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Geological Survey of Canada
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PAPER 85-8

**CURRENT ACTIVITIES FORUM 1985
PROGRAM WITH ABSTRACTS**

1985



**GEOLOGICAL SURVEY OF CANADA
PAPER 85-8**

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Energy, Mines and
Resources Canada

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Ressources Canada

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CURRENT ACTIVITIES FORUM

22-24 JANUARY, 1985

1985 Forum Chairman

D.C. Findlay, Director, Economic Geology and Mineralogy Division

Place: Halls A and E, Ottawa's Congress Centre,
55 Colonel By Drive.

**Non-Technical
Event:** An informal evening get-together with cash bar on
23 January.

**Popular
Lecture:** At 19:30 on the evening of Tuesday, 22 January.
D.A. St-Onge will present a talk entitled
"Canada's Landscape, Beauty Through
Understanding/Les paysages du Canada, grandiose
héritage" to the general public. The poster
session will be open from 1930h to 2130h.

Program: About 35 poster sessions and 16 formal
presentations.

PROGRAM / PROGRAMME

Wednesday, 23 January, 1985 / mercredi, le 23 janvier 1985

0900 - 0915	R.A. Price, J.G. Fyles	Welcome and opening remarks / <i>Accueil et allocution d'ouverture.</i>
0915 - 0940	R.F. Emslie	Anorthosite massifs and the Precambrian crust.
0940 - 1005	R. Tirrul	Nappes in the Kilohigok Basin, Northwest Territories and their relations to the Thelon Tectonic Zone
1005 - 1010	Official Opening of Poster Session / Ouverture officielle des séances consacrées aux expositions visuelles	
1010 - 1035	Coffee break / Pause-café	
1035 - 1100	C.J. Mwenifumbo	Mapping of the auriferous sulphide horizons by hole-to-hole mise-à-la-masse borehole logging.
1100 - 1125	R. Stea, P.W. Finck	Geological and till-geochemical evidence for northward-flowing ice in northern mainland Nova Scotia.
1125 - 1150	J.R. Henderson	Auriferous quartz veins in the Meguma Group, eastern Nova Scotia: their geometry and origin due to hydraulic fracturing.
1150 - 1330	Lunch / Déjeuner	
1130 - 1355	R. Mason	The McIntyre gold mine at Timmins, Ontario.
1355 - 1420	C.J. Yorath et al.	Lithoprobe-Phase I: southern Vancouver Island; preliminary analysis of reflections seismic profiles and surface geological studies.
1420 - 1445	V.R. Slaney	Application of an image analysis system to geophysical-geochemical data sets to produce computer-plotted pseudo lithologic maps.
1445 - 1510	J.R. Bélanger	Mineral prospecting using remote sensing and geobotanical indicators, Thetford Mines, Quebec.
1510 - 1535	G.F. Bonham-Carter, A.N. Rencz	Detection of Landsat linears and methods of correlating mineral occurrences with lineaments.

Poster sessions / *Expositions visuelles (1005-1700; 2030-2200)*

Thursday, 24 January, 1985 / jeudi, le 24 janvier 1985

0900 - 0925	H. Williams	The Humber Arm Allochthon, western Newfoundland.
0925 - 0950	L.J. Kornik, J.G. Thurlow J. Whalen	An interpretation of aeromagnetic gradiometer results from the Buchans area, Newfoundland.
0950 - 1015	D.J. Piper	Continental slope facies - ancient and modern
1015 - 1045	Coffee Break / Pause-café	
1045 - 1110	T. Jerzykiewicz, A.R. Sweet	Stratigraphy and sedimentology of coal-bearing Upper Cretaceous-Paleocene Saunders Group, central Alberta Foothills between Athabasca and Blackstone rivers.
1110 - 1135	W.D. Sinclair	Tin deposits in Western Tasmania: some observations and comparisons with Canadian tin deposits.
1135 - 1200	C.E. Keen	Evolution of rifted continental margins.
1200 - 1320	Lunch / Déjeuner	
1320 - 1445	A special session devoted to seafloor studies of the Juan de Fuca and Explorer ridges. Topics to be discussed include / <i>Séance spéciale consacrée aux recherches sur les fonds marins effectuées dans la région des dorsales Juan de Fuca et Explorer:</i>	
	i)	Tectonics of these actively spreading ridge areas
	ii)	Mineral deposits associated with these hydrothermally active zones
	iii)	The unique fauna that have been found in conjunction with these hot, sulphide-rich springs.

