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Abstract - Note

Geological, Geophysical and Geochemical Data in the Oil Exploration of Central Adriatic Area

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PROCEEDINGS

The Dinarides Mesozoic carbonate platform constitutes an extensive palaeogeographic unit of the Neo-Tethys platform system. The large sedimentary complex within the platform displays good hydrocarbon potential. A detailed study of the latest geological data from the Kornati block and other relevant areas is based on the following elements:

- stratigraphic evolution linked to structural history;
- definition of potential source rocks, their stratigraphic and geographic extent;
- palaeotectonic control of various depositional environments. These range from extremely restricted (anoxic) conditions, to high energy zones on the platform margins and the edges of intraplatform basins and lagoons;
- differential platform subsidence and burial of potential source rocks during platform evolution and post platform flysch and molasse sedimentation;
- the distribution of reservoirs and seals;
- the location of traps and the timing of their development in relation to the timing of hydrocarbon generation and migration.

The complex geological setting of the area required detailed structural analysis, to provide the base for construction of balanced geological cross sections. The general nature of geological maps, the scale and the data quoted therein, were insufficient for that purpose. To enable better understanding of the structural concept of the area, satellite data were introduced.

Landsat scannograms at scale 1:50.000 covering the Central Adriatic and adjacent areas were analysed. The data were recorded by LANDSAT-5 satellite, using the Thematic Mapper technique (TM). The TM scanner records a wide spectre of visible and near infrared wavelengths, on 7 spectral channels (16 detectors each) at an elevation of 700 km. The data are digitally transmitted to Earth and processed by computer.

Structural interpretation of the area based on Landsat TM analysis included all available data; the base geological map, well data, published articles and field clarification of several details. The structural elements were outlined and by observing the nature of their contacts, it was possible to anticipate the position of thrust faults and the direction of their strike. The interpretation enabled us to follow the regional structural pattern, determine changes in structural trends, to rank structural elements regarding their length, and define changes in the sense of structural deformation. Landsat TM interpretation of the area on-shore, together with the interpretation of off-shore seismic data, resulted in the construction of new structural map of the exploration area.

Geochemistry confirmed or denied the predictions of source availability, of their depositional environment, whether they were oil prone and their maturity. It elucidated the genetic relationship between the kerogens, bitumens, oils and oil seeps in the exploration area as well as explaining the consequences of biodegradation.

Organic geochemistry enabled the identification of Triassic, Jurassic and Cretaceous source rocks. Sterane aromatization and porphyrine maturity parameters offered reliable indications of the reached maturity rank. Hopanes distribution were used to determine the Eh and gammacerane for the hypersaline depositional environment.

According to the stearans and MAS distributions, accompanied by ^{13}C isotope data, the explored hydrocarbons were positively distinguished and ascribed to the relevant source rock.

The low molecular hydrocarbons in wells, as well as the bitumen in cores and outcrops, were found to exhibit little effect of biodegradation. Oil seeps suffered severe biodegradation. The relation of sterane aromatization to API° allowed the determination of viscosity which the biodegraded hydrocarbons would have had if they were preserved.

The interpreted data, especially when integrated, present a reliable basis for the prediction of exploration risk and potential in the studied oil generative basin.

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