FURTHER STRUCTURAL MAPPING ON THE DAN PROSPECT, UPPER SWIFT RIVER (105B/3).

GEOLOGICAL MAPPING ON THE HUDSON'S BAY EXPOSURE OF THE DAN PROSPECT AND GPS SURVEY OF THE DAN-LUCY TREND OF MINERALIZATION. MAP SHEET 105B-3, WATSON LAKE MINING RECORDER'S DISTRICT.

Dr. T. Liverton and Professor Luiz J.H. D'el-Rey Silva

Watson Lake, February 2001

Latitude & Longitude 60°10'N, 131°07'W

Work performed on the Park 45 (YB 095560), Park 41 (YB 09556), Park 43 (YB09558) and Park 47 (YB09562) claims of First Yukon Silver from the 31st. August to the 3rd. September 2000.

This report has been examined by the Geological Evaluation Unit under Section 53 (4) Yukon Quartz Mining Act and is allowed as representation work in the amount of $ 4200.00.

M. B[illegible]

for Regional Manager, Exploration and Geological Services for Commissioner of Yukon Territory.

CONTENTS

FURTHER STRUCTURAL MAPPING ON THE DAN PROSPECT, UPPER SWIFT RIVER (105 B / 3).

'WINDOW' EXPOSURE: PARK 45 CLAIM

LOCATION

The Dan or Bar prospect is located in the upper Swift River valley at 60°10' N, 131°07' W, (U.T.M. coordinates for south drill hole = 382460E, 6671748N) and is 12.5 km NW of the Pine Lake airstrip (Fig. 1a). Access is by good four wheel drive road from the airstrip.

INTRODUCTION

The Dan prospect has been known since 1946 when prospectors from Hudson's Bay Mining and Smelting explored ground accessible from the Alaska Highway. Subsequent to their exploration programme, which included trenching and shallow diamond drilling, various exploration programmes have investigated the upper Swift River valley. They are: Boswell River Mines in the late 1960s (geophysics, geochemistry and diamond drilling of various prospects); with excavation of showings by First Yukon Silver (1989 on) and subsequent options to Cominco: drill programme 1993; and Birch Mountain Resources: drill programme 1997. Most of these efforts were aimed at investigating skarn-type mineralization since the area does contain abundant calc-silicate mineral assemblages. The initial intent of First Yukon Silver's efforts (Doug Schellenberg) was to investigate this mineralization as being possibly of stratiform type, i.e. contained in rocks that had as protoliths volcanics and exhalites. This current (ongoing) geological investigation is aimed at investigating the host rocks of the area and their structural geology to develop a regional exploration model.

Structural analysis was commenced during the 1999 field season by Professor Luiz J.H. D'el-Rey Silva with work in the Dan ('Window' exposure) and has been continued during the 2000 season with further work in the vicinity and also on the region 3.5 km to the south, where the TBMB-MOD-BOUND prospects define a second parallel trend.

This report gives details of mapping on the Hudson's Bay exposures of the Dan prospect and implications of the structural geology for prospecting in the immediate Dan-Lucy area.

TECTONICS AND REGIONAL GEOLOGY

The Swift River area covers the easternmost part of the Dorsey Terrane and its contact with the displaced Palaeozoic continental North American strata of the Cassiar Terrane (Fig. 1b). The correlation of Dorsey terrane sequences is problematic. The western portion of the terrane contains siliciclastic units very similar to Proterozoic to middle Palaeozoic continental strata, whilst correlation of the eastern assemblages seems to be most likely with Yukon Tanana Terrane.

In the Swift River area the Dorsey Terrane has been divided into the following assemblages by Roots et al. (2000):

From SW to NE the sequence is:

The structurally lowest sequence is the Ram Creek Assemblage, consisting of sheared mafic metavolcanics, quartzite and marble; this is separated from the overlying Dorsey Assemblage by an early Jurassic diorite intrusion (sill). The Dorsey Assemblage consists of meta-tuff, chlorite schist, quartzite, calc silicates and quartz-eye felsic schist. The contact with the overlying assemblage is faulted. The Klinkit Assemblage consists of variolitic metavolcanics, augen schist, marble and carbonaceous schist with quartzites. Overlying this is the Swift River Assemblage which is a thick, monotonous phyllite sequence.

North American continental strata on the north side of the Swift River valley contain inbricated strata of (?) Proterozoic through Cambrian to Mississippian age (Poole et al., 1960) Since the Ram Creek Assemblage includes amphibolite grade metamorphics to the NW of the Swift River area the contact with the structurally underlying and low-grade Cassiar Terrane continental strata is assumed to be a contractional fault (Roots et al., 2000).

Besides the Jurassic diorite sill already mentioned, both Dorsey Terrane and Cassiar Terrane have been intruded by undeformed mid Cretaceous biotite granites of the Seagull and Cassiar batholiths. These granites have been considered to be derived from crustal melting rather than a mantle-derived source during peak crustal thickening in the Omineca Belt (Driver et al., 2000; Liverton and Botelho, 2000). The Ram Creek rocks at the Dan prospect have, therefore undergone dynamothermal metamorphism to at least lower greenschist facies, followed by two episodes of contact metamorphism / metasomatism.

Mineralization at the Dan prospect is hosted by marble and a mafic to acid metavolcanic sequence.

MAPPING TECHNIQUES

The eastern and western parts of the DAN showing ('Window' exposure) were mapped in detail during the 1999 season. The outcrop to the east is about 30 m long and was mapped at 1:100 scale, whereas the outcrop to the west, which is both longer and wider (100 X 50 m), was mapped at 1:200 scale. Further detailed lithostructural mapping was carried out in Aug/Sept 2000, in the uphill continuation of the exposures (the Hudson's Bay exposures as enlarged and cleaned up by First Yukon Silver). The mapping was performed with the aid of a plane table, alidade and tape on the Window exposures and with theodolite and tape on the upper (Hudson's Bay) exposures. Particular attention was paid to those points where key structures and/or relationships are noted: fold hinges, fold limbs, contacts, and places where structures cross cut each other. Hundreds of measurements of structures were taken in the field, and all attitudes mentioned herein follow the dip direction method. The contacts and folds were drawn directly on the plane table or plotted at the Hudson's Bay trench whilst still at the outcrop, and this helped substantially to understand the effects of fold superposition, particularly in the western part of the DAN.

STRUCTURAL RESULTS FROM 1999 WORK

Only a brief summary of the structural geology was given in the assessment report for 1999, since drafted maps from Professor D'el-Rey had not reached the Yukon in time for submission in the assessment report. The results of this mapping are given in more detail here.

SUMMARY OF STRUCTURES AND DEFORMATION

Structures in the studied area clearly result from two events of highly ductile deformation (D_1-D_2) and a late event of brittle-ductile deformation (D_3), all under sub- to greenschist facies metamorphism. The two earlier events imposed several micro- to mesoscopic-scale structures on the sedimentary layering (S_0), e.g., folds (F_1, F_2) and their associated planar and linear structures: axial plane foliations (S_1, S_2) and intersection lineations (L_{1-0}, L_{2-1}), fold axial planes (PA_1,

PA_2), and fold axes (B_1, B_2). Consequently the area is underlain by a packet of ESE-WNW trending S-tectonites containing three planar structures commonly sub-parallel to each other ($S_0//S_1//S_2$) and which dip shallowly to steeply generally to the southwest. Linear structures such as L_{1-0}, L_{2-1}, B_1, B_2 are also sub-parallel and trend NW-SE, with a gentle plunge commonly to NW or SE.

The D_3 event affected the D_1-D_2 packet of tectonites and developed folds (F_3) with their associated planar structures, such axial plane foliations (S_3), and a set of shallowly dipping fracture planes (S_{3a}) that control the erosion of the outcrops and which are a type of bc fracture (e.g., Twiss and Moores, 1992, p. 49) relative to the F_2 folds. D_3 linear structures (fold axis and intersection lineation) are obviously controlled by the dip of $S_0//S_1//S_2$ but have not been treated in detail because the field work soon indicated that D_3 is not significant for the spatial control of rocks and mineralisation.

THE SEDIMENTARY LAYERING (S_0)

The oldest planar structure in the area is the sedimentary layering, and is characterized on a range of scales. The intercalation of layers of sedimentary and volcanic rocks of different composition, on a scale of 1-10 meters, is evidence for different beds being deposited on top of each other in a sedimentary basin, rather than being a tectonic layering. Occurrence of rhyolite and volcanic-derived sediments indicate that basin infilling was augmented by volcanism. On a small-scale, S_0 is marked by cm- to dm-thick beds of different composition and color within each sedimentary unit, for example within the marble unit, where beds of grey metapelites occur intercalated with dominant beds of white marble. Although S_0 and S_1 are sub-parallel, such intercalation of thin layers is actually a primary sedimentary feature because the whole set of layers is affected by F_1 folds, and these are in turn coaxially affected by F_2 folds.

THE D_1 DEFORMATION

This event is characterized by F_1 folds and their associated axial plane foliation (S_1) that affect S_0 throughout the area and develop a longitudinally continuous packet of well-banded, low-grade metamorphic rocks, within which the F_1 fold hinges can be traced easily in many places. F_1 folds are entirely isoclinal in style, so their hinges are contained within the packet of layers and commonly exhibit a size of 0.1-1.0 m, whereas the fold limbs are very long and coincident with the sedimentary layering, therefore supporting the interpretation that D_1 was an event of very ductile deformation. The F_1 folds compare well with the folds of class 3 of Ramsay (1967). F_1 folds developed a strong axial planar foliation (S_1) that is sub-parallel to S_0, unless in the F_1 hinges, where S_1 cuts across the primary layering. Due to the intensity of F_1 folding, the axial plane (PA_1) and S_1 both display attitude very similar to that of S_0, forming a set of NW-SE trending planar structures that dip from 40° to 80° generally to SW everywhere in the Swift River area. However, the average dip angle of S_0-S_1 is greater in the eastern (Fig. 3 & 5) than in the western part of the DAN (Figs. 3&4). The F_1 fold axes (B_1) plunge shallowly to NW or to SE, in the DAN and also regionally.

S_1 is commonly a mineral foliation marked by the plane-parallel orientation of flattened crystals of carbonate and quartz, and phyllosilicates such as fine-grained white mica (sericite), chlorite and perhaps some biotite. Quartz and white micas are common in quartzite and rhyolite, whereas the other minerals are more commonly seen in the marble and metapelitic units. A slaty cleavage may be seen in some fine-grained siliciclastic units. The intersection of S_1 and S_0 develops a strong intersection lineation (L_{1-0}) that follows the attitude of the B_1 fold axes (Fig. 8c).