CURRENT ACTIVITIES FORUM / FORUM DES TRAVAUX EN COURS

22-24 January 1985 / 22 au 24 janvier 1985

Poster Sessions / Séances consacrées aux expositions visuelles

Resource Geophysics and Geochemistry Division
Division de la géophysique et de la géochimie appliquées

L.J. Kornik, J. Thurlow, J.B. Whalen
Gradiometer interpretation, Buchans, Newfoundland.

Staff, Regional Geophysics Subdivision
Gradiometer survey of Lunenburg County, Nova Scotia - Technology transfer by the Geological Survey of Canada.

W.D. Goodfellow, R. Parrish
 $^{87}\text{Sr}/^{86}\text{Sr}$ ratios in barite and carbonate from stratiform Zn-Pb deposits, Selwyn Basin: implications for the origin of ore-forming fluids.

D. Roach, E.M. Cameron, K. Hattori
Isotopic characteristics of stratiform barite occurrences west of the Hemlo gold deposit.

J. Broome
New presentations of aeromagnetic and gradiometer data.

Staff, Regional Geophysics Subdivision
Magnetic Anomaly Map of Canada, 4th edition, 1984.

K.L. Ford, R. DiLabio, A. Rencz
Preliminary results of a multidisciplinary study of the Algonquin Park suspected carbonatite.

A.K. Sinha
Deep EM sounding over permafrost terrain and in southern Ontario.

B.W. Charbonneau
Radioactive granites of the Nuelin Lake area, N.W.T.: geophysical signature and mineralization potential.

Terrain Sciences Division
Division de la science des terrains

D.R. Sharpe, P.A. Egginton
Thermokarst landforms on Victoria Island, N.W.T.

S. Federovich
Acid rain: diatoms as indicators of pH.

R.N.W. DiLabio, J.W. Newsome, D.F. McIvor
Gold spheres in till.

R. Stea
Nova Scotia - Geological Survey of Canada till mapping and geochemistry.

R.J. Fulton, S. Pullan, R.M. Gagné
Interpretation of shallow seismic profiles, Ottawa valley.

S.G. Evans
The stability of natural moraine dams in the Cordillera.

P.J. Kurfurst, K. Moran, J.A. Hunter
Geotechnical and geophysical investigations, southern Beaufort Sea, Spring 1984.

R.J. Mott, D.R. Grant, R. Stea, S. Occhietti
The Allerod/Younger Dryas climatic oscillation in North America - fact or fiction.

Cordilleran Geology Division
Division de la géologie de la Cordillère

C.J. Yorath et al.
Lithoprobe-Phase I: southern Vancouver Island; preliminary analysis of reflective seismic profiles and surface geological studies.

Atlantic Geoscience Centre
Centre géoscientifique de l'Atlantique

Staff, Atlantic Geoscience Centre
Offshore oil and gas location map.

Staff, Atlantic Geoscience Centre
Baffin Island fiords - a video account of an expedition.

Economic Geology and Mineralogy Division
Division de la géologie économique et de la minéralogie

R.T. Bell, V. Ruzicka, G.M. LeCheminant
Uranium in Circum-Ungava Geosyncline.

G.F. Bonham-Carter
Quantitative relationships between gold occurrences and lineaments, Timmins-Kirkland Lake area.

R.F.J. Scoates, J.M. Duke, S. Thompson
Chromite mineralogy of the Bird River Sill.

K.H. Poulsen
Textural variations in the host rocks of the Star Lake gold deposit, La Ronge Belt, Saskatchewan.

C.W. Jefferson
Redstone Copper Belt: tectonics, sedimentation and relevance to late Proterozoic metallogeny of northwestern Canada.

J.W. Lydon, K.A. Hudson
Parameters controlling the distribution of gold in the TEA barite deposit, Yukon.

P. Vaillancourt
Petrology of the Yava Sandstone lead deposit.

Staff, University of Manitoba
Manitoba Economic and Regional Development Agreement.

