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ABSTRACTS

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Beginning this year, the abstracts of the annual Atlantic Universities Geological Conference will be published in "Atlantic Geology." This will provide a permanent record of the abstracts, and also focus attention on the excellent quality of and interesting and varied science in these presentations.

The Editors

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Geology of the Lark Zn, Pb, Cu deposit, N.W.T.

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The Lark massive sulfide deposit is located approximately 118 km east-northeast of Yellowknife, N.W.T., in the Beaulieu River greenstone belt of the Slave geological province.

The rocks hosting the occurrence compose a wedge-shaped block of the Archaean Sunset Lake Basalt Formation (SLB). The SLB consists predominantly of mafic pillow lavas, pillow breccias and associated hyaloclastites with local felsic units. To the south, west and along part of the east side the SLB is overlain by the Payne Lake Formation (PLF) which consists of layered schists and gneisses derived from volcaniclastic sediments. The remainder of the wedge is bordered by intrusive rocks, predominantly granodiorite, of the Meander Lake Plutonic Suite which appears to have intruded the volcanic terrane. Metamorphism is greenschist to amphibolite facies.

The Lark deposit consists of one or more sulfide-rich cherty horizons that have been interpreted as exhalites. Mineralization is dominated by pyrrhotite with lesser pyrite, sphalerite, galena, and lesser chalcopyrite. The presence of pyrrhotite has enabled tracing of the horizon by both magnetic and electromagnetic methods over a strike length of 700 m. Widths in core range from 1.1 to 10 m with a typical intersection of 4.9 grading 4.05% Zn, 0.63% Pb, and 0.13% Cu. Geochemical analyses indicate potassium enrichment and sodium depletion in host rocks adjacent to the deposit. The deposit has a number of characteristics of a volcanic massive sulfide deposit, and drilling to date may have intersected the periphery of a larger and possibly economic deposit.

Geochemical discrimination of provenance and tectonic setting of siliciclastic rocks in the Antigonish Highlands

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There has been increasing interest in the study of the relationship between geochemistry of clastic sediments and tectonic setting. Chemical composition of sediments may provide insight into the geology and tectonic setting of the provenance regions. The reliability of geochemical discriminants in sedimentary rocks can be tested in an area where the tectonic setting has been evaluated using penecontemporaneous volcanic rocks and sediments derived from the same source area are deposited in variable tectonic environments.

The Antigonish Highlands, Nova Scotia, is suitable for this analysis because Precambrian, Cambrian, Silurian, and Devonian-Carboniferous volcanic rocks are interlayered with clastic sedimentary rocks. Fine- to medium-grained rocks that are spatially associated with volcanic sequences were selected for geochemical analysis from Precambrian, Cambrian, Silurian, and Devonian-Carboniferous clastic sequences within the Antigonish Highlands. Geochemistry of the volcanic rocks indicates that the Precambrian turbidites were probably associated with an ensialic volcanic arc, whereas the lithologically similar Palaeozoic fluviatile arkosic sequences were deposited in an intra-continental rift environment.

In some instances, standard discrimination plots for sedimentary rocks are consistent with provenance type and tectonic setting determined from analysis of volcanic rocks. Other plots seem to indicate the discrimination diagrams cannot distinguish immature intra-continental sediments from volcanic arc turbidites.

In general, variation diagrams yield smooth trends showing progressive increases in SiO_2, and decreases in Al_2O_3, TiO_2, MgO + Fe_2O_3, Rb, Ga, V, and Ni from older to younger sequences. These trends indicate a single provenance area for these sequences and increasing maturity of the younger sediments.

Rb-Sr isotopes show a limited range of $^{87}Sr/^{86}Sr$ initial ratios within each individual clastic succession, which lies within the ranges of initial ratios determined from the penecontemporaneous volcanic rocks. This indicates that the main source of sediment for each unit is the temporally related volcanic rocks. Calculated $^{87}Sr/^{86}Sr$ initial ratios for the Cambrian sedimentary rocks were extremely low (0.7007-0.7016), possibly due to post-diagenetic remobilization of Rb.

