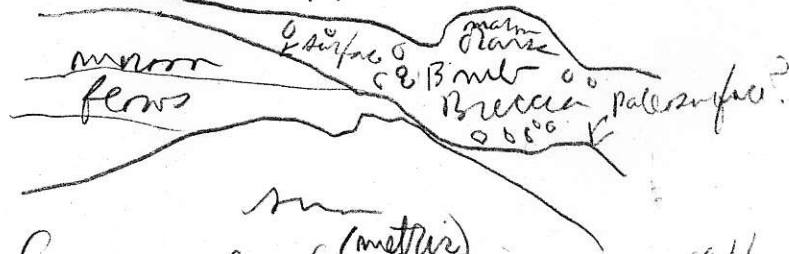
91H164 Block red matrix blocks, 2-5m tuff bed over
welded tuff breccia w/ 10-100cm clasts
 $S_0 = 280/18$ - cutc RWU w/ XB = 330° current
direction
Red tuff caps the ridge

91H165 dk green ^{ch/cc/gz} amygdaloidal thin flows
& tuffs under massive v. breccia
 $S_0 = 060/20$
These f.g. mafic? tuffs ~100m thick

91H 166 massive PC porph silic. fl. flows
w/ interlayered tuffs
 $S_0 = 092/30$

91H167 Height of wind - Massive green amygdaloidal
aphanitic ANDS (cc, gz, ch amygdaloid) w/
~~some chammudules~~ blocky flow top
 $S_0 = 338/15$ between flows
Spec vesicular lava μ + 20 flow
total thickness of vesicular lava > 100m

from 25 ~ 200m down slope view
to NE of cliff above snow



The coarse bomb (matrix) breccia caps all the
ridges this side of Knippels Glacier
- 1 Spec of Kspn porph from bomb

91H168 buff thick 55+ cgl all QZ + shale matrix
- m. volcs.

Came up sections thru 10m grey/green tuff over
50=340/18

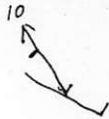
→ Boulder volc breccia, then 20m black
white laminated silt (pyroclastic beds), with
these Buff, 55+ rice crispie cgl beds

1 Spec Ammonite fossil!

Spec LC Rusty br sulphidic black & white
silty pyroclastic beds

S+AZOL=310/40 FDAX=320@10 achr

sw vergent



15.08.91 Thurs AMU again but freeze on Big Ridge E of
Brucejack Lk elevation 2000m on end of ridge
91H168 A green, gray or red tuffaceous massive
epiclastic (fragments 2-10cm no bedding
atal. Possible argillite clasts

Shear-sensal detrital/mud fault = 282/44, slide 0550/35

Spec - ok if welded & not

Photo of lovely slickensided fault below South

- 1 Spec filled vein (256/40) w/ Nusek
attached

91H169 passed thru massive structureless fine
grained tuff weathering green, red &
lt gray to white - no sign of bedding
at the point we are in red weathering blocks
lapilli tuff looking welded, but contact
w/ f.s. tuff not apparent
weathering stripes strike N-S
The tuff has frags w/ scalloped edges and
drapes around the fragments 100% vke.

Spec Red within welded tuff w/ 2-5cm frags

Mariette's photo of me walking away from
spectacular hanging glaciers & ice falls
in background



91H170 3m thick bed of brick red bedded tuff w/a few outsize clasts

S₀ = 285/20

Cuts of BP veins and angular veins in red tuff

Shear is normal

fibres = 110 @ 20 Shear plane 325/40

base of PC prob vesicular + flow is ~ 30m thick

pr 27 Cuts porphyry above red water land tuff 3m red bedded tuff over massive welded tuff breccia

pr 28-29 fibred extension shear view NE

29



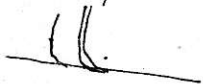
Spec 30m down slope under red Tuff is PC xltuff w/ zoned PC and Jasper frags

91H171 QZ-CH fibred fault zone in massive fs red + white with red tuff (NB weathering follows fractures, not S₀)

- veins are fibred / chert sided

gashes = 002/10 slicks = 280 @ 5

Zindary tension fractures = 210/70



→ N are they bedding left of listric?