A.E. Beswick, Laurentian University
Sudbury, Timmins, Algoma Minerals Project

Precambrian Geology Division
Division de la géologie du Précambrien

I.R. Annesley, T. Frisch, C.A. Gittens
Geology of the Chantrey Belt, northern District of Keewatin, N.W.T.

R. Tirrul
Regional pure shear deformation by conjugate transcurrent faulting, externides of Wopmay Orogen, N.W.T.

P.F. Hoffman, K.D. Card, A. Davidson
Preliminary geological and tectonic maps of the Canadian Shield - 1:5 000 000 scale.

J.B. Whalen
A petrological study of the McGerrigle Pluton, Gaspé, Quebec.

M. St-Onge, J. King
Tectonic thickening, eastward transport, inverted metamorphism and rapid uplift documented with composite down-plunge sections and multipoint P-T-X paths in the internal metamorphic zone of Wopmay Orogen, N.W.T.

Institute of Sedimentary and Petroleum Geology
Institut de géologie sédimentaire et pétrolière

T. Jerzykiewicz, A.R. Sweet
Stratigraphy and sedimentology of coal-bearing upper Cretaceous-Paleocene Saunders Gp, central Alberta Foothills between Athabasca and Blackstone Rivers.

ANORTHOSITE MASSIFS AND THE PRECAMBRIAN CRUST

R.F. Emslie¹

Anorthositic magmas intruded cratonic crust widely from about 1.7 to 0.9 Ga. With few exceptions they were accompanied by K-rich granitic intrusions including rapakivi types; numerous similar granites were emplaced with little or no evidence of an associated basic component. Several lines of evidence strongly suggest that the anorthosites developed from mantle-derived melts and the granites from crustal melts. The suites chiefly intruded older Proterozoic orogenic terranes which may have provided the necessary source for voluminous K-rich crustal melts.

Rock and mineral compositions in anorthosite massifs are consistent with crystallization from fractionated basic magmas. General lack of positive gravity anomalies associated with the anorthositic and granitic suites implies that the thermal engines for crustal melting remained beneath the cratonic crust. The fractionated anorthosite suites imply that the uppermost mantle was well below its solidus, contrary to the requirements of most models for active continental rifting. Subcratonic ponded mafic magma satisfies requirements for a source of heat and fractionated basic magmas. The great diabase dyke swarms of the Proterozoic may mark sites of burst magma ponds and not signify lithospheric extension controlled by plate movements.

¹ Precambrian Geology Division

NAPPES IN THE KILOHIGOK BASIN, NORTHWEST TERRITORIES AND THEIR RELATION TO THE THELON TECTONIC ZONE

R. Tirrul¹

A thin-skinned thrust and fold belt involving Goulburn Group rocks is exposed in oblique cross-section in the Bear Creek Hills area of Bathurst Inlet. Upright, northwest verging folds at high structural level pass downward into recumbent tight folds and thrusts near the basement-cover contact, reflecting increasing shear strain. On the basis of style, orientation, amount of strain, and relative timing, this structural belt is clearly unrelated to Bathurst Fault, and is tentatively interpreted to be a remnant of the highest structural level of the Thelon Tectonic Zone. Absence of the belt south of Bathurst Fault indicates that the latter has a minimum of 100 km of left-slip with 4 km north-side down movement.

¹ Precambrian Geology Division

MAPPING OF AURIFEROUS SULPHIDE HORIZONS BY HOLE-TO-HOLE MISE-À-LA-MASSÉ BOREHOLE LOGGING

C.J. Mwenifumbo¹

Drill hole mise-à-la-masse potential measurements were conducted at the Barber-Larder gold-sulphide prospect at Larder Lake in Ontario. Gold mineralization on this property is associated with pyrite mineralization within altered volcanic flows and tuffs. Induced polarization (IP), resistivity and self potential (SP) logging data had indicated that the pyritized zones (10-15% pyrite) can be delineated along the drill holes as low resistivity and high IP zones. The objective of the mise-à-la-masse measurements was to determine the orientation of these pyritized zones along and across the strike of the prospect. Measurements were conducted in a fence of holes across the strike and in a number of holes along strike. The results indicate that the low resistivity, pyritized zones do not occur sporadically within the volcanic flows and tuffs. These zones extend across the strike and are oriented approximately parallel to a prominent and extensive graphitic zone within the area.