THE D_2 DEFORMATION

The D_2 event of deformation is well characterized by F_2 folds (Fig 7) and their associated axial plane foliation (S_2) that affect S_0 and all D_1 tectonic structures, developing trains of several pairs of mesoscopic folds well exposed in the DAN. F_2 folds develop a co-axial pattern of fold interference with F_1 (type 3 of Ramsay, 1967). This explains the girdles exhibited by the plot of S_0-S_1 in stereograms (Fig. 8b). However, comparing the stereograms of $B_1 + L_{1\text{-}0}$ and $B_2 + L_{2\text{-}1}$ it is noticeable that the poles of B_1 and $L_{1\text{-}0}$ are somehow dispersed around southerly directions. This is attributable, in part, to the fact that F_1 are non-cylindrical folds (Williams and Chapman, 1979) that may have even evolved into sheath folds (see following).
The F_2 folds are NW-SE trending, commonly tight, display m- to 10 m-scale, with axial plane dipping between 80° to SW and 90°, in the eastern part of the DAN, and around 40°-60° to SW in the western part, whereas the fold axes normally exhibit a plunge of only few degrees to NW or SE in both parts of the area studied in detail. These folds develop a strong and penetrative axial plane foliation (S_2) that keeps, in general, the same orientation and associated mineralogy as S_1, reflecting similar conditions of low greenschist facies metamorphism and deformation during D_1-D_2. The intersection between planes of S_2 with S_1 and S_0 develops a penetrative lineation $L_{2\text{-}1/0}$ that overprints $L_{1\text{-}0}$ and becomes parallel to it in most of the area. Nevertheless, although it is generally hard to separate these two lineations in the field, they may be both identified locally.

Because the D_1 and D_2 conditions of deformation were quite similar, and because their respective structures are generally parallel, during the mapping a procedure was adopted for identification of a fold as F_1 only if it is clearly affected by another fold (F_2). Fortunately the identification of both type of folds is in fact not a difficult task at the Window, so numerous are the examples of fold interference in the mapped area.

The detailed map and vertical cross-sections of the western DAN are based upon an interpretation that the layers of marble and pelitic material (in the north) change southward into the calc-silicate unit. The gradual passage of these rocks in cross section fits the observation that they are closely related in the center of the western part of the DAN (Fig.5), where both layers are in contact with the marble unit; both lie along the same trend, and are separated by a few meters.

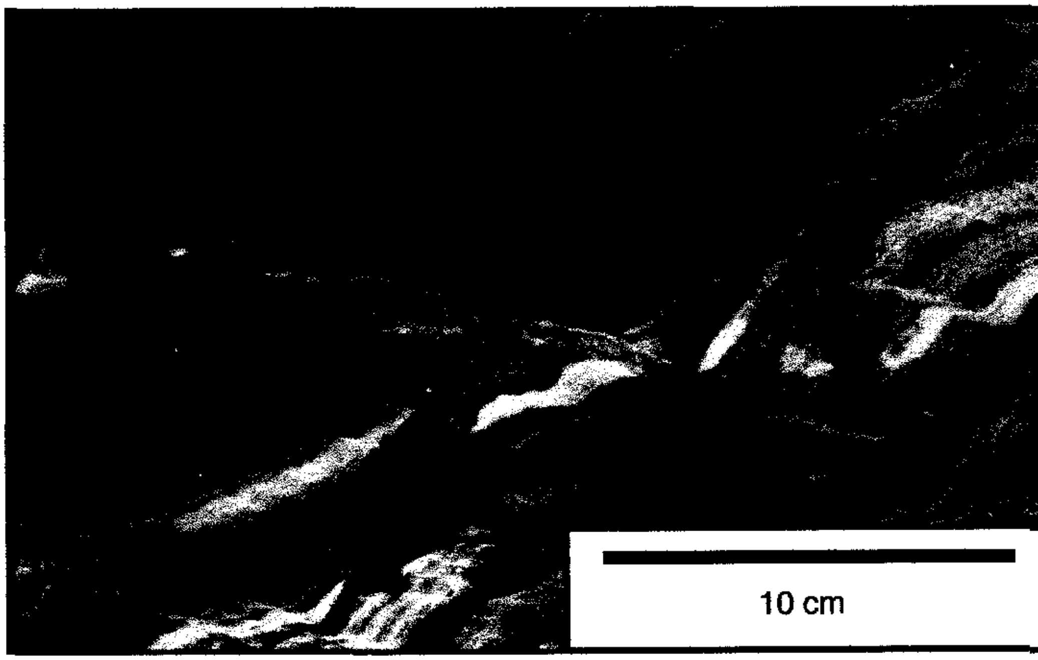
SHEATH FOLDS AND FOLD INTERFERENCE MAP PATTERN

Sheath folds are a common feature at the DAN prospect. They are best observed between the marble and calcsilicate units in the western part of the Window area. These are F_1 sheath folds and they display a size of 1-3 meters in cross section perpendicular to the axis of the sheath $B_{1} + L_{1\text{-}0}$ and are of sufficient scale for representation on the geological map. The interpretation that the sheaths are the F_1 generation is based on the observation that the axial plane of the sheaths dip at intermediate angles to SSW, sub-parallel to the dip of the layers, and that the sheath folds are affected by F_2 folds of dm- to m-scale. Nevertheless, F_2 sheath folds may occur in the area as well, but they have not yet been identified. The alignment of the fold axes and the intersection lineation (B_1 and $L_{1\text{-}0}$) in southerly directions (sub-parallel to physical axes of the sheaths seen in the field), records the stretching direction.

THE D_3 DEFORMATION

This event produced (F_3) folds, axial plane foliations (S_3), and a set of low-angle dipping fracture planes (S_{3a}), that affect the D_1-D_2 tectonites in a sub-perpendicular relationship that is systematic across the studied area. However, the D_3 structures are not relevant to spatial distribution of the layers.

The F_3 folds are gentle to open, and have axial plane (PA_3) and S_3 axial plane foliation all trending N-S on average, with a steep to sub-vertical dip to westerly and easterly directions, as statistically demonstrated for the eastern and western parts of the DAN (Fig. 8b). The folds are sub-vertical bends that affect the anisotropic packet described in the previous sections, so the fold axes and the intersection lineation (B_3 and $L_{3\text{-}2/1/0}$) generally plunge steeply to southerly directions, as it is controlled by the dip of S_0, S_1, or S_2, or even by the dip of all of these together. Although the F_3 bends are generally 1m-size they may well be smaller or larger (fold wavelength)



Polished slab from the 'tuff-rhyolite' unit at the Hudson's Bay trench (central southern part of Figure 3) showing crenulation cleavage. Sulphide mineralized extensional veins follow the cleavage and are interpreted as metamorphic remobilization of the mineralization.

and likely display a kink-style.

Two sets of D_3 planar structures are quite common in the studied area: the S_3 foliation, that is generally a well-developed, sub-vertical spaced cleavage locally displaying a more or less evident component of pressure solution. and the S_{3a} foliation, that is also a kind of spaced cleavage, but trending generally WNW-ESE and dipping at low angles to northerly directions. The S_3 foliation is ubiquitous, not always associated with F_3 folds. The foliation cuts the WNW-ESE trending tectonites perpendicularly and locally displays a cm-scale component of strike-parallel slip, though the sense of displacement is non-systematic. The west end of the western outcrop of the DAN is marked by a closely spaced set of S_3 planes (Fig. 3) such that the layering is so intensely cross cut to give the impression of a fault zone, although no significant displacement was noticed.

Carbonate veins may be found along the planes of S_3 and S_{3a}, indicating that these structures developed during the time that dissolved rock-forming material was still percolating. A most distinct feature in the western part of the DAN is a set of sub-vertical dykes of brownish green calcsilicate material. They were emplaced along N-S trending planes and are also affected by dm- to m-scale folds with sub-vertical axial planes and vertical fold axes. They are associated with an axial plane foliation of the pressure solution type, parallel to S_2.

As proposed last year (Assessment Report 094117) the combination of F_1 and F_2 folds produces repetition and effective thickening of the mineralized horizons: much of the mineralization seen in the lower part of the 'Window' can be explained by one horizon. Figure 8a shows the structural model developed then.

MAPPING DURING THE 2000 SEASON

DETAILED MAPPING

Subsequent to the 1999 season's work, Hardy Hibbing had sawn slabs of the 'tuff-rhyolite' unit at the south edge of the 'Window' exposure. These displayed a crenulation cleavage that had not been observed before. It was thought that such a fabric development could have been related to a shallow-angle extensional detachment zone just above the 'Window', so the very detailed structural mapping (1:100 scale) was extended to include the Hudson's Bay trench.

This mapping is shown on the large folded sheet in the pocket of this folder.

The crenulation was seen to be a steeply-dipping structure rather than flat-lying and to be associated with the progressive deformation (D_1-D_3). Careful observation of the calc-silicate and pyrrhotite-chalcopyrite mineralized outcrop at the extreme southern end of the Hudson's Bay exposure (see Fig.3 and the large map) reveals an F_1 / F_2 interference pattern, consistent with the earlier structural model. The apparent thickness of the sulphide-rich horizon here is thickened due to fold repetion as demonstrated by the 1999 mapping for the lower exposures.

GPS SURVEY

In addition to the detailed mapping a G.P.S. survey (using a 12 channel receiver) of several of the existing drill hole collars and various important rock exposures was undertaken since the Birch Mountain logs lacked full coordinates. Results are as follows:

LOCATION	UTM E	UTM N
Birch Mountain DDH 97-05A	382802	6671368
Birch Mountain DDH 97-04	382835	6671415
original showing, bottom S_0 / S_1 = 134 / 76	382813	6671504
& top of exposure	382798	6671490
Green tuff o/c on drill road to Lucy	381815	6672059
Upper Lucy rhyolite (?) o/c S_0 / S_1 = 219 / 88	381683	6672036
Birch Mountain DDH 97-01 (Lucy) Az 035, -45°	381384	6672198
Birch Mountain DDH 97-02 Az 035, -60°	381373	6672181
centre of Lucy exposure	381417	6672223
Birch Mountain DDH 97-03 Az 035, -44°	382371	6671764

Birch Mountain DDH 97-06, Az 035°, -50° is 9.2 m on 220° true.

