1990 ATLANTIC UNIVERSITIES GEOLOGICAL CONFERENCE

ABSTRACTS

November 1-4, 1990

Organised by
The Bailey Geological and Geological Engineering Societies
University of New Brunswick, Fredericton, New Brunswick

Again this year, abstracts from the annual Atlantic Universities Geological Conference are published in "Atlantic Geology." This provides a permanent record of the abstracts, and also focuses attention on the excellent quality of and interesting and varied science in these presentations.

The Editors

ATLANTIC GEOLOGY
26, 293-296 (1990)

0843-5561/90/030293-4$1.60/0

Geological implications of stratiform sill, Cape St. Francis area, Newfoundland

Rod Churchill
Department of Earth Sciences / Center for Earth Resources Research, Memorial University of Newfoundland, St. John's, Newfoundland A1B 3X5, Canada

Precambrian felsic to mafic volcanic rocks of the Harbour Main Group are associated with siliciclastic sediments of the Conception Group in the study area. Some previous workers have suggested that the Harbour Main Group volcanic rocks are older than the sedimentary rocks of the Conception Group. In the Cape St. Francis area, however, they are found to be contemporaneous with the sedimentary rocks as indicated by the presence of a stratiform sill, bounded by Conception Group sandstones. The sill was emplaced during a later phase of Harbour Main Group igneous activity.

The sill possesses a marked igneous layering throughout, with layer thickness varying from approximately ten centimetres at the base of the sill to less than one centimetre in upper stratigraphic heights. This layering apparently formed due to magmatic convection during cooling and resulted in subtle chemical variations that culminated in the formation of chemically distinct repetitious layers.

Geochemistry of the sill indicates that it is weakly calc-alkaline which would normally imply an island arc tectonic setting for the magma source. It is proposed, however, that the volcanic rocks comprising the sill were initially low K tholeiites which produced a hybridized magma through the partial melting of arkosic sandstones. The partial melting of the sandstones took place during injection into the semi-consolidated sediments.

The geochemical data of the sill and the presence of diabase dykes in the area suggest a tectonic environment controlled by extensional tectonism, perhaps analagous to the Basin and Range Tectonic Province of the western United States.

Sedimentation at the Appalachian Thrust Front, Port Au Port Peninsula, western Newfoundland

Randolph Corney
Department of Geology, St. Mary's University, Halifax, Nova Scotia B3H 3C3, Canada

Sediments of the Port Au Port Peninsula, located on the west coast of Newfoundland, record the evolution and destruction of a Cambrian-Ordovician, passive continental margin. The Goose Tickle Group clastics have been interpreted as being deposited in advance of the Humber Arm Allochthon. Outcrops exposed in Victors Brook have been interpreted to represent blocks of Goose Tickle Group material incorporated by the advancing allochthon.

Based on fieldwork in the Victors Brook area, a succession upward from the carbonate platform through shales to the clastics of the Goose Tickle Group has been mapped. The Goose Tickle Group sediments, in Victors Brook, contain conglomerates that have been divided into three types. The first type of conglomerate is composed of sub-rounded limestone clasts, the second of black and green sub-angular shale chips, and the third is polymictic, and poorly sorted. A large raft of material from the Humber Arm Allochthon is incorporated into the conglomerates. Measured sections in the sandstones and shales show partial Bouma sequences and indicate deposition by turbidites.

Observations indicate that the sediments in this area were deposited in a sedimentary basin formed in front of the advancing allochthon. This basin was then structurally inverted during the Acadian Orogeny. Sediments in the Victors Brook area mark the present day, western boundary of the Humber Arm Allochthon on Port Au Port Peninsula.

The geochemistry and origin of the Bourne Complex, northwestern Ellesmere Island, Canada

Andrew S. Henry
Department of Geology, Dalhousie University, Halifax, Nova Scotia B3H 3J5, Canada

The Bourne Complex, a reconnaissance unit of unknown thickness, contact relations, and age, underlies Kleybolte Peninsula on the northwestern coast of Ellesmere Island. Situated on the rim of the Sverdrup Basin, the basic volcanic and intrusive rocks of the complex contain important information regarding pre-Sverdrup Basin magmatism. Three petrographically distinct sets of rocks have been identified. Mobilization of major elements has occurred as a result of hydrothermal alteration or low grade metamorphism. Analysis of immobile trace elements indicates that the Bourne Complex rocks have calc-alkaline affinities and were deposited in a volcanic arc setting.