¹ Resource Geophysics and Geochemistry Division

GEOLOGICAL AND TILL-GEOCHEMICAL EVIDENCE FOR NORTHWARD-FLOWING ICE IN NORTHERN MAINLAND NOVA SCOTIA

R.R. Stea¹ and P.W. Finck¹

Erosional and depositional glacier landforms indicate a major northward ice flow crossing the Cobequid Highlands in northern mainland Nova Scotia. Striations trending 001°-020° are found ubiquitously on the fine grained volcanic and metasedimentary rocks of the Cobequid Highlands. Sequences of ice-contact stratified drift and outwash indicate northward paleoflow of glacier meltwater streams. Distinctive plutonic and volcanic erratic boulders are found dispersed northwards up to 10 km from the Cobequids on to the Carboniferous sedimentary lowlands. Till pebble lithology contours reveal a rapid northward decrease in erratic percentages from more than 90% adjacent to the highlands to values of 30% 4 km away. Moraines parallel to the highlands, marginal meltwater channels, and the northward termination of glaciofluvial sequences suggest a limit to the northward flowing ice.

Ca and Mg values in the clay fraction of the reddish brown lowland till sheet are elevated in areas north of the inferred glacier limit. This till sheet was initially formed during a regional southward ice flow. Ca and Mg values decrease systematically towards the highlands in the lowland till sheet north of the limit. These elements are negatively correlated with Cobequid Highland erratic percentages in lowland till samples. This indicates that the northward-flowing ice which implanted the erratics in the till diluted the fine matrix with noncalcareous highland material. Cu and Pb anomalies in the surface till sheet and higher background values south of the mapped limit suggest that mineralized Cu and Pb sources in the Carboniferous sediments adjacent to the highlands were dispersed northwards along with the Cobequid Highland erratics.

Contribution to Canada-Nova Scotia Mineral Development Agreement 1984-89.

¹ Department of Mines and Energy, P.O. Box 1087, 1690 Hollis Street, Halifax, Nova Scotia B3J 2X1

AURIFEROUS QUARTZ VEINS IN THE MEGUMA GROUP, EASTERN NOVA SCOTIA: THEIR GEOMETRY AND ORIGIN DUE TO HYDRAULIC FRACTURING

J.R. Henderson¹

Since 1899, auriferous quartz lodes in the Meguma Group have been modelled after the nested saddle reefs of Bendigo Australia: the larger size of folds in the Meguma compared with Bendigo indicating larger saddle reefs at depth. Subsequent drilling over anticlines in the Meguma has not been successful in proving the predictive capacity of the saddle reef hypothesis.

Recently, bedding-parallel auriferous quartz lenses have been said to be (1) syngenetic hydrothermal vent-apron sinters or chemical precipitates above hemipelagic divisions of turbidite beds, or (2) epigenetic hydraulic fracture fillings formed during tectonic dewatering. Quartz microfabrics support the hydraulic fracture hypothesis for the origin of the bedding parallel lenses; their timing and distribution in relation to folds show that they cannot be saddle reefs.

Some implications of these findings with respect to gold exploration in the Meguma Zone will be discussed.

Contribution to Canada-Nova Scotia Co-operative Mineral Program 1981-1984.

¹ Precambrian Geology Division

THE McINTYRE GOLD MINE AT TIMMINS, ONTARIO

R. Mason¹

The McIntyre mine was developed on part of a major Archean hydrothermal system which also includes the Hollinger gold mine to the west and the Coniaurum mine to the east. The whole complex has produced about 35 million ounces of gold, 7 million ounces of silver and 100 000 tons of copper, of which McIntyre produced about one third of the precious metals and all of the copper. Stockwork copper-molybdenum-gold-pyrite mineralization occurs in a breccia pipe within the Pearl Lake porphyry intrusion at McIntyre. The breccia pipe was the focus of intense albitization and hydraulic fracturing. An albite core is surrounded by a zone of hematite-anhydrite alteration which grades out into an extensive pyritic halo. A zone of auriferous quartz-ankerite-albite veins occurs around the periphery of the pyritic halo, and this zone culminates in the central ore zone at Hollinger. Gold veins are localized in preferred stratigraphic sites which have been loci of brittle failure, vein emplacement and complex shear deformation. Mineralized veins throughout the complex are characterized by sericitic alteration and pyritization of wall rocks. Ductile shear deformation resulted in the formation of a pervasive cleavage and linear fabric during the main stage of vein emplacement. The hydrothermal alteration and veining associated with the complex appears to have promoted deformation by weakening the country rocks and enhancing ductility contrasts.