Upper DDH, Hudson's Bay exp. (S end of 1:100 scale map in pocket)	382460	6671748

The purpose of this survey was to be able to plot the location of the marble / calc-silicate and volcanic rocks to investigate whether these localities are consistent with there being the one principal horizon that has been followed by the surveys conducted by Birch mountain Resources. Figure 8d shows the positions of the Lucy, Window, Hudson's Bay and original showings, together with the drill holes (lengths of their horizontal projections are not to scale). It would appear that DDHs 04 and 05A, the Hudson's Bay exposure and DDHs 03 and 06 all have intersected the one major F_2 fold limb, but there may be a deflection of the trend between these localities and the Lucy drillholes (01 and 02). Two possibilities are suggested. If the F_2 fold axes have a westerly plunge to the west of the Window, then this may represent a parasitic fold on the overturned limb of a major antiform. An alternative is that the drill holes at the Lucy prospect intersected the southern limb of a synform and that the overturned limb is to the north. This is discussed below.

PROTOLITHS OF THE DAN ROCKS

Investigation of the rock unit mapped as 'tuff-rhyolite' is ongoing. Some preliminary petrographic work has been caried out. This indicates that much of the unit can be ascribed to a volcanic protolith, in most cases likely tuff or tuffaceous water-borne sediment (Figs. 10-11). Some sections have shown probable fiamme (i.e. the rock is a tuff sensu stricto). Within the unit there are, however, cryptic fault zones as very local mylonites are recognisable (Fig. 9).
The presence of recognisable volcanics in the sequence indicates that the mineralization at Swift River is likely of exhalative origin, somewhere within the VMS-SEDEX spectrum.

DISCUSSION AND RECOMMENDATIONS

The structural model presented last year has been more fully described here. The detailed mapping performed this year has confirmed that the model is still valid. Repetition of the Dan mineralization is to be expected *somewhere* uphill (south) of the original showing, but the exact scale of the macroscopic F_2 folds at this locality remains conjectural. The near-kilometre scale of these folds demonstrated for the TBMB area is probably valid for the Dan area. If so, then there is likely room for repetition of the mineralization immediately alongside the diorite sill.

The Lucy area offers intriguing possibilities for further minealization to be discovered. The drill logs for Birch Mountain DDH 01 (-46° to 050°) indicate marble in the following intervals below 'andesitic tuffs' and with siltstone interbeds: 166.46-166.92; 172.53-172.93; 223.88-224.42; 227.02-228.74; 230.58-257.87; 258.77-262.25; 262.83-263.25; 263.82-264.11; 264.43-264.66; 266.32-266.41 and ending the hole in marble at 266.77.
DDH 02 (-60° to 035°) only intersectedmarble from: 74.84-76.70 and 79.66-80.04, but the actual total 'skarn and marble' intersection was 68.80-83.10.

The intercalation of 'tuffaceous siltstone' and marble most likely correlate with the mixed marble-pelite that we mapped at the 'Window'. Intersection of 100m of marble and pelite in DDH 01, collared at 46° would indicate that this hole penetrated the hinge zone of a F_2 fold.

At approximately 100+ metres north of the Lucy showing there is abundant float (likely subcrop) of finely laminated actinolite-chlorite-sphalerite rock that is somewhat different from the predominantly magnetite-rich outcrop of the Lucy exposure. It is unlikely that DDH 01 penetrated far enough to have intersected the down-dip extension of this material. The regional offset in trend of the mineralized unit previously mentioned also indicates the possibility of a major fold here. Little interpretation can be done without some detailed mapping of the Lucy and, hopefully, access to the Birch Mountain drill core, which was taken to Calgary after the 1997 season.

RECOMMENDATIONS

Possibly the best prospect for the Dan area is to investigate the region immediately below the diorite sill to test for repetition of the mineralized horizons on the opposite limb of a major F_2 fold. The upper slopes on that ridge should be traversed to determine if there is any natural rock exposure and to estimate till cover. If cover appears thin, then soil geochemistry would be a suitable and inexpensive method to employ.

The Lucy area deserves more work and, in particular, reinterpretation of the 1997 drilling. It should be possible to expose the mineralization occurring as float immediately to the north of the Lucy showing without too much disturbance. This should be attempted in future, or alternatively when funding permits, the drilling of at least one more hole to obtain a continuous drill section through the area.

In general, the whole region could benefit from suitable geophysics. Gravity methods are now easier to apply than in the 1970s and should be capable of detecting near-outcropping massive mineralization. In future consideration of this technique is advised.

Timothy Liverton PhD, FGS FGAC February 2001

FIGURES

Figure 8a. Cartoon-type cross section to illustrate possible repetitions of horizons by the folding.

Figure 8b. Stereograms (lower hemisphere Schmidt projections) of poles to foliations from the 'Window' exposure.

Figure 8c. Stereograms (lower hemisphere Schmidt projections) of lineations from the 'Window' exposure.

Figure 8d. Map at 1:7500 scale indicating the relative location of the Window, original Dan, and Lucy showings together with the Boswell River Mines diamond drill holes. Also shown are prominent outcrops of the volcanic unit with attitude of S_0 / S_1 given.

Figure 9. Scanned image of a thin section from the Hudson's Bay exposure. This rock is an ultramylonite. Such a mylonitic zone is likely quite narrow (perhaps only centimetres width) and indicates the presence of cryptic faulting in the sequence. This is quite consistent with the structural model presented here as thrust faulting is to be expected.

Figure 10. Scanned image of a thin section from Cominco drill core (93-05, 25.13 m). This rock is interpreted as an acid tuff, with buckling due to diagenesis of the sediment. Present mineralogy is predominantly quartz-sericite.

Figure 11. Scanned image of a thin section from Cominco drill core (93-07, 49.0 m). This rock shows original layering as a volcanic-derived sediment and syngenetic pyrite (now partially replaced by amphibole and sericite). The effect of a contact metamorphic / metasomatic overprint and remobilization of mineralization is obvious as discordant masses of chloritised amphibole with pyrite or pyrrhotite and sphalerite.