In this pilot study, geochemical analyses of the Devonian-Carboniferous rocks did not detect source contribution of the Meguma Group. However, it is conceivable that in some cases, abrupt changes in chemistry of sediments and/or characteristic $^{87}Sr/^{86}Sr$ initial ratios may help document terrane accretion.

Ichnology of Triassic sedimentary rocks of the Lepreau region, southern New Brunswick, Canada

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Continental red beds outcropping in southern New Brunswick along the Lepreau River and along the shore and inland at Point Lepreau have historically been assigned to the Triassic Lepreau Formation. No stratigraphic correlation of the two sections has been accomplished. The Triassic age of the Point Lepreau section is based on the presence of Pennsylvanian-derived lithoclasts and on palaeomagnetic data. The Lepreau River section contains reptile footprints of possible Triassic age, but the age of the section is currently uncertain.

The coastal section is subdivided into three members: the basal Fishing Point Member (350 m), the Duck Cove Member (1200 m), and the uppermost Mace's Bay Member (1175 m). The basal and upper members reflect deposition in an alluvial fan environment whereas the middle member is interpreted to have been deposited in a braided fluvial environment. Stratigraphic thicknesses are approximate as dip-slip faulting of unknown throw is common throughout the formation.

Ichnofossils in the coastal section occur commonly in sandstones and, to a lesser degree, in siltstones and shales, and are of essentially simple morphology. Twelve ichnogenera have been tentatively identified, some informally. The Duck Cove Member contains the most diverse assemblage. Preservation is poor due to the grain-size and easily weathered nature of the host rock. Pseudofossils, root casts, and other sedimentary structures occur, complicating ichnological study.

Due to the broad time ranges of the ichnogenera present the observed assemblage is of no value in assigning an age to the strata. The ichnofauna belongs to the *Scoyenia* ichnofacies of Seilacher and was probably produced by opportunistic organisms able to withstand rapid environmental changes under semi-arid conditions. The occurrence of *Rusophycus* ichnosp., more common in marine deposits, reinforces the danger of using isolated occurrences of ichnofossils as palaeoenvironmental indicators.

Geothermometry and geobarometry of xenoliths in the Ten Mile Lake Gabbro of the Liscomb Complex, central Nova Scotia

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Devonian granites, granodiorites, and gabbros of the Liscomb Complex intruded Cambro-Ordovician metasedimentary rocks of the Meguma Group in central Nova Scotia. Pelitic and calc-silicate xenoliths of upper amphibolite facies appear in a granodiorite-gabbro unit near Ten Mile Lake, Halifax County.

The pelitic and calc-silicate xenoliths are interpreted as fragments of basement underlying the Meguma. Minerals observed in the pelitic xenoliths include almandine + biotite + white mica + K-feldspar + plagioclase + sillimanite + quartz ± kyanite ± staurolite ± sulfides ± spinel. The calc-silicate xenoliths contain carbonate + garnet + diopside + amphibole + quartz ± forsterite ± clinozoisite.

Temperature and depth estimates for the protolith and pluton emplacement are determined through geothermometery, geobarometery, and textural relationships in the xenoliths.

Lode gold mineralization at Deer Cove, Baie Verte Peninsula, Newfoundland

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The Baie Verte Peninsula has recently become an important target for gold exploration in Newfoundland because of its tectonic and lithological similarities with the Mother Lode Belt of California. The Deer Cove lode gold deposit is located within the Point Rousse ophiolite complex of the Dunnage Zone and is one of the many significant gold occurrences in this area.

The mineralization is hosted by mafic volcanic rocks which occur in an overturned back-thrusted block overlying talc-carbonate altered ultramafic rocks. A genetic model has been suggested in which the gold is thought to be remobilized from the ultramafics during the back-thrusting event and carried through fractures which served both as conduits for the hydrothermal fluids and depositional sites for the gold-bearing quartz-carbonate veins. Detailed petrography, as well as geochemical and stable isotope data from this study, further characterize the deposit and support, to a certain extent, the postulated model.

Gold deposits such as Deer Cove have important implications for Appalachian metallogeny.