The McIntyre-Hollinger complex is interpreted as a gold dominated, volcanic facies porphyry system, in which original configurations of the system and its orebodies have been modified by late stage shearing and formation of a pervasive cleavage and linear fabric.

¹ Department of Geological Sciences, Queen's University, Kingston, Ontario K7L 3N6

LITHOPROBE – PHASE I: SOUTHERN VANCOUVER ISLAND: PRELIMINARY ANALYSES OF REFLECTION SEISMIC PROFILES AND SURFACE GEOLOGICAL STUDIES

C.J. Yorath¹, R.M. Clowes², A. Sutherland-Brown³, M.T. Brandon¹, N.W.D. Massey¹,
A.G. Green⁴, C. Spencer⁴, E.R. Kanasewich⁵, and R.D. Hyndman¹

Seismic reflection and geological studies conducted on southern Vancouver Island during 1984 show that the region has sustained considerable shortening above a widespread décollement zone. Beneath Wrangellia, a thick interval of possibly underplated pre-Upper Miocene oceanic crust overlies the modern subducting Juan de Fuca Plate. The latter is clearly seen on all record sections and comprises an undeformed layered sequence resting upon presumed oceanic crust. The Leech River Fault is identified as a surface dipping towards the north at 35°. Beneath the fault the Eocene Metchosin Volcanics and Sooke Gabbro are seen to overlie a succession that may have its correlatives in the core zone Olympic Mountains of northern Washington.

¹ Pacific Geoscience Centre, Box 6000, Sidney, British Columbia, V8L 4B2

² Department of Geophysics and Astronomy, University of British Columbia, Vancouver, British Columbia, V6T 2B4

³ British Columbia Department of Energy, Mines and Petroleum Resources, Vancouver, British Columbia

⁴ Earth Physics Branch, 1 Observatory Crescent, Ottawa, Ontario, K1A 0Y3

⁵ Department of Physics, University of Alberta, Edmonton, Alberta, T6G 2E2

APPLICATION OF AN IMAGE ANALYSIS SYSTEM TO GEOPHYSICAL-GEOCHEMICAL DATA SETS TO PRODUCE COMPUTER PLOTTED PSEUDO LITHOLOGIC MAPS

V.R. Slaney¹

Airborne magnetic and radiometric data have been used to discriminate between a variety of sedimentary and plutonic rocks in Nova Scotia.

The study site is an area 35 x 40 km centred on Lake Shubenacadie, near Halifax, Nova Scotia. Folded Goldenville quartzites and Halifax slates are intruded by granodiorite and monzogranite plutons and are in part overlain by Carboniferous conglomerates, sandstones and marls. The area is heavily forested and is covered by till.

The digitally recorded airborne radiometric and magnetic data were acquired from surveys flown by the Geological Survey of Canada. The data were registered to a geometrically corrected Landsat image. A geology map was also digitized and registered to the Landsat image. Eight data sets (eUranium, eThorium, Potassium, eU/K, eU/eTh, eTh/K, total field, and vertical gradient magnetics) were used in a principle component transform. The first three principle components were used to prepare a colour composite image.

This image maps the distribution of all the major rock units in the area.

¹ Resource Geophysics and Geochemistry Division

MINERAL PROSPECTING USING REMOTE SENSING AND GEOBOTANICAL INDICATORS, THETFORD MINES, QUEBEC

J.R. Bélanger¹

During the last glaciation, ultrabasic bedrock in Thetford Mines area was deeply eroded by continental glaciers and the debris, enriched in Ni, Cr, Mg, Cu, Co and Fe, was dispersed in the till over an area exceeding 70 km by 15 km wide, down ice from the source. The geochemical anomaly was initially studied within the framework of a drift prospecting project thus providing an ideal background for further study based on botanical and remote sensing methods.