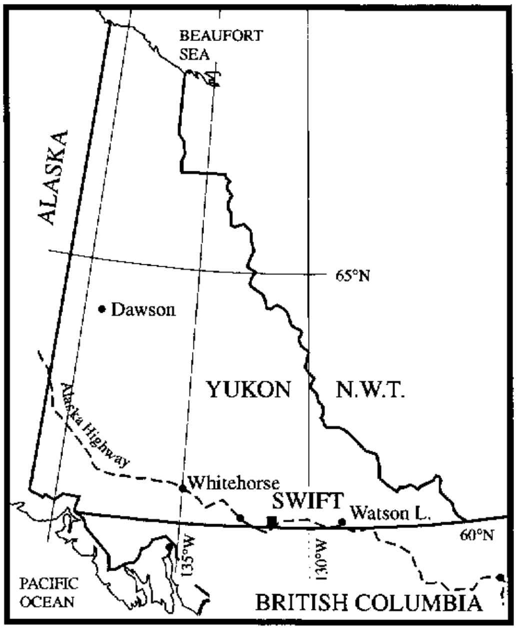


FIGURE 1a

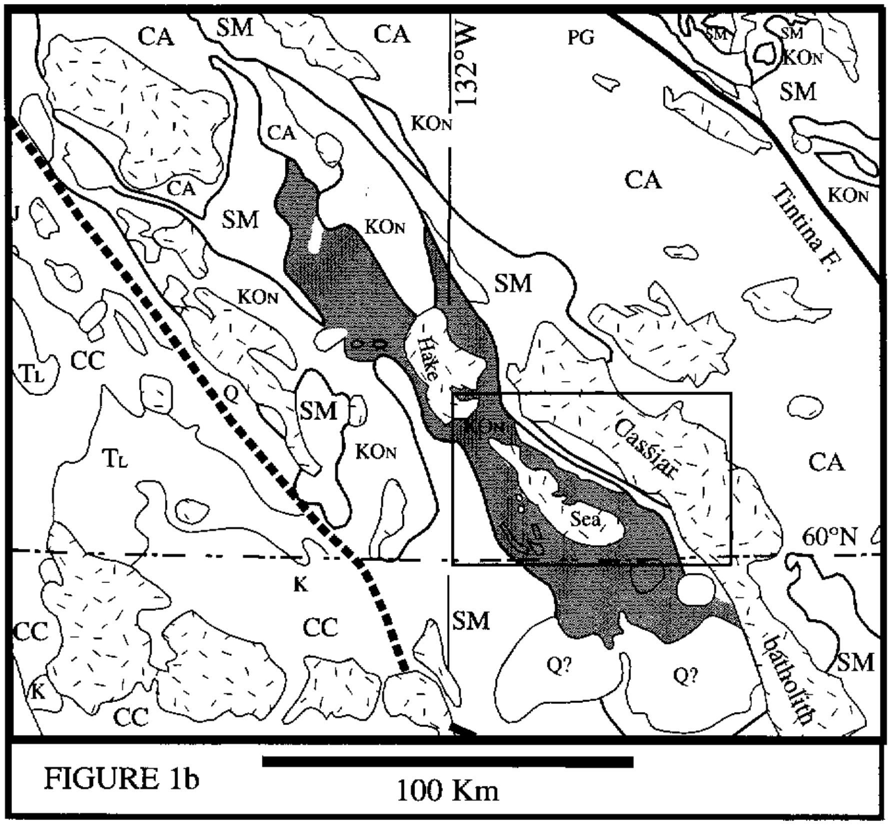


FIGURE 1b

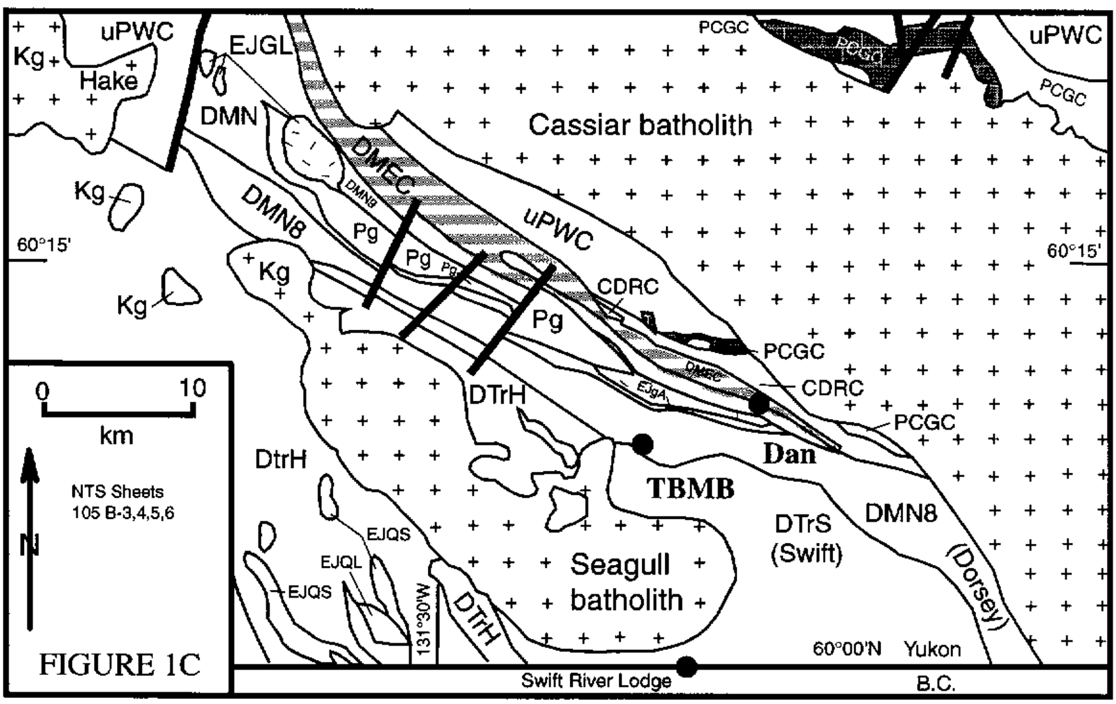
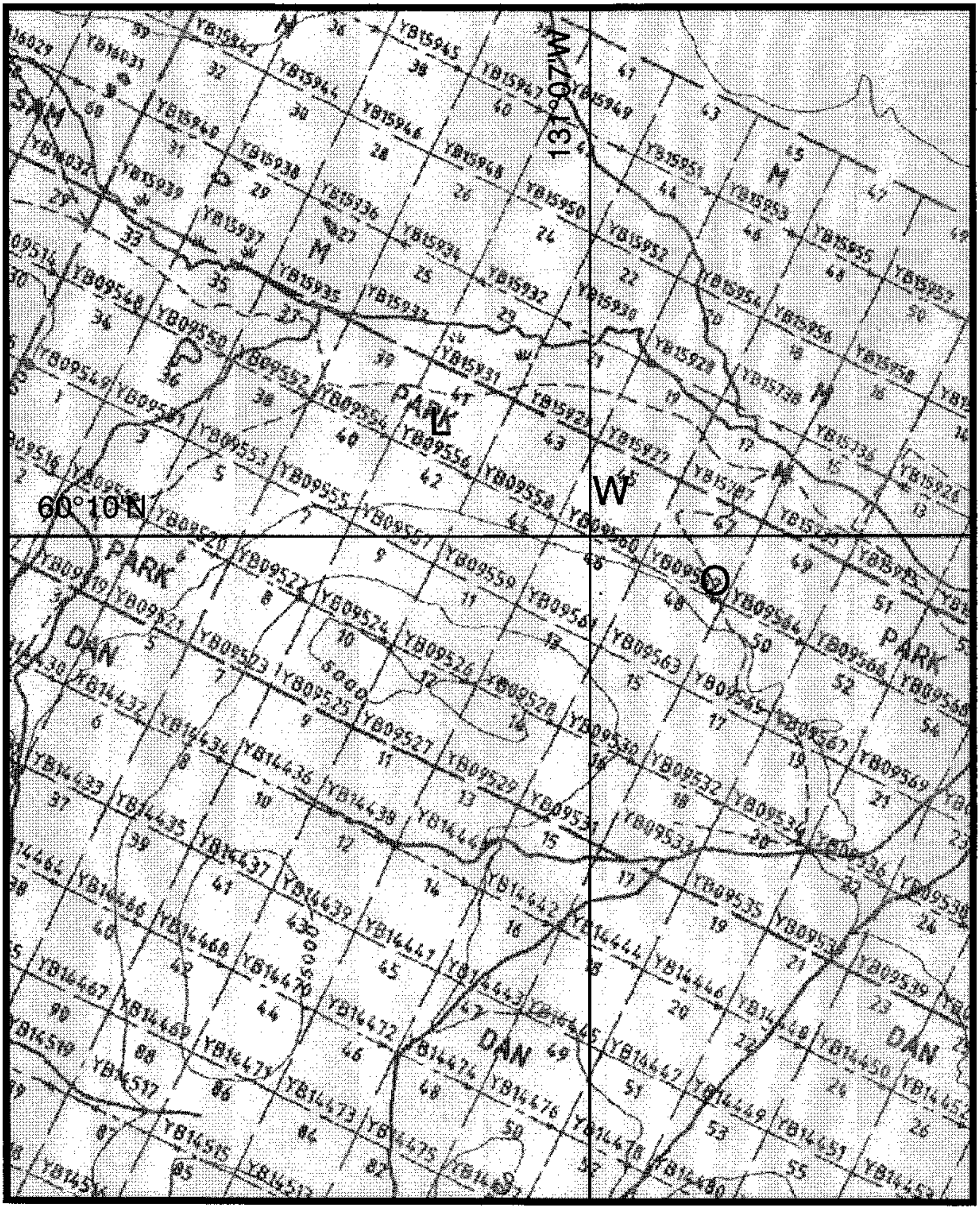
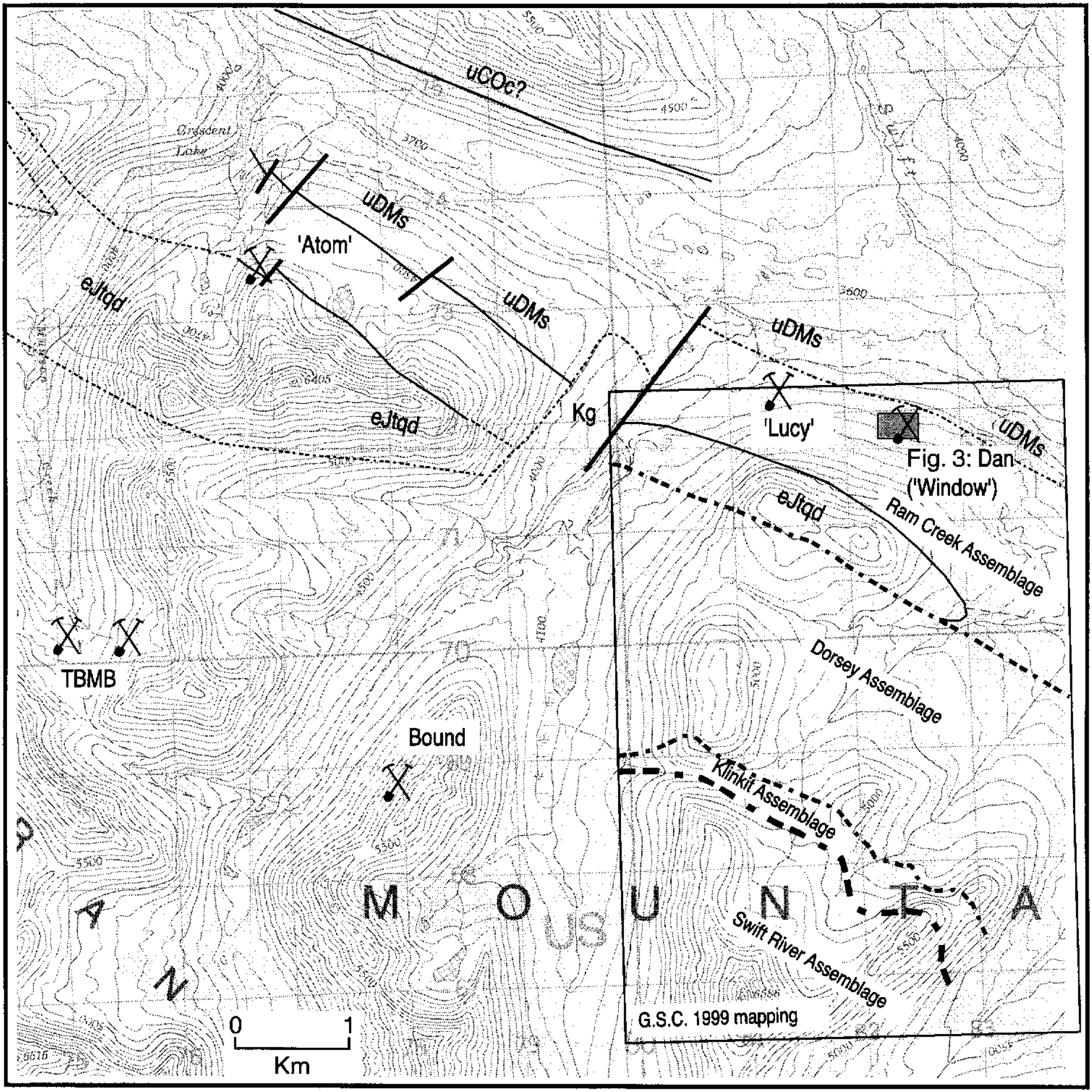


FIGURE 1C



PORTION OF CLAIM MAP 105B-3 SHOWING THE PARK CLAIMS. L = LUCY SHOWING; W = WINDOW; O = ORIGINAL SHOWING. SCALE 1:30,000.


uCOc?
uDMs
'Atom'
eJtqd
uDMs
uDMs
Kg
'Lucy'
uDMs
Fig. 3: Dan
('Window')
eJtqd
Ram Creek Assemblage
eJtqd
Dorsey Assemblage
TBMB
Bound
Klinkit Assemblage
Swift River Assemblage
G.S.C. 1999 mapping
0
1
Km

