

Current Research

Volume 4, Number 1, April 1968

URI: https://id.erudit.org/iderudit/ageo04_1res01

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Publisher(s)

Maritime Sediments Editorial Board

ISSN

0843-5561 (print)

1718-7885 (digital)

[Explore this journal](#)

Cite this document

(1968). Current Research. *Atlantic Geology*, 4(1), 32-34.

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Research Programs in the Maritime Provinces of Canada by the Department of Geology, University of Pennsylvania, 1966-68, by G. deVRIES KLEIN

Dr. George deVries Klein, Associate Professor of Geology - "Relationship between directional properties of sediments to flow directions and flow hydraulics in the intertidal zone, Minas Basin North Shore". This research is sponsored by the National Science Foundation (Grants GA-407 and GA-1583). John Henry Way, MS Candidate (degree awarded, June 1967) - "Sedimentology of Carboniferous rocks at Joggins, Nova Scotia". This research was sponsored by the Nova Scotia Research Foundation. A short paper covering this research is in press in Jour. Sedimentary Petrology. Mary Grace Laub, MS Candidate (degree awarded, June 1968) - "Gravel bar sedimentation in the intertidal zone". This work was done in the Approaches to Parrsboro Harbour, and was sponsored by grants from Sigma Xi, Nova Scotia Research Foundation and a stipend from NSF Grant GA-4-7. Roderick S. Smith, MS Candidate (degree expected, June 1969) - "Comparison of sediments of the Moose and Diligent River Deltas, Minas Basin". This work is being supported from funds from NSF Grant GA-1583. Paul R. Schluger, PhD Candidate (degree expected, June 1972) - "Sedimentology of the Perry Formation of New Brunswick and Maine". This research is supported by a grant from the Geology Department, University of Pennsylvania.

Research on the Atlantic continental margin, Woods Hole Oceanographic Institution, Woods Hole, Mass. by DAVID A. ROSS

Dr. Michael H. Ruef, from Heidelberg, Germany, has joined our staff as a post-doctoral investigator to work on topics concerning the hydrology of the Atlantic Continental Margin. Dr. David W. Folger, from Lamont Geological Observatory, has joined our staff also as a post-doctoral investigator to prepare a national summary of the properties of estuarine sediments. Dr. Frank T. Manheim completed a study of the mineralogy, chemistry, and distribution of phosphorite and manganese nodules on the Blake Plateau. Results indicate that the phosphorites are a lag deposit from Mid-Tertiary strata, but remobilization and reprecipitation of carbonate-fluorapatite continue up to the present. Manganese replacement and accretion began in middle Miocene time and has continued to the present at a rate of about 3 mm/10⁶ years.

A recent CHAIN cruise directed by Dr. Elazar Uchupi was made to study the shallow structure (using continuous seismic profiling) and magnetic properties of the New England Seamount Chain. Two bathymetric charts from Georges Bank to Flemish Cap - scale 1:1,000,000, with a 20 and 200 meter contour interval will be published, this year, by the Canadian Hydrographic Service. The data for the charts was compiled by Dr. Uchupi. Scientists from the Woods Hole Oceanographic Institution will make 4 series of dives on the Atlantic Continental Margin. The dive sites and the chief scientists are as follows: Gulf of Maine - Dr. J. Schlee; Bear Seamount - Dr. K.O. Emery; Corsair, Qydonia and Gilbert Canyons - Dr. D.A. Ross; Hudson Canyon - Dr. C.D. Hollister.

Graduate Studies in the Geological Sciences at the University of South Carolina

A program of study at South Carolina may include Appalachian, Coastal Plain and Recent inshore geology. Studies in the laboratory include mineral structure, mineral equilibria, rock mechanics and fluvial hydraulics. The staff and its teaching assignment will indicate the curriculum which, among many things, is favourable to students of sediments and sedimentary rocks: Bruce W. Nelson - Sedimentology and sediment geochemistry; clay mineralogy; estuarine processes. Vinton E. Gwinn - Tectonics and sedimentology; deformation of layered rocks; regional geology of folded Appalachians; alluvial-deltaic processes. Donald J. Colquhoun - Sedimentology and stratigraphy; Pleistocene geology; evolution of coastal plains; computer applications to sedimentology. Donald T. Secor - Structural geology and rock mechanics; theory of origin of geologic structures in light of field and experimental data; regional geology of Carolina Slate Belt. John R. Carpenter - Geochemistry and petrology; trace element distribution in metamorphic and igneous minerals; geochemistry of ultramafic rocks; chemistry of metasomatism. Tudor T. Davies - Paleontology; calcification of Recent and fossil marine

invertebrates; biogeochemistry; instrumental applications to paleontology. David R. Lawrence - Paleontology and stratigraphy; paleoecology and taphonomy; structure and evolution of communities, especially oyster communities; theory of geology. W. Edwin Sharp - Mineralogy and economic geology; mineral solubility; x-ray petrofabrics; computer applications to geology. W. Robert Black - Instrumental analytical methods; soil mineralogy and chemistry.

Geological and Geophysical Research and Exploration on the eastern Canadian Seaboard by
B. R. PELLETIER

At Dalhousie University, Halifax, geologists are continuing their sedimentological studies and seismic reflection profiling on the Scotian Shelf in the vicinity of Yarmouth near the southern end of Nova Scotia. The geophysicists are collaborating with their colleagues at the Bedford Institute, Dartmouth, N.S., on seismic, gravity and magnetic investigations over the mid-Atlantic Ridge. Sedimentological studies at the Bedford Institute are being carried out in Northumberland Strait and other inshore areas of the Maritimes. Seismic reflection profiling is presently being undertaken over the Scotian Shelf and involves about 800 to 1,000 miles of tracks. Geological sampling is also underway and the final phase of the operation in this area involves traverses with the underwater television and a record maintained on video tape for re-play and study in the laboratory. Other programs on sedimentary and seismic reflection profiling are being undertaken in some areas of the Gulf of St. Lawrence by the Fisheries Research Board of Canada at the Bedford Institute.

Geophysicists at the Bedford Institute are carrying out more extensive seismics on the Grand Banks. Here they hope to undertake 8 seismic refraction profiles on short lines extending 15 to 20 miles in length. Another seismic program together with geological sampling will take place in late summer off the Labrador coast. All the seismic work is of the airgun type, with the exception of the program on the Grand Banks which will be by means of conventional explosives.

The Bedford Institute geophysicists have a comprehensive program laid down in the Gulf of St. Lawrence. They will accompany the hydrographers who will carry out their sounding traverses on lines spaced at one-half to one-mile intervals while gravity and magnetic lines will be carried out on two-mile intervals, presumably in an east-west direction.

Paleontological studies will continue with emphasis placed on Tertiary and younger material. Correlation with sections to the south as far as Venezuela are being attempted and it is hoped to extend some of this correlation in areas north of the Gully on the continental slope adjacent to Sable Island.

In organic geochemistry the sedimentary environment related to the deposition and preservation of carbon and hydrogen compounds is being studied and measurements are made of structural parameters such as oxygen contained functional groups and molecular weights. Sediments for this study were obtained in different physiographic areas on the Scotian Shelf.

Finally at the Bedford Institute two rock core drills are being developed. One is to operate remotely at great depths in which differential pressure from the water column is utilized to drive the drill. Another drill will be used for the continental shelf and will be operated remotely by means of the ship's electrical power. Both are diamond drills and are lowered to sea floor on a cradle by means of the ship's winches. Television and photography will complete the capability of these programs.

The oil industry is carrying out comprehensive geophysical surveys over a major portion of the 200 million acres now held under lease along the eastern Canadian seaboard. Because of the restricted nature of the information it is only possible, at the time of writing, to indicate that the general type of survey will involve refraction and reflection seismics, combined marine gravity and magnetometer surveys, and considerable surface geology in the land areas adjacent to the filed acreage.

Matachewan Canadian Gold Ltd. of Montreal is now working on its inshore acreage along the Atlantic coast of Nova Scotia. The reflection profiling and bottom sampling is under contract to Ocean Science. This program involves the search for ancient beaches and submerged

sediment-filled river beds on the Scotian Shelf, which may contain placer gold. This is the first survey of its kind in eastern waters and should it prove successful other similar ventures may follow together with the ancillary projects and industries that must maintain the program. This year promises to be the most important one to date with regard to offshore research and exploration in the Atlantic area.

Further to the south, the State of Maine has granted a Colorado company exclusive rights to prospect for oil off its coast for a period of one year. The area comprises 3.3 million acres and extends from the coast to the submerged lands 80 miles offshore, exclusive of the inshore area northeast of Portland. As well as the intense interest developing in the exploration program, considerable interest is already at hand on the jurisdictional settlement between the state and federal governments.