The botanical study included visual examination and inventory of plant species, chemical analysis of leaf tissues and chlorophyll analysis of plants located within and outside the geochemical anomaly. The remote sensing study compared the spectral signature of various tree species located throughout the studied area. Fieldwork took place during the summers of 1979, 1980 and 1984.

The geobotanical study shows that the geochemical anomaly influences the distribution and growth rate of plant species, and provokes chlorosis of the leaves and dwarfism of certain species. The biogeochemical analysis shows a close relationship between the soil and plant chemistry, and an inverse relationship between the concentration of heavy metals and plant and the chlorophyll production. The remote sensing study confirms the influence of the geochemical anomaly on vegetation patterns and shows how spectral signatures are affected by the presence of high concentrations of heavy metals in the soil and plants. Even though the results are preliminary and the study is still in progress, a possible link has been established between geochemistry, plant behaviour and remote sensing.

¹ Terrain Sciences Division

DETECTION OF LANDSAT LINEARS AND METHODS OF CORRELATING MINERAL OCCURRENCES WITH LINEAMENTS

G.F. Bonham-Carter¹ and A.N. Rencz¹

A method for quantitatively expressing the degree of correlation between a set of points and a set of lines has been developed. The significance of spatial associations between mineral deposits and linear features detectable on satellite imagery, or other images such as those produced from geophysical surveys, can be tested statistically.

The method involves measuring the distance from each point to the K-th nearest line. These distances are then compared with those obtained using the same set of lines, but a) a set of points occurring at random over the whole map, or b) a set of points occurring randomly but restricted to particular map units. Significance of a particular orientation can also be tested.

For the Timmins-Kirkland Lake area, gold occurrences are shown to be significantly associated with lineaments lying in directions northeast to east; lineaments lying in other directions are not significantly associated with gold. Results indicate that lineament density is important, not simply proximity to the single nearest lineament.

The degree of correlation between gold deposits and lineaments, derived from Landsat and Seasat images, and fold axes, has been evaluated for the Halifax and Guysborough area of Nova Scotia. The effect of restricting the points to Goldenville and Halifax formations and linears to certain orientations are shown to be important.

¹ Economic Geology and Mineralogy Division

THE HUMBER ARM ALLOCHTHON, WESTERN NEWFOUNDLAND

H. Williams¹

The Humber Arm Allochthon records a fairly complete early Paleozoic history of the continental margin of eastern North America. Its bank-foot breccias (Cow Head), continental slope-rise deposits (Humber Arm) and ophiolite suites (Bay of Islands) are Canadian examples of international renown.

Modern geological and thematic maps of the allochthon have lagged far behind a conceptual understanding of many of its rocks. A project to study and map the entire allochthon was initiated in 1978 and supported by Geological Survey of Canada Research Agreements and contracts. This work provides a sharper perspective and understanding of the complete allochthon. Many new discoveries were made during the course of this investigation, especially with respect to its component structural slices, their external and internal geometries, and relationships to nearby groups.

The project is nearing completion and the ultimate goals of a final colour map and synthesis are now in sight.

¹ Department of Earth Sciences, Memorial University of Newfoundland, St. John's, Newfoundland, A1B 3X5

STRATIGRAPHY AND SEDIMENTOLOGY OF COAL-BEARING UPPER CRETACEOUS-PALEOCENE SAUNDERS GROUP, CENTRAL ALBERTA FOOTHILLS BETWEEN ATHABASCA AND BLACKSTONE RIVERS

T. Jerzykiewicz¹ and A.R. Sweet¹

The following topics will be addressed:

1. standard section of the Saunders Group along Blackstone River;
2. correlation of the coal seams within the Coalspur member. Reference pits and outcrops near Coalspur;
3. the Cretaceous-Tertiary boundary; and
4. depositional environment.