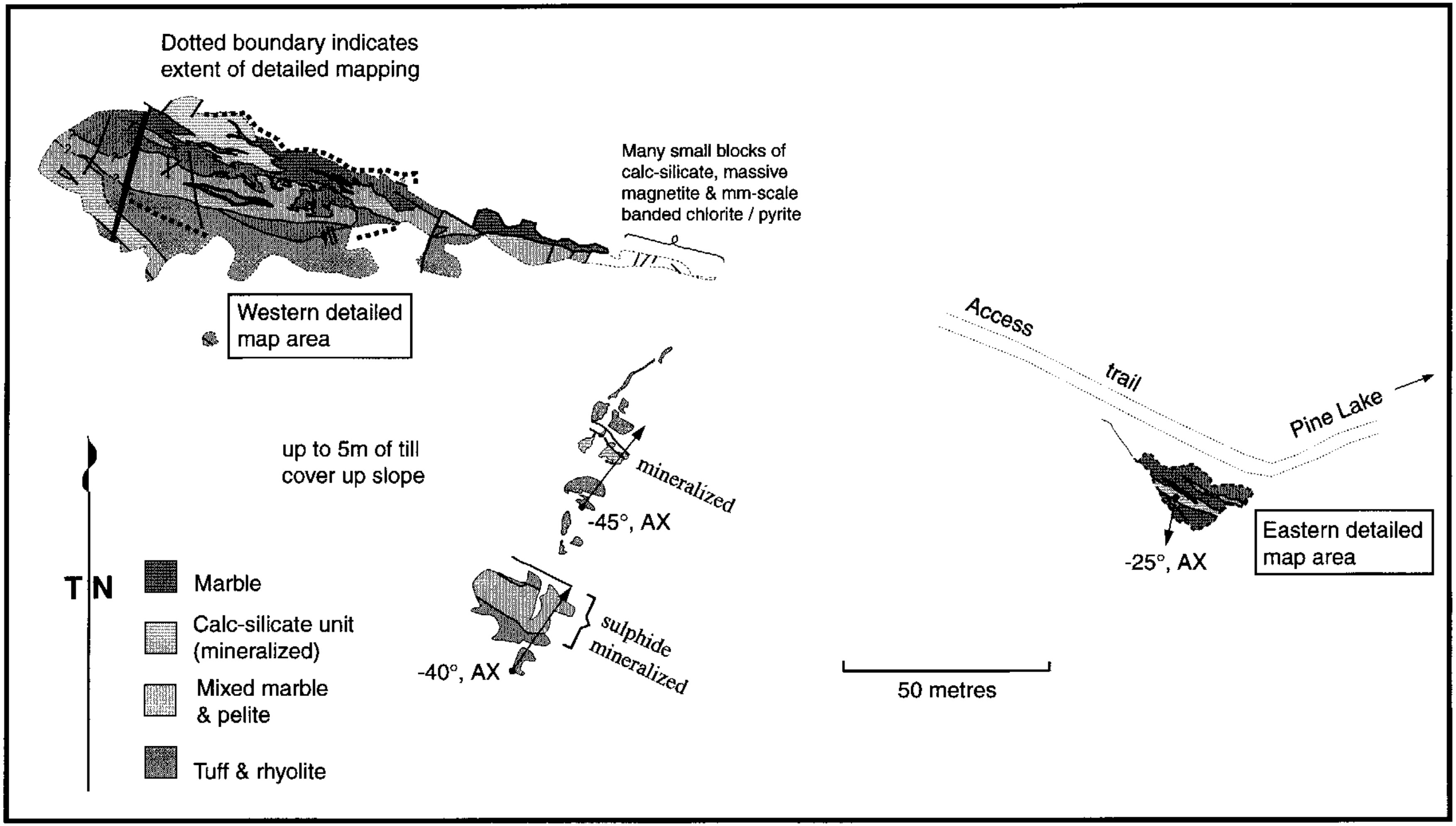


Figure 3. Lithologies exposed at the 'Window' exposures of the Dan prospect. From mapping by T. Liverton during 1990, 1996 and this present work with Prof. D'el-Rey. The heavy dots show the very detailed mapping carried out during 1999 and the central portion of the map covers the area mapped at 1: 100 scale during the 2000 season.

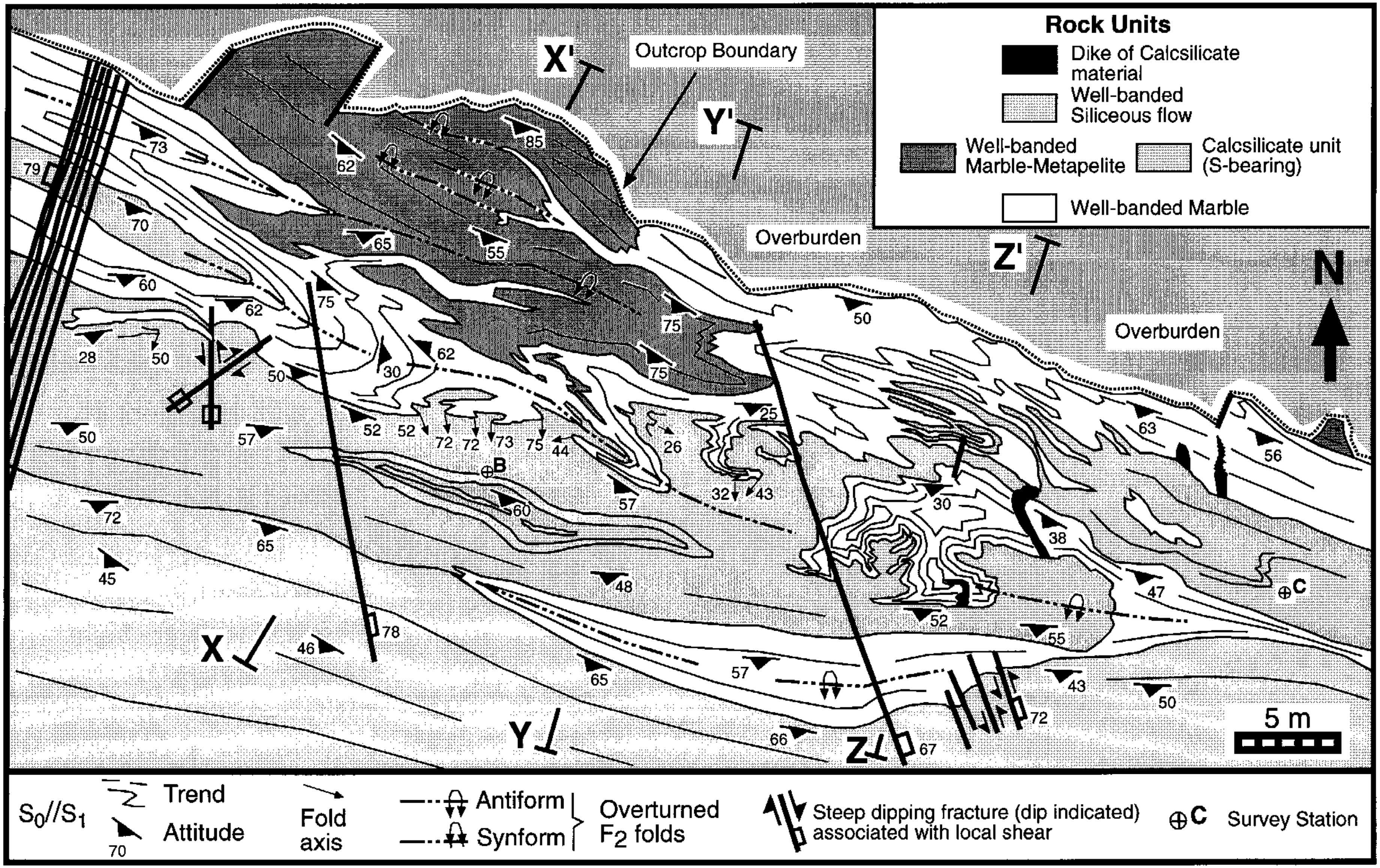
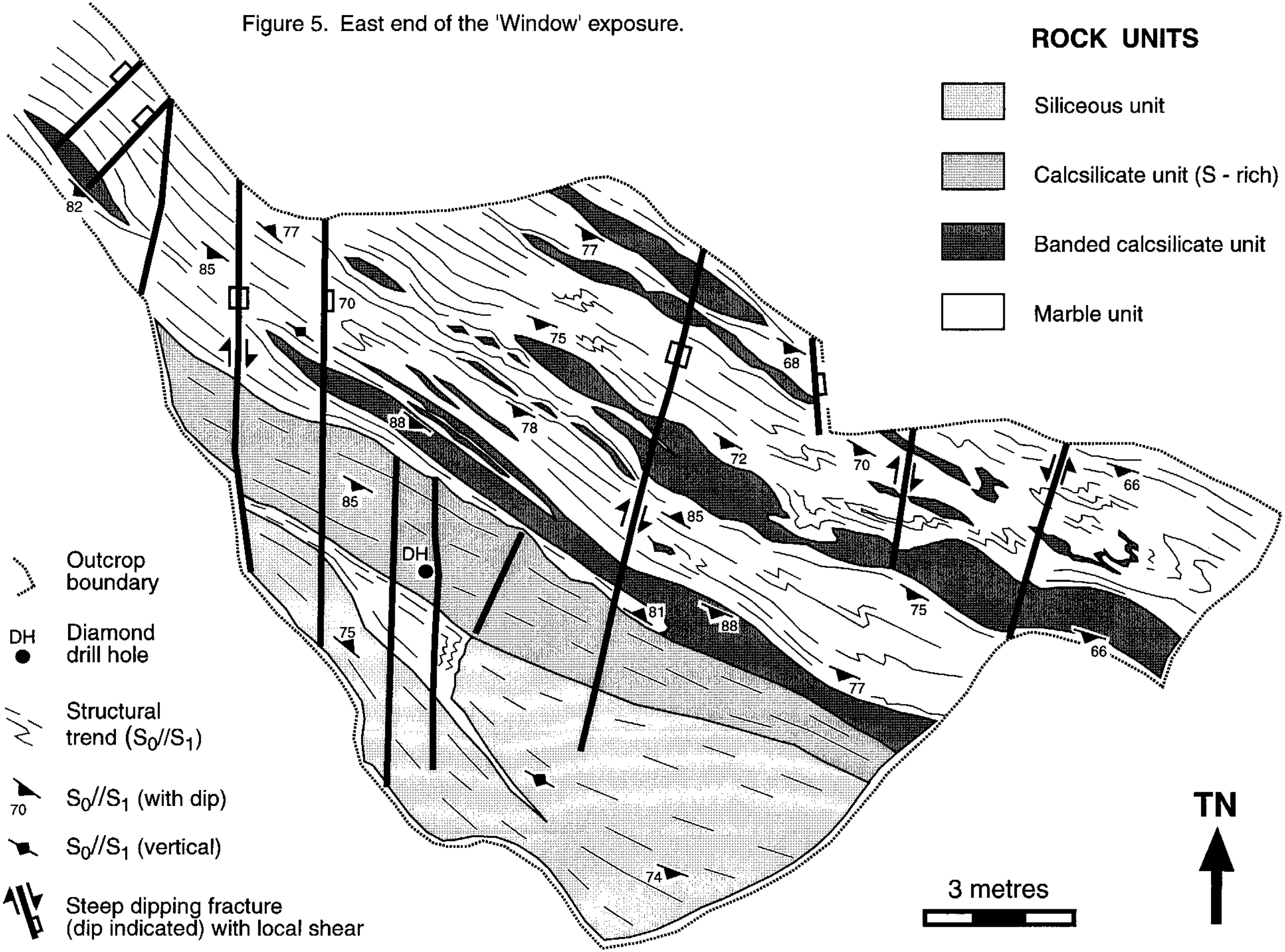


Figure 4. Lithostructural mapping over the west part of the 'Window' exposure of the Dan prospect.

Figure 5. East end of the 'Window' exposure.



