Thermal Maturation of Lower Paleozoic Shales in Northern Appalachian Nappe Structures Around Quebec City, Canada

Progressive changes in organic matter maturation and clay mineral diagenesis have been studied in transverse and longitudinal profiles in the external domain of the Quebec Appalachians. Reflectance measurements (90 samples) on dispersed organic matter, probably asphaltic pyrobitumen, and illite crystallinity values reveal an increasing degree of diagenesis from northwest to southeast.

In the northwest, reflectance in oil ranges from 1.70 to 2.30 in the Cambrian Chaudiere nappe, from 1.53 to 1.90 in Cambrian to Ordovician Bacchus nappe, from 1.08 to 1.27 in Lower Ordovician Pointe de Levy nappe, and from 0.99 to 1.21 in Middle Ordovician Quebec Promontory nappe. Illite crystallinity ranges from 4 to 8 mm (0.53 to 1.05° 2θ). In individual nappes, reflectance increases with stratigraphic depth but may not have been affected significantly by tectonic burial resulting from the superposition of nappes. Predeformational burial diagenesis is therefore suggested as the principal agent of thermal maturation.

In the southeast, the Middle Ordovician St. Henedine nappe, representing the anchimetamorphic zone, has reflectance values from 2.82 to 3.79% R_o and illite crystallinity ($<$3mm = 0.40°2θ) lower than in the northwest. In this region, high reflectance in conjunction with low illite crystallinity may be related to elevated temperatures resulting from syndeformational or postdeformational regional metamorphism.

For hydrocarbon exploration in the Quebec Appalachians it appears significant that the trend of decreasing thermal maturation with increasing tectonic "burial" depth may continue into the little deformed platform sequence of the St. Lawrence Lowlands underlying the nappes of the external domain.

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Sulfur and Oxygen Isotope Geochemistry of Abu Dhabi Sabkha

Sulfur and oxygen isotope data vary in a laterally systematic manner across the sabkha at Abu Dhabi. At least three different mechanisms are required to explain the variation of $\delta^{34}S$ and $\delta^{18}O$ of sulfate in evaporite minerals and interstitial brine. Gypsum is precipitating in the seaward zone, and extensive postcrystallization exchange maintains isotopic equilibrium between bulk gypsum and dissolved sulfate. Anhydrite is the dominant sulfate mineral in the central zone where bacterial sulfate reduction results in heavier $\delta^{34}S$ and $\delta^{18}O$ values. In the landward zone both minerals and brine reflect mixing with the isotopically distinct sulfate of continental brines. Laterally systematic isotopic variation supports Patterson's chemical discrimination between seaward, mixed and landward hydrologic regimes, and is consistent with vertical variation of $\delta^{34}S$ demonstrated by Butler et al for this regressive sedimentary sequence. Gypsum-anhydrite transitions do not have significant effects on the isotopic composition of sulfate. Some ancient marine evaporite formations consisting mainly of dolomite and anhydrite may have formed in environments similar to the seaward and central zones of the Abu Dhabi sabkha; considerable isotopic variation would probably accompany subaerial deposition of laterally extensive marine evaporites.

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Oligocene Transgressive Sediments of New Jersey Continental Margin

Sediments deposited by a middle-late Oligocene transgression are present as a thickening downdip wedge in the subsurface of the New Jersey coastal plain. Glauconitic sands and silts, designated as the Jobs Point formation, were deposited under inner mid-shelf depths (15 to 80 m). Middle-upper Oligocene glauconitic silts in the COST B-2 well which were deposited in outer shelf–upper slope depths (180 to 225 m) are a facies of the Jobs Point formation. The Oligocene transgression followed a major regressive event which occurred at the close of Eocene time. A regional hiatus resulted from this event.

Benthic forams in cores from the type wells of the Jobs Point cluster into three assemblages which represent biofacies of distinct depths ($<$30 to 35 m; $<$50 to 60 m; 45 to 80 m). The distribution of these biofacies in the Jobs Point shows an initial rapid transgression and a more gradual regression toward the top of the Oligocene sequence. The presence of the planktonic foraminiferal *Globigerina ampliapertura* Zone in the basal part of Oligocene sediments indicates that the transgression began about 32 m.y.B.P.

Structural-contour and isopach maps of the Jobs Point show that tectonic movements of the Salisbury Embayment and the South Jersey high influenced deposition of the Oligocene sediments.

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Availability of Remotely Sensed Data

A large amount of remotely sensed data has been acquired over many areas of the world, but it is difficult for an individual to identify sources of existing data and to determine coverage, imagery characteristics, availability, and costs. Many federal and state agencies do not distribute descriptions of remotely sensed data holdings to the public. A comprehensive survey conducted by J. R. May in 1978 identifies many sources of these data in federal and state organizations.

The U.S. Geological Survey's EROS Data Center (EDC) is the national distribution facility for LANDSAT and other remotely sensed data products. Data stored at EDC at the end of 1978 included over 1,200,000 frames of LANDSAT imagery; over 56,000 images from Skylab, Apollo, and Gemini; over 1,400,000 images from the NASA research aircraft programs; and over 3,300,000 aerial mapping photographs from the U.S. Department of the Interior, U.S. Department of Commerce, and other federal agencies. Availability and