

Biostratigraphic Studies of Grand Banks Wells: What's New In An Old Approach?

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ABSTRACT

Renewed exploration interest in lesser known basins of the Grand Banks - including Carson and Whale Basins - has motivated a reappraisal of their maturation history and hydrocarbon potential. The project team successfully complete detailed biostratigraphic studies of wells from these basins, using as control wells from the Jeanne d'Arc Basin and surface sections from western Europe. Wells examined include: Terra Nova K-18 and Cormorant N-83 in the Jeanne d'Arc Basin; St. George J-55, Skua E-41 and Osprey H-84 in the Carson Basin; Grand Falls H-09 in the Whale Basin; and the adjacent Hermine E-94 in the Scotian Basin. Although the biostratigraphic studies were based solely on the palynomorphs, the rich terrestrial (pollen and spores) and marine (dinoflagellates) assemblages yielded encouraging results.

Much of the success is due to the revolution in dinoflagellate biostratigraphy over the last decade, allowing us to correlate the Grand Banks sections with the European stages from the Carnian to the Tortonian (a span of about 220 million years). Section younger than Tortonian has not been found. A new development is paleoenvironmental plots, which delineate non-marine, coastal to marginal marine, inner neritic, outer neritic and open oceanic environments. In the wells previously analysed, the environmental data were based solely on analyses of sidewall and conventional cores. Now, we are also using drill cuttings samples to develop such plots.

One major surprise has been the recognition of the Late Paleocene thermal maximum in several wells. This represents a geologically brief interval of about 220,000 years at ca. 55 Ma when there was profound global warming. The warming is denoted by an abundance spike of the dinoflagellate *Apectodinium*, and is characteristic of assemblages in the North Sea, New Zealand, Austria and the Grand Banks. Obviously, the well locations where the peaks occur must have been influenced by the proto-Gulf Stream. This information will be valuable in reconstructing the pathways of oceanic currents in the region.