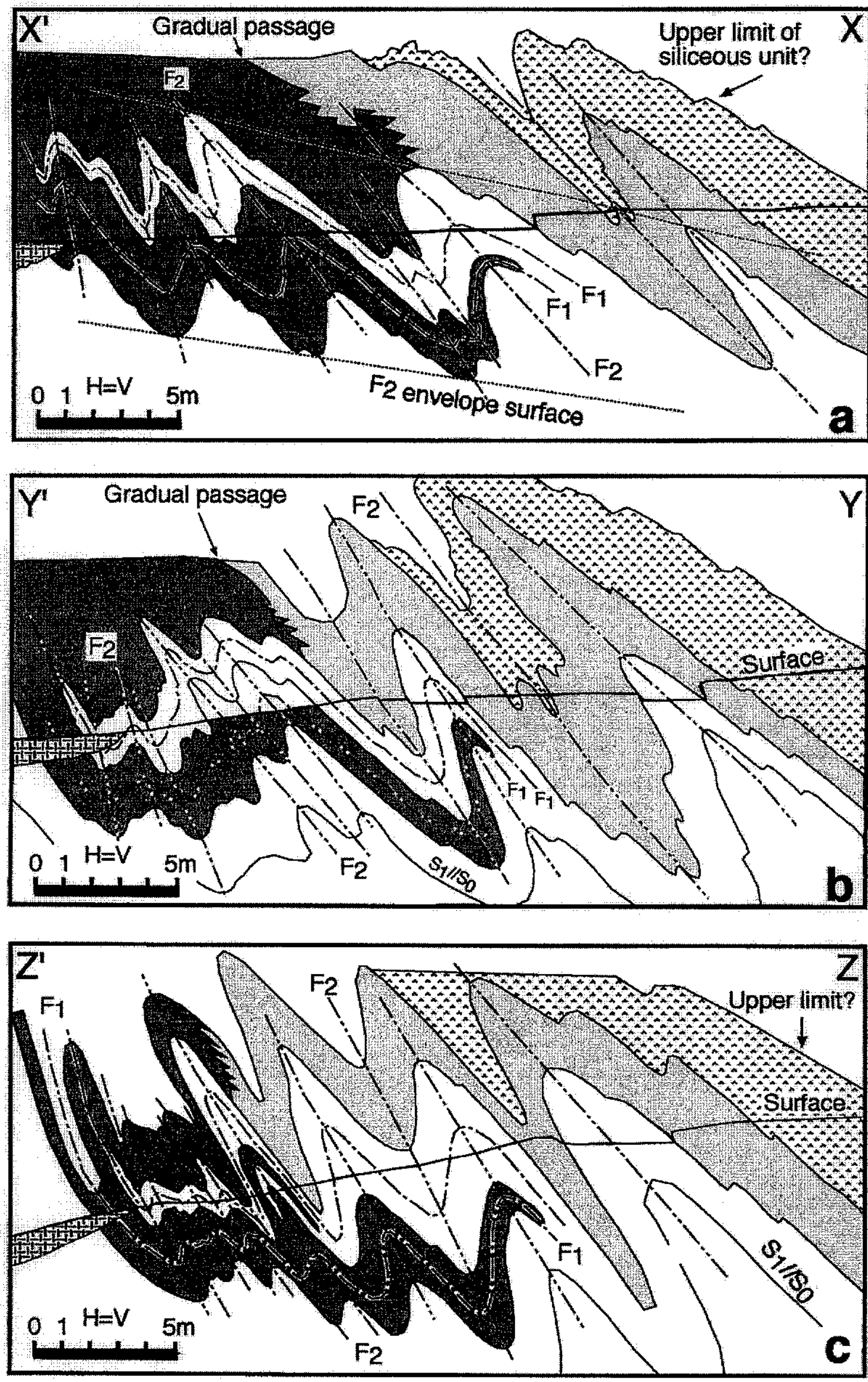


Figure 6. Cross sections through the west 'Window' exposure.

Figure 7a. View of the western part of the 'Window' exposure showing a refolded F1 fold of pelitic material in the marble unit.

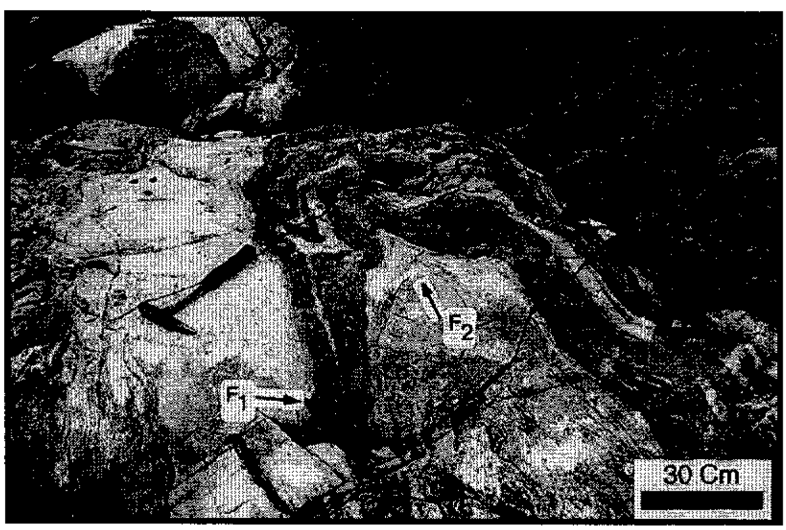


Figure 7b. Detail of the fold in (a), taken using the step-ladder to obtain a near axial profile.

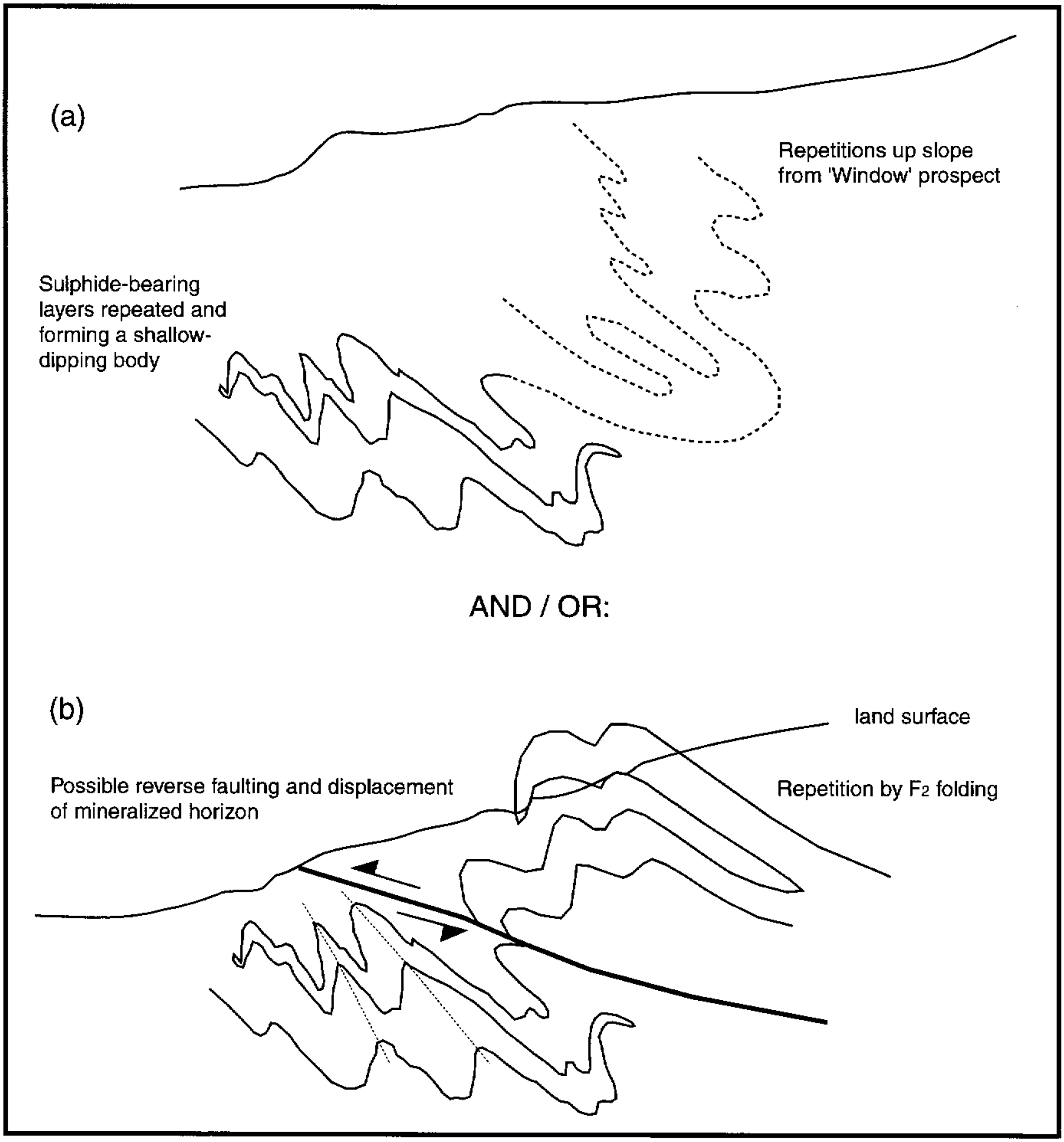


Figure 8. Models for possible repetition of mineralized horizon by both F_1 & F_2 folding.