Petrochemistry and tectonic setting of volcanic rocks in the Antinouri Lake Brook area, northern New Brunswick

Shyann LeBlanc
Department of Geology, Acadia University, Wolfville, Nova Scotia B0P 1X0, Canada

The Antinouri Lake Brook area is located in the Tobique Volcanic Belt in northern New Brunswick. The area is underlain by a sequence of marine siltstones, conglomerates and limestones, overlain by mafic and felsic volcanic rocks of Silurian and Devonian age. Subvolcanic dykes and sills of basaltic composition are also common in the area. Although petrochemistry of volcanic rocks elsewhere in the Tobique Volcanic Belt has been documented, volcanic rocks in the Antinouri Lake Brook area were not included in these earlier studies.

Mafic volcanic rocks of the Antinouri Lake Brook area are generally massive and amygdaloidal. They range in colour from greenish black to maroon. The groundmass is typically pilotaxitic, consisting of plagioclase, clinopyroxene, quartz, chlorite and calcite. Amygdules are commonly filled with calcite. Minor phenocrysts consist of pyroxene and plagioclase.

Felsic volcanic rocks in the Antinouri Lake Brook area are generally flow banded and porphyritic. Colour ranges from light orange to a deeper red orange. The groundmass is aphanitic with phenocrysts of quartz and feldspar. In thin-section some display eutaxitic texture. Some felsic welded crystal tuffs are also present.

Major and trace element geochemistry and pyroxene compositions indicate that the mafic rocks are both tholeiitic and calc-alkalic in composition. They are thought to have formed in co-existing extensional and compressional environments during Siluro-Devonian transpression in the northern Appalachian Orogen.

Contact mapping and modeling using magnetics, Heath Steele Mine area, northern New Brunswick

Sean McDonald
Department of Geology, University of New Brunswick, Fredericton, New Brunswick E3B 5A3, Canada

The Heath Steele property is approximately 50 km southwest of Bathurst in northern New Brunswick. Sulphide deposits at Heath Steele lie within a polydeformed sequence of felsic and mafic metavolcanic and metasedimentary rocks of the Tetagouche Group.

The stratigraphic succession is not well understood due to lack of outcrop, complex and rapid facies changes in volcanic units, polyphase deformation and the lack of well defined contacts. In this situation, conventional ground mapping techniques are limited and other methods must be sought. Total field, gradient and magnetic susceptibility measurements were therefore used in delineating contacts between magnetic and non-magnetic bodies in areas of little or no exposure.

The most significant magnetic anomaly was found to be associated with a gabbro intrusion. This body has a large magnetic susceptibility in comparison to its host rocks. This property makes the intrusion easily visible on magnetic profiles and contoured gradient maps.

Crystallochemical characterization of white micas from the East Kemptville tin deposit, Nova Scotia

David A.S. Palmer
Department of Geology, St. Francis Xavier University, Antigonish, Nova Scotia B2G 1C0, Canada

Numerous descriptive and experimental studies of micas have shown that their chemical and structural character is sensitive to the PTX conditions of their formation. In an attempt to gain a better understanding of the formation of the late Devonian (370 Ma) East Kemptville tin deposit, accurate chemical and structural determinations have been made on white micas from different mineral associations. These associations represent distinct paragenetic stages in the evolution of the deposit.

Micas from leucogranite, pegmatite-aplite and greisen were hand picked, on the basis of optical and textural characteristics, for X-ray and chemical analysis. X-ray powder diffraction photographs using a Debye-Scherrer camera (114.6 mm diameter) were taken with Cu Ka radiation. This method was chosen to avoid the problem of preferred orientation of mica grains. Chemical analysis was obtained by both electron microprobe and by wet chemical techniques.

Although previous studies from similar granite-related tin deposits show the presence of both trioctahedral and dioctahedral white micas, all micas examined from the East Kemptville deposit were shown to be muscovites of a 2M structure. However, gross differences in lattice plane spacings were observed, in muscovites, between the paragenetic sequences. Most noticeable are shifts in the d(002) reflection, which is sensitive to substitution of the interlayer cations. These measurements are consistent

with the observed variations in the Na/Na + K ratios. These preliminary data show a direct relationship between muscovite crystal chemistry and paragenesis. It may therefore be possible to classify white micas at the East Kemptville deposit on the basis of their environment of formation.