91H172 massive PC porphyry green + red withing no fabric

BC No 081 photo (1:50 000)

91H173 PC porphyry dk green aphanitic granular same as ~~west~~ side of glacier terminus

91H174 PC porphyry green withing massive epidotized
Spec L.A. Petrog (most abundant unit around here)

Fri 16.08.91 CAVU head of Ted Morrison to glacier
1:50 000 No 083 + blowup

91H175 Mostly white QSS well foliated & ^{off map} 10443-8-I ^{crumpled?} intruded by olive green + dm aphanitic dykes

S₁ in QZ-5 on Sect = 200/67, S₁ = 306/45/60/75
S₂ incl = 150/25, S₂ incl AXPL = 040/26

91H176 Cuts ^{white} QSS + ? BSLT - BSLT is not fol: intruded
^{off map} QSS

S₁ QSS = 175/82 very regular

Spec white QSS (with yellow siltstone)
orient = 175/82

- 1 Spec QZ amygd. ? BSLT aphanitic dk grey

71H177 Grey f.g. PANDS w/ spaced S₁ = 228/70
 rusty, with very massive
 very well-cleaved.

Spec marked 228/70 = spaced S₁

From 31 + 32 view of well
 wall of top of Mid class
 cuts white gran + rusty PANDS
 w/ dykes of gran cutting into rock



71H178 cuts
 SS sand dk grey 1/5 tect PANDS/ANPB?
 Spec 1/5 tect

Peak is QSS 1/5 mylonite Porphyritic Widened
 - 1 spec mylonite S = 170/65

91H179 cuts @ SS and grey mylonitic gneiss

~~101B-8~~ S₁ = 163/73

Spec mylonitic PC clastic S_m = 145/60 L₁ = 150/285
 cut in XZ see shear sense

2260m on arête
 91H180 aphanitic white & navy cut hrs felsite
 with PC porphyroclastic mylonite
 to the east
 Beautiful view 020 from here across
 Kerr ridge - Sulphurets - Mitchell Iron Cap
 (Hanging of Clacien in centre w/ satellite peaks to E.)

~~101B-8~~ 101B-8 7.08.91 CAVU again!
 North side of Mitchell Cr (Tom & Marietta
 further westward McTagg Cr)

Photo 11-304

91H181 Grey silts shales no clay thin bedded
 S₀ = 170/72 some shale rip-up cgl, graded
 bed + cord structure say QWU

91H182 60% grey/green PC porphyroclastic 5-10m wide
 and 40% sand & shale chip cgl (w/ some ^{plus} clastic)
 S₀ = 154/77 50cm ^{from} cgl w/ 2cm black shale
 dyke cut = 276/55 well expressed discordant, not folded
 Graded bed is QSD PAure! Channels also say QSD.

Spec SS/Dyke orient = S₀ = 160/73 cut = 270/66

91H183 Interbedded 50cm SS + 50cm cgl (2-4cm rounded pebbles)
 S₀ = 192/74 some Boulder beds w/ bedded SS + chert boulders

- 1 Spec PC porph dyke for ZR dating } all parallel
 dyke cut = 265/48 3m wide } undeformed &
- 2 Spec aphanitic dyke for ZR (2m wide) in 50m reach other
- 3 Spec f.g PC phyllite " " (2m wide)
- 4 Spec f.g PC phyllite white dyke (2m wide)
- 5 Spec " " " " (2m wide)

91H184 2m wide aphanitic dyke cutting vertically

SS = cgl beds

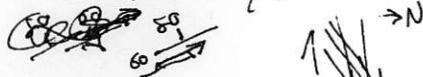
S₀ = 198/75 dyke = 270/67

PR 36-38 end of roll 17.08.91

91H185 Brn with argillaceous SS within black sh
w/ cleavage in shale indicates west
versence (i.e. beds are USD)