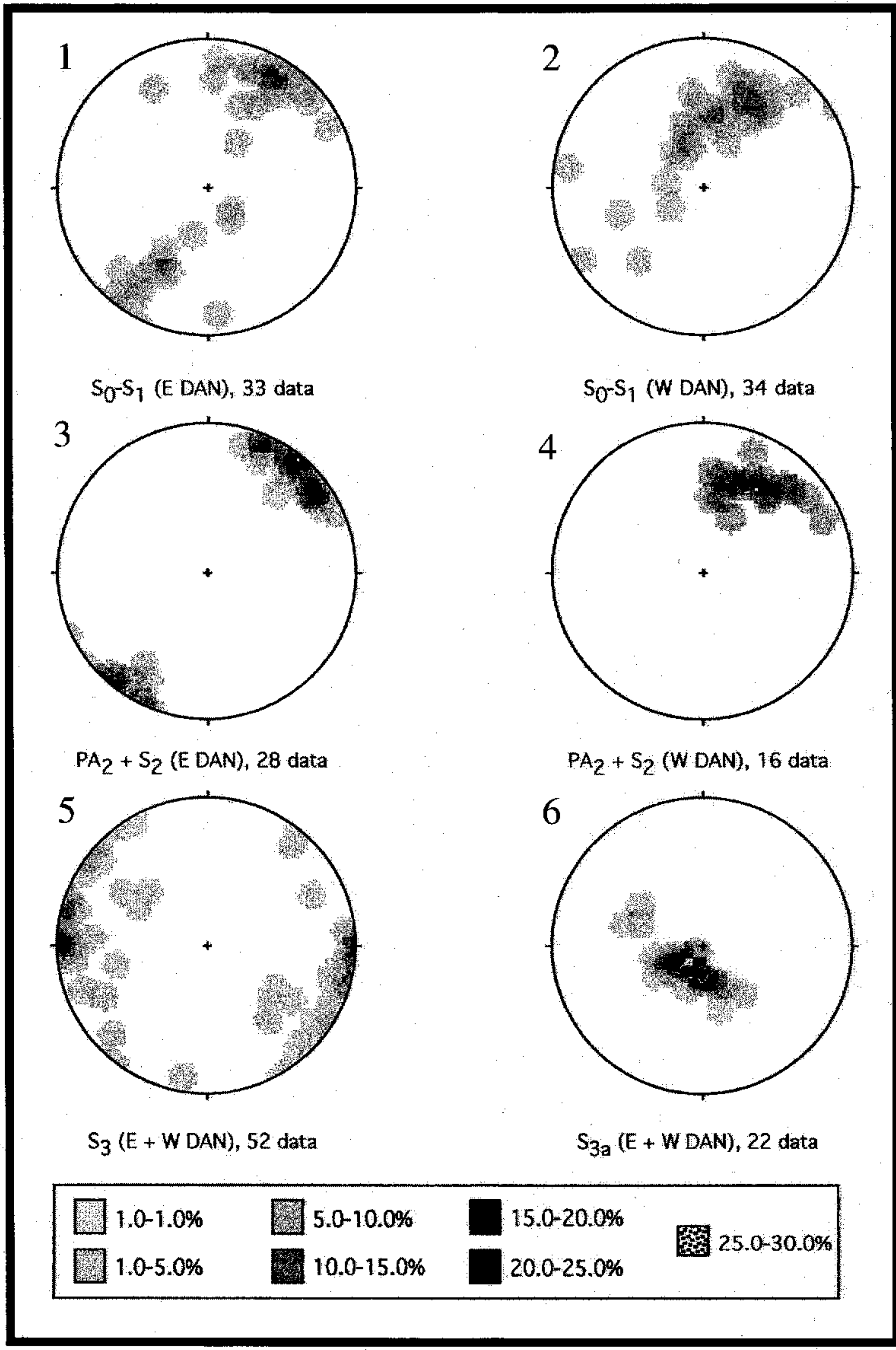


Figure 8b. Stereograms of poles to foliations from the Dan (Window exposure).

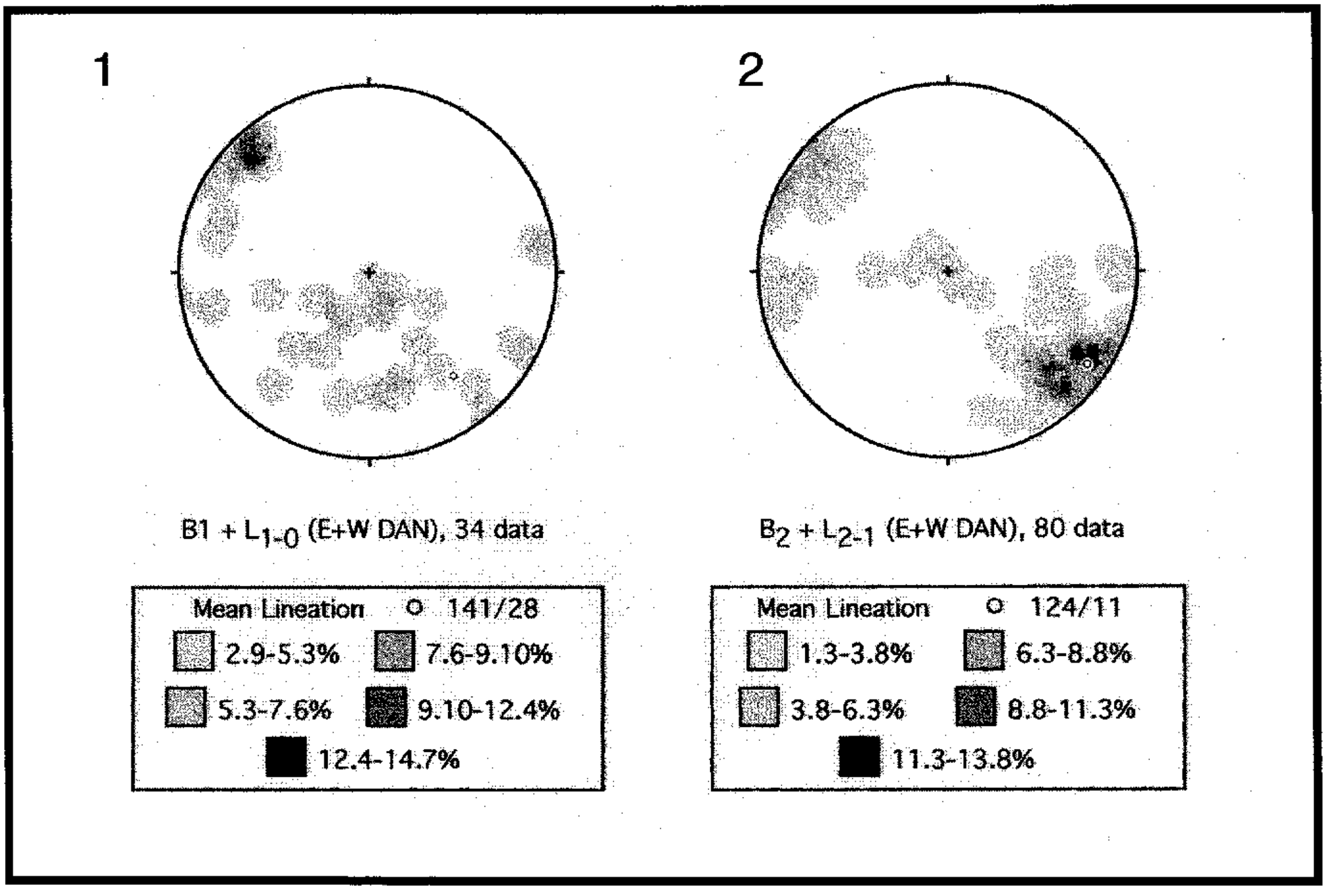


Figure 8c: Stereograms of lineations for the Dan (Window) exposures.

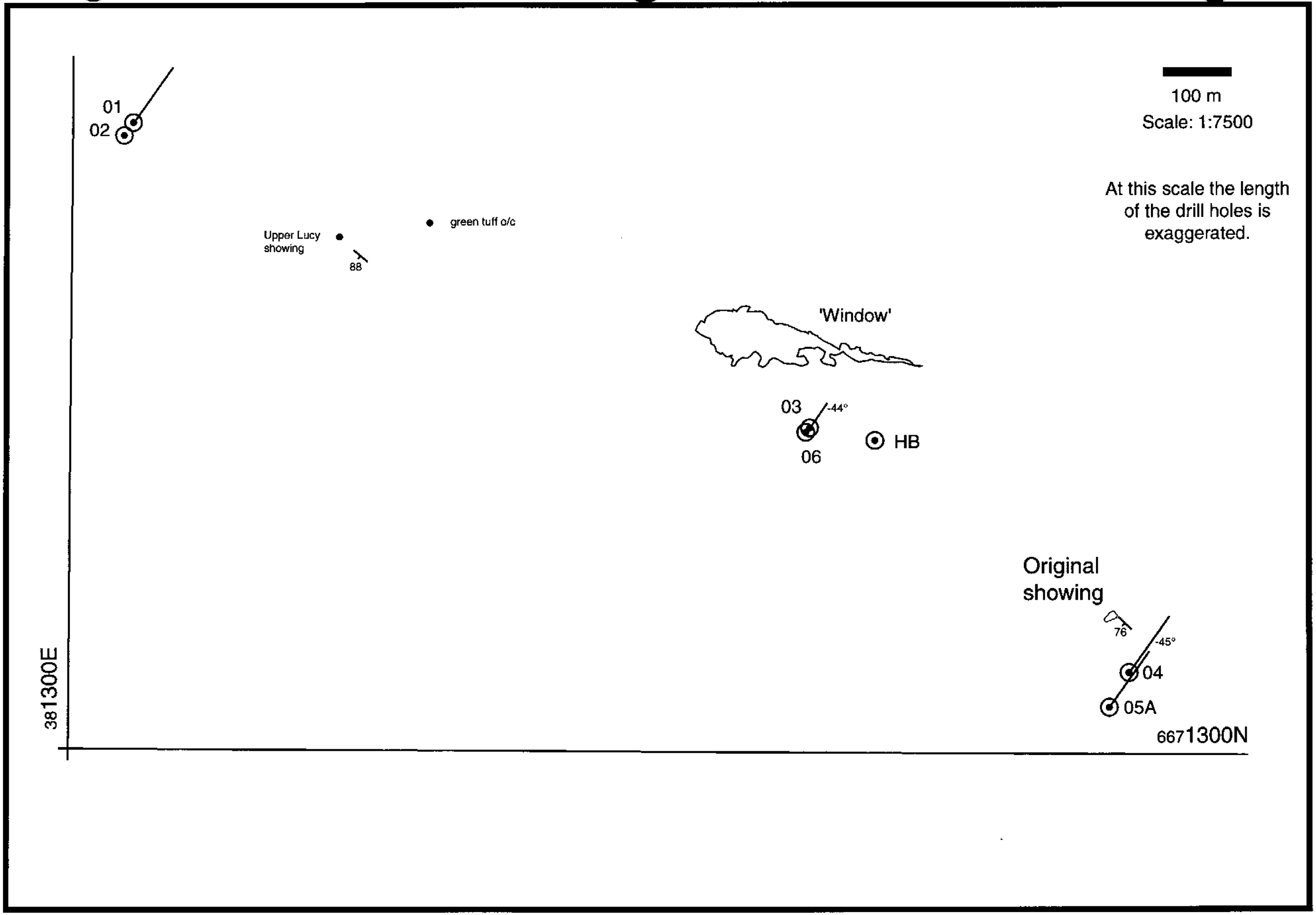


Figure 8d. Map at 1:7500 scale showing relative positions of Lucy, Window and original showings, Birch Mountain drill holes and outcrops of volcanics with attitude of S_1 / S_0.