¹ Institute of Sedimentary and Petroleum Geology, 3303 - 33rd Street N.W., Calgary, Alberta, T2L 2A7

AN INTERPRETATION OF AEROMAGNETIC GRADIOMETER RESULTS FROM THE BUCHANS AREA, NEWFOUNDLAND

L.J. Kornik¹, J.B. Whalen², and J.G. Thurlow³

In August 1983, the Buchans and Badger map areas of western Newfoundland were surveyed with the GSC vertical gradiometer system. The resulting vertical gradient and total field maps are useful in delineating geological features of a portion of the Topsails Igneous Terrane and volcano-sedimentary units of the Buchans Group. This is extremely important in light of the poor outcrop in this area of Newfoundland. In particular the aeromagnetic data help to outline individual intrusive bodies within the Topsails terrane and to identify both northwest and northeast trends. The ubiquitous northwest structural elements appear to reflect the position and shape of the individual intrusive centres in the Topsails terrane and also to outline, along with the northeast trends, the compositional and structural fabric of the older intruded remnants of the Hungry Mountain complex. In addition, the aeromagnetic data indicate the presence of these northwest trends within the Buchans Group where they truncate and displace magnetic units. The Buchans Group appears to have a complex faulted pattern not previously recognized.

¹ Resource Geophysics and Geochemistry Division

² Precambrian Geology Division

³ Abitibi-Price Mineral Resources, P.O. Box 9, Buchans, Newfoundland, A0H 1G0

CONTINENTAL SLOPE FACIES: ANCIENT AND MODERN

D.J.W. Piper¹

Recent advances in deep-water acoustic technology allow the mapping of sediment instability features on the continental slope by sidescan sonar and sub-bottom profiles. The Scotian Slope is a high sedimentation rate ice-proximal environment with a historical record of large earthquakes that have triggered slumps and slides, most recently in 1929. Facies associations are defined between hemipelagic sediment, ice-margin sandy turbidites, slumps, debris flows and muddy turbidites. Analogous features are found on many ancient continental slopes.

¹ Atlantic Geoscience Centre, Bedford Institute of Oceanography, Box 1006, Dartmouth, Nova Scotia, B2Y 4A2

TIN DEPOSITS IN WESTERN TASMANIA: SOME OBSERVATIONS AND COMPARISONS WITH CANADIAN TIN DEPOSITS

W.D. Sinclair¹

Cassiterite-stannite-pyrrhotite replacement deposits in carbonate beds and associated vein deposits constitute the largest tin resources in Tasmania. The Renison deposit, for example, originally contained at least 150 000 t of tin and ranks as one of the world's largest primary deposits. The Renison deposit is associated with a cupola of tourmalinized granite that appears to extend from a subsurface granitoid related to the Heemskirk Granite. Unusual concentrations of tourmaline-rich nodules in the Heemskirk Granite occur mainly in the upper parts of the "white granite" phase, a flat-topped body that appears to intrude an overlying, horizontally-layered "red granite" phase.

Similar concentrations of tourmaline-rich nodules are present in the upper parts of the Seagull batholith in southern Yukon. This and other similarities between the Seagull batholith and the Heemskirk Granite suggest that some areas in southern Yukon and northern British Columbia may have potential for Renison-type tin deposits.

¹ Economic Geology and Mineralogy Division

EVOLUTION OF RIFTED CONTINENTAL MARGINS

C.E. Keen¹

The evolution of Atlantic-type continental margins is largely controlled by the lithospheric processes which occur during rifting. Much observational evidence suggests that extension and necking of the lithosphere is the primary process which occurs, just prior to final continental breakup and the generation of new oceanic lithosphere. Extension causes crustal thinning, high geothermal gradients, and elevation changes. After rifting, the lithosphere cools, contracts and subsides. The amount of extension controls the degree to which the thermal gradients increase during rifting and the magnitude of the eventual subsidence of the margins. Thus extension dictates the burial depth and temperatures of the sediments deposited on the subsiding rifted margins.

Seismic refraction measurements allow estimates of the amount of crustal thinning and extension which occurs during rifting. Using these estimates, the temperature and subsidence history of sediments can be predicted. The thermal history can be related to source rock maturity and hence to the likelihood of petroleum generation.

In this presentation, the various steps in predicting the source rock maturity from evolutionary models of rifted margins are reviewed. Examples are described from offshore Eastern Canada, and the usefulness of the predictions as a tool for petroleum exploration in frontier regions, such as the continental slopes, is discussed.

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