S₀ = 230/82

S₁ = 232/60



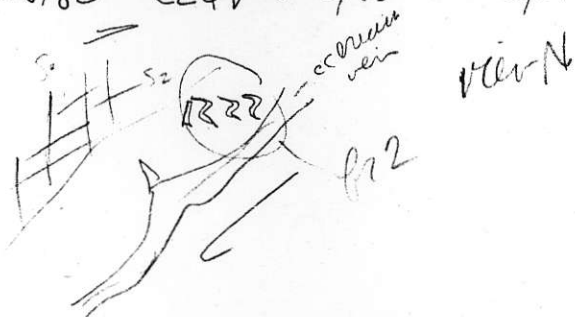
91H186 Dykes are beginning to bend +
show EEPV w/ reverse shear + the
gray SS/black shales are dev. a new clog

S₀ = 356/75

S₂ = 255/45 shear SE w/ clog, 305 @ 10

dyke = 256/80 EEPV = 005/15 = Brn mafic

PR 12



91H187 Good S₂ pre cleavage in gray SS/BC sh + dykes
S₀ = 070/90, S₂ = 256/36 are bend

1H188 Sheared dyke = 250/55

S₀ = 218/66, S₂ from = 265/38

1H189 Ric ongru cgl + Cobble cgl (mostly clasts)

clasts flattened || S₂ = S₀ = 170/66 dyke = 230/46

fibred veins in dyke = EEPV + clog = 030/45 w/

shale fibre = 285/110 top to SE shear

Type dyke = 040/45 (melt) = EE vein cut ⊥

fibre Spec-1 cgl flattened in S₂

Sunday 18.08.91 went from Newhawk to
Stranger camp

Field trip w/ Bob Wright to "Cirque Lake"

N-S S₁ pressure solution clog

non-cylindrical fold in ? dark liver

limey silts + slates (w/ weak ~~bed~~)

Hope plug pre cleavage

Fantastic bend polymed green ANOS
dyke || axial fold, but probably post-fold
+ pre-cleavage.

Late E-W brn mafic dykes w/ incredible
pencil thin injections parallel to clog
(means cleaved rocks were brittle
when intruded - fits w/ nice chilled margins
on dyke)

Upon ridge Delworth looks subhorizontal

Sampler for Petrography

- 91 HSA-100 Troy Ridge Pyjama Bed
- 101 Trarion bioclastic ls for Troy Ridge
- 102-1 Dilworth volc breccia for "
- 102-2 Dilworth dust top for "
- 105 QZ-scs scst
- 105-2 oriented QSS
- 109 volc breccia
- 110 silicified, oncophidic QZ - ch for S, oriented
- 111 Pc morph dyke oriented
- 111-2 Dyke margin oriented
- 113 Pc morph dyke oriented
- 114 mylonitic LS
- 114-2 poss fossil LS
- 116 Pc morph dyke w/ diss MC?
- 117 Hb Ddt clast for debris flow
- 121 lt grey silt oriented
- 123-1 maroon lapilli tuff
- 123-2 white lapilli tuff
- 125 cleaved Dilworth tuff
- 127 'phyronite' oriented
- 130 spec KC-91-63A
- 131 Red has spec of QZ eye kyanite
- 131-1 Rhyo. tuff cgl oriented
- 131-2 Pyjama bed
- 132 black tuff
- 132-2 -3, -4, -5 pyritic black silt & shale
- 133 liney bed
- 8 Aug 134 cgl w/ shale chips
- 9 Aug 135 volc. clast cgl
- 136 PX x.l tuff
- 10 Aug 138 Pc-Hb Porphyry

Lithocher Samples

128

138 for Newbank

147-1 for Tantalus

168-2 pygmy beds

156-1, 2-3 Eskay faces