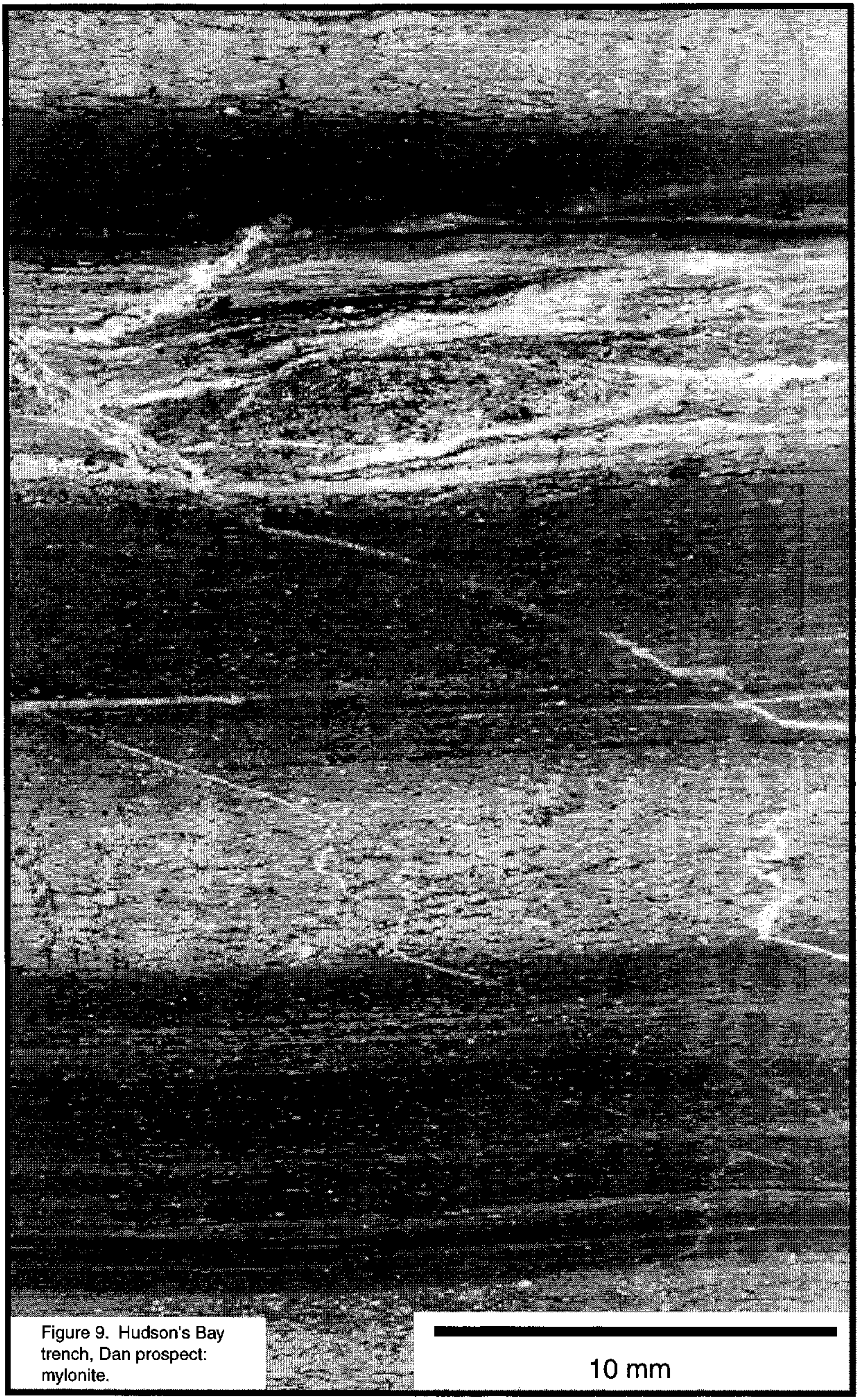


Figure 9. Hudson's Bay trench, Dan prospect: mylonite.

Figure 10. Cominco DDH
93-05 / 25.13 m.

Figure 11. Cominco DDH 93-07 / 49.0 m.

REFERENCES

Driver, L.A., Creaser, R., Chacko, T. and Erdmer, P. 2000. Petrogenesis of the Cretaceous Cassiar batholith, Yukon-British Columbia, Canada: Implications for magmatism in the North American Cordilleran interior. Geological Society of America Bulletin **112:** 1119-1133.

Gordey, S.P. and Makepeace, A. , 1999. Yukon digital geology, S.P. Gordey and A Makepeace (comp.) Geological Survey of Canada Open File D3826 and Exploration and Geological Services, Yukon, Indian and Northern Affairs Canada, Open File 1999-1(D).

Liverton, T. 1999. Detailed geological mapping on the Bond and TBMB claims. Assessment Report 093954.

Liverton, T. 1998. Geological mapping and mineralogical examination of zinc mineralization on the Bound and Tanis claims. Assessment Report 093758.

Liverton, T. and Botelho, N.F. 2000. Fractionated alkaline rare-metal granites: two examples. Journal of Asian Earth Sciences (in press).

Liverton, T. and D'el-Rey Silva, L.J.H. 2001. Structural analysis of the TBMB-BOUND trend of stratiform mineralization, Swift River, 105B-3. Assessment Report for 2000.

Liverton, T. and D'el-Rey Silva, L.J.H. 2000. Preliminary structural analysis of mineralized units in the Swift river region. Assessment Report 094117.

Nelson, J., Mihalynuk, M., Murphy, D.C., Colpron, M., Roots, C.F., Mortensen, J.K. and Friedman, R.M. 2000. Ancient Pacific Margin: A preliminary comparison of potential VMS-hosting successions of the Yukon-Tanana Terrane, from Finlayson Lake district to northern British Columbia. *In:* Emond, D.S. and Weston, L.H. (eds.): Yukon Exploration and Geology 1999. Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, p. 79-86.

Poole, W.H., Roddick, J.A. and Green, L.H. 1960. Wolf Lake map sheet. Geological Survey of Canada Map 10-1960. 1" to 4 miles scale.

Ramsay, J.G. 1967. Folding and fracturing of rocks. McGraw-Hill Book Company, 568 p.

Roots, C.F., de Keizer, M. and Nelson, J.L. 2000. Wolf Lake project: Revision mapping of Dorsey Terrane assemblages in the upper Swift River area, southern Yukon and northern B.C. *In:* Emond, D.S. and Weston, L.H. (eds.): Yukon Exploration and Geology 1999. Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, p. 115-125.

Twiss, R.J. and Moores, E.M. 1992. Structural Geology. W.H. Freeman and Company, New York. pp. 532.

Wheeler, J.O. and McFeely, P. (comp.) 1991. Tectonic assemblage map of the Canadian Cordillera and adjacent parts of the United States of America; Geological Survey of Canada, Map 1712A, scale 1:2 000 000.

Williams, G.D. and Chapman, T.J., 1979. The geometrical classification of non-cylindrical folds. Journal of Structural Geology 1, 181-186.

COST STATEMENT

Fieldwork from the 31st. August to the 3rd. September:

Professor D'el-Rey Silva	4 days @ $700 per day	$	2800.00
Dr. T. Liverton	4 days @ $600 per day	$	2400.00
four wheel drive vehicle	4 days @ $100	$	400.00
accomodation at Great Divide	3 days	$	225.00
meals		$	280.00
report preparation		$	800.00
Total		$	6905.00

STATEMENT OF QUALIFICATIONS

Dr. LUIZ JOSÉ HOMEM D'EL-REY SILVA

Degrees obtained:

Degree in Geology: Universidade de Brasília (UnB, Brasília, Brazil), 1971.

MSc. in Structural Geology: Universidade Federal da Bahia (UFBa, Salvador, Brazil) 1982-1984.

Thesis title in Portuguese: Geologia e controle estrutural do depósito cuprífero Caraiba - Vale do Curaçá/Ba, Brasil. UFBa, 152p.

Thesis title in English: Geology and structural controls of the Caraíba copper deposit, Curaçá River Valley / Ba, Brazil, UFBa, 152p.

PhD in Structural Geology and Tectonics: Royal Holloway University London (RHUL-Egham, UK), 1992.

Thesis title: Tectonic Evolution of the southern part of the Sergipano Fold Belt, Northeastern Brazil, RHUL, 258p.

Professional Experience:

17 years experience as an exploration and mine geologist, working at different mining areas of Brazil, and also including:

- Head of the Mining and Exploration Geology Divisions of the Caraíba Company: respectively 1977-1983 and 1985-1989.
- Operation Superintendent of the Caraíba Copper Mine: 1983-1984
- Planning Superintendent of the Caraíba Mine: 1986.
- Professor of Structural Geology and Tectonics, Institute of Geosciences, University of Brasília (IG-UnB, Brazil), 1993 to present.

Professional membership:

Fellow of the Geological Society London, since 1990 (Number 17935)
Fellow of the Geological Society of America, since 1992 (Number 2000614)
Fellow of the Geological Society of Brazil, since 1978.
Fellow of the Brazilian Academy of Sciences, since 1999.

Dr. Luiz J. H. D'el-Rey Silva
Universidade de Brasília - Instituto de Geociências,
Campus Universitário Darcy Ribeiro, Asa Norte
CEP 70910-900, Brasília – DF, BRAZIL
Fax: 00 55 61 347 4062 or 272 4286, **Phone**: 307 2436 (office), 274 7966, 3073707 (home),
E-mail : ldel-rey@unb.br

STATEMENT OF QUALIFICATIONS

Timothy Liverton

Academic qualifications:
BSc in geology and geophysics, University of Sydney conferred, 1965
BSc (Hons) in economic geology, University of Adelaide, conferred 1968
PhD in geochemistry, petrology and structural geology, University of London 1992,
Thesis title: 'Tectonics and Metallogeny of the Thirtymile Range, Yukon Territory, Canada' pp. 325.

26 years experience in mining and exploration geology in Australia, Canada, USA, Norway, Portugal and Brazil

1997-1998 Visiting Professor in Economic Geology at the Universidade de Brasília

Fellow of the Geological Society, Member of the Geological Society of America, Fellow of the Geological Association of Canada, Member of the Society of Economic Geologists.

DDH
SURVEY
STATION
SILICEOUS UNIT
Se-Qz SCHIST
CS
SULPHIDE-BEARING
LAYER
INFERRED
FOLD
INFERRED
CONTACT
INTERPRETED
FOLD
WELL-BANDED
SILICEOUS UNIT
SILICEOUS
METATUFF
INFERRED
FOLD
SULPHIDE-BEARING
LAYER
SULPHIDE
SULPHIDE-BEARING
LAYER
T.N.
0 1 5m
WELL-BANDED
SILICEOUS UNIT