

Hydrocarbon exploration in brackish and freshwater basins: new tools for biostratigraphic and environmental reconstructions

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The existing time-distribution charts for foraminifers and calcareous nannofossils (marine biostratigraphic markers) confer to these groups of organisms one of the best places in biostratigraphic studies in the typical marine basins studied for hydrocarbon exploration.

However, some hydrocarbon basins did not continuously (or never) evolve in full marine conditions as they

1. have been impacted by huge freshwater fluvial inputs (Gulf of Mexico, Gulf of Lions, Levantine Basin, Adriatic Basin, etc.) which modified sea-surface salinity causing an “uncomfortable” environment for these marine markers; in such conditions, these organisms suffered from very diluted waters and, as a consequence, those which persisted present important morphological changes;
2. evolved into brackish to freshwater (Black and Caspian seas) or hypersaline conditions (Dead sea) where the usual microfossil markers did not develop.

In front of such peculiar environmental conditions the usual research of the marine microfossil markers makes almost impossible to obtain reliable biostratigraphic information.

We present here some examples (Gulf of Lions, Black Sea and Guinea Gulf) where high-resolution alternative investigations (pollen grains and/or dinoflagellate cysts) resulted in a successful bio-chronostratigraphy and environmental reconstruction.