

## A RE-EXAMINATION OF THE HYDROCARBON CHARGE COMPONENTS OF THE SOUTH CASPIAN PETROLEUM SYSTEM

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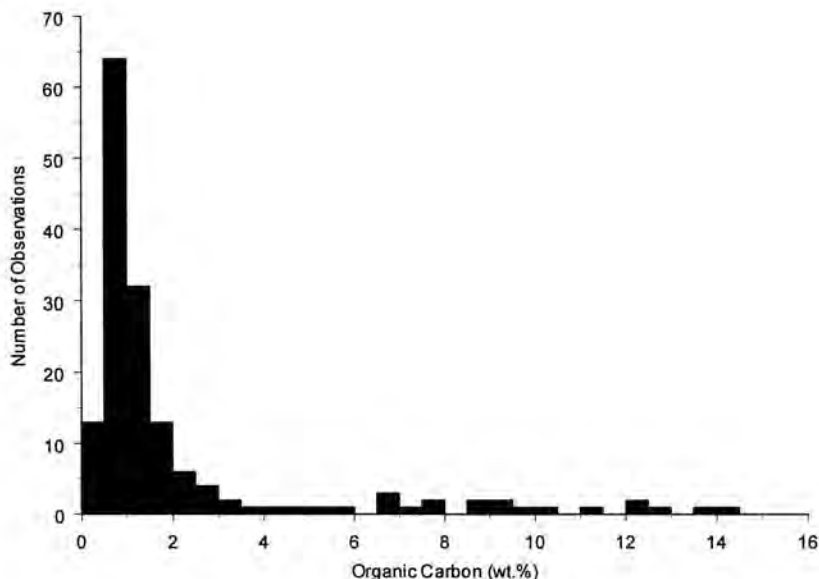
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