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Aller au sommaire du numéro

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

The Editors

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Microfossil evidence of Holocene salinities and sea levels in the Gulf of St. Lawrence and off the northeast coast of Newfoundland

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Cores from the Gulf of St. Lawrence and Notre Dame Bay, Newfoundland, were sampled for ostracods with the purpose of investigating salinity fluctuations and sea level changes during Late Wisconsian glaciation. Forty-three species of Ostracoda from twenty-nine genera were present. Local salinities and depths were inferred from the conditions in which those species live today. The Notre Dame Bay ostracod faunas indicate frigid water conditions interrupted by short intervals of subfrigid conditions, with water depths of 100 to 200 m. The absence of exclusively marine species in selected intervals is taken as indicating coastal-marine conditions. The Gulf of St. Lawrence faunas indicate a progression through three stages: (1) temperate to warm waters of 200 m or more; (2) cold-temperate to warm waters of 200 m or more; and (3) sub-frigid to cold temperate coastal-marine to marine waters of less than 200 m depth. Brackish to coastal-marine transitions similar to those seen in Notre Dame Bay are observed in the upper part of the Gulf of St. Lawrence succession. The presence of warm water in the Gulf of St. Lawrence is tentatively interpreted as being due to a northward migration of the Gulf Stream, caused by flow reversal in the Davis Strait at the end of Wisconsian glaciation.

Paleoenvironmental analysis of trace fossils of selected Jeanne d'Arc Basin wells

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Biological activity within sediments is a major factor in sediment modification and is a strong environmental indicator. Documentation of trace fossil assemblages and sequences in core from Cretaceous sediments of the Jeanne d'Arc Basin, Grand Banks, eastern offshore Newfoundland, will provide a better understanding of the environmental significance of the traces in this basin. Previous work by Moore (1992, MUN) established a vertical lithofacies sequence of deeper shale facies transitional upward into bioturbated silty and sandy muds, to bioturbated argillaceous sands and laminated sands. This sequence is a shallowing and coarsening upward cycle. Ichnofacies corresponding to this lithofacies are Arenicolites, Asterosoma, Diplocraterion, Lockeia, Ophiomorpha, Paleophycos, Planolites, Skolithos, Thalassinoides, and Zoophycos. Detailed analysis within the ichnofacies highlight higher resolution relationships. These ichnogenera occur in assemblages characterized by a mixture of simple horizontal and vertical structures common to both the Skolithos and Cruziana ichnofacies. In addition, application of these findings have significant impact for characterization of porosity, permeability and, more importantly, flow pattern behavior in Jeanne d'Arc hydrocarbon reservoirs. This project is one part of a broader reservoir characterization study intended to improve enhanced oil recovery techniques in the basin.

Groundwater fluoride concentration levels in private water supply wells in Annapolis Valley region, Nova Scotia

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Fluoride (F^-) is a naturally occurring inorganic species in groundwaters which has significant health implications, particularly for children. It is an essential element in human nutrition as optimum development of teeth and bone depend on its availability. A strong correlation has long been established between low levels of F^- in drinking water (and no use of dietary supplements) and increased dental caries (tooth decay) in children. More recently, concerns have been raised over situations where and when the F^- intake of children is more than optimum because of the possibility of mild or even moderate fluorosis. Fluoride supplementation or removal from drinking water may therefore be necessary in some groundwater flow system regions.

No detailed inventory and mapping of F^- concentrations in the groundwater flow systems of the eastern Annapolis Valley region currently exists. This preliminary study of the concentration levels in groundwaters utilized for drinking water purposes from private wells has been initiated to provide base level data for this region. Fluoride concentrations were analyzed with a solid state Orion No. 9609BN selective ion (combination) electrode (calibrated with TISAB standard solutions). Electrical conductivity and pH tests were also conducted on each of the samples collected. The regional geological setting of the wells involved the Halifax, Horton Bluff and Wolfville formations.

Well owners were also questioned regarding: (1) their knowledge of the F^- concentration in their drinking water, (2) the number and ages of children consuming their well water, and (3) their knowledge of the daily F^- intake for children recommended by the Canadian Dental Association.

Did petroleum seeps concentrate bacteria to produce deep-water limestone mounds of Carboniferous age in Cape Breton Island?

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Mounds in the basal Windsor carbonate consist mainly of bioprecipitated cements (biocementstones). They occur in eastern Cape Breton Island within a facies-linked spectrum from south to north of: (1) thinly laminated peloidal black limestones with breccias and slumps (Soldiers Cove); (2) black, peloidal limestone in black shale with micro- and macro bacterial mounds, and thinly bedded dolomudstone (East Bay); (3) large microbial mounds in dolomudstone with defluidization structures and deep water trace fossils (Burke Head); and (4) giant compound mounds and slumps within dolomudstone with large, mineralized vents (Bear Cove).

The spectrum records a shoaling succession from south to north of: (1) restricted, episodic sedimentation of bacterial peloids and early cements in deepest, saline, anoxic water; (2) bacterial activity supporting organic "oases" and settling of periplatformal ooze; (3) microbial mounds in deep-water ooze with fluid expulsion from below and possible sulphur plumes; and (4) three sizes of domes with high fluid content causing slumps and hydrothermal vents. Hot water seeps concentrated bacteria to produce deep-water mounds and precipitate metallic sulphides within an anoxic environment that preserved bituminous material.

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Depositional model for the Early Cretaceous Paddy Member of the Peace River Formation, northwestern Alberta

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The purpose of the project was to determine the hydrocarbon potential of the Paddy Member of the Peace River Formation in northwestern Alberta, through interpretation of the depositional environment. The Peace River Formation is late Early Cretaceous (Albian) in age and was deposited during a time of significant relative sea-level fluctuations. At least two transgressive and regressive events occurred that were responsible for the unconformable contacts above and below the Paddy Member. The Paddy Member is underlain by the coarsening-upward Cadotte Member and is overlain by shales of the Shaftsbury Formation. A fish scale zone near the base of the Shaftsbury Formation produces a pronounced deflection in the gamma ray logs that provide a reliable marker for correlation.

Analysis of well logs, particularly the gamma ray log signatures, showed that the study area consists of six different facies that were the product of varying depositional environments. Evidence for these interpretations came from both log and core analyses, including study of sedimentary structures and trace fossils observed in the core. Four of these facies were interpreted as tidal channel complexes filling valleys that were incised during sea-level lows. Two of these tidal channel facies are relatively sand-rich and were probably formed on the erosional, thicker sides of the channels. They differ from each other primarily in their thickness and maturity of the sandstones. The third tidal channel-fill facies is a fining-upward sequence of sandstones and mudstones deposited on the inner, accreting sides of the channels. They differ from each other primarily in their thickness and maturity of the sandstones. The third tidal channel-fill facies is a fining-upward sequence of sandstones and mudstones deposited on the inner, accreting sides of the channels. The fourth is a thin, argillaceous sandstone formed as a reworking of the regional sediments. Adjacent to these is a facies interpreted as an estuary bay-fill complex that consists of a tidally influenced sequence of alternating sandstones and shales. The regional Paddy Member facies, into which these tidal channels were incised, displays a coarsening upward sequence of shallow marine sandstones, siltstones and shales. Each of these lithofacies was mapped and their distribution was plotted as a paleogeographic map. The best potential for hydrocarbons was found to exist in the sandier tidal channel facies. It was found that the hydrocarbon traps are stratigraphic in nature and the seals are provided by the adjacent muddier facies and the overlying shales. Only through detailed sedimentologic and stratigraphic study can these potential traps be delineated.