

of a reservoir, trap, and maturation history, are of minimal value. Exploration of the North Atlantic ocean basin has documented that sedimentary basins developed on the shelf mostly evolved under different oceanographic systems than those at continental slopes, therefore indicating the existence of different settings and conditions for the generation and accumulation of organic carbon.

Occurrence of source rocks depends on marine organic matter generation and preservation, with the generation controlled by the availability of nutrients supplied either by continental runoffs (therefore dependant on the climate), or as result of coastal upwellings, surface water mixing, and open ocean divergence. For deep margin exploration, one more oceanographic parameter has to be considered, and that is dissolved oxygen levels in the ocean water. Studies of the west Tethys margins provide evidence that in some areas, such as east of the Florida-Georgia border, intermediate waters during the Aptian- Cenomanian were highly oxygenated, and therefore no source rocks are preserved. Could such conditions extend to, or influence depositional regimes on the deep margin off Nova Scotia?

Deep sea drilling has documented that during the Oxfordian to early Tithonian, and again during post-Turonian to early Eocene time, all deep waters in the central North Atlantic were highly oxygenated, leading to deposition of deep sea red beds lacking any organic carbon accumulation. Such conditions severely decrease the probability of any source rocks of those ages existing on the deep margins of Nova Scotia. However, it remains unknown whether the upper margin off Nova Scotia during the middle Cretaceous could have been a region of upwelling (results of exploratory drilling of the Nova Scotia margin are kept confidential by the oil companies) and the paleowind directions for the Cretaceous time period remain unconstrained.

Paleoceanography and its implication for the Nova Scotia margin hydrocarbon exploration

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Most earth system changes in climate, ocean circulation, ocean-water chemistry, tectonics, and geography are archived in sediments deposited in the oceans; therefore, sediment studies allow us to interpret the history of the Earth and its ocean basins. Deep parts of the continental margin off Nova Scotia have recently become of interest to oil companies as a potential new gas province, under the assumption that success in hydrocarbon exploration on the shelf can be expanded and extended to the deeper parts of the continental margin. Is such an assumption supported by our knowledge of processes in the recent oceans and of the paleoceanography of the late Mesozoic North Atlantic?

Of all the components of the petroleum system, the presence of source rocks should be considered as the most critical, as without them, all the other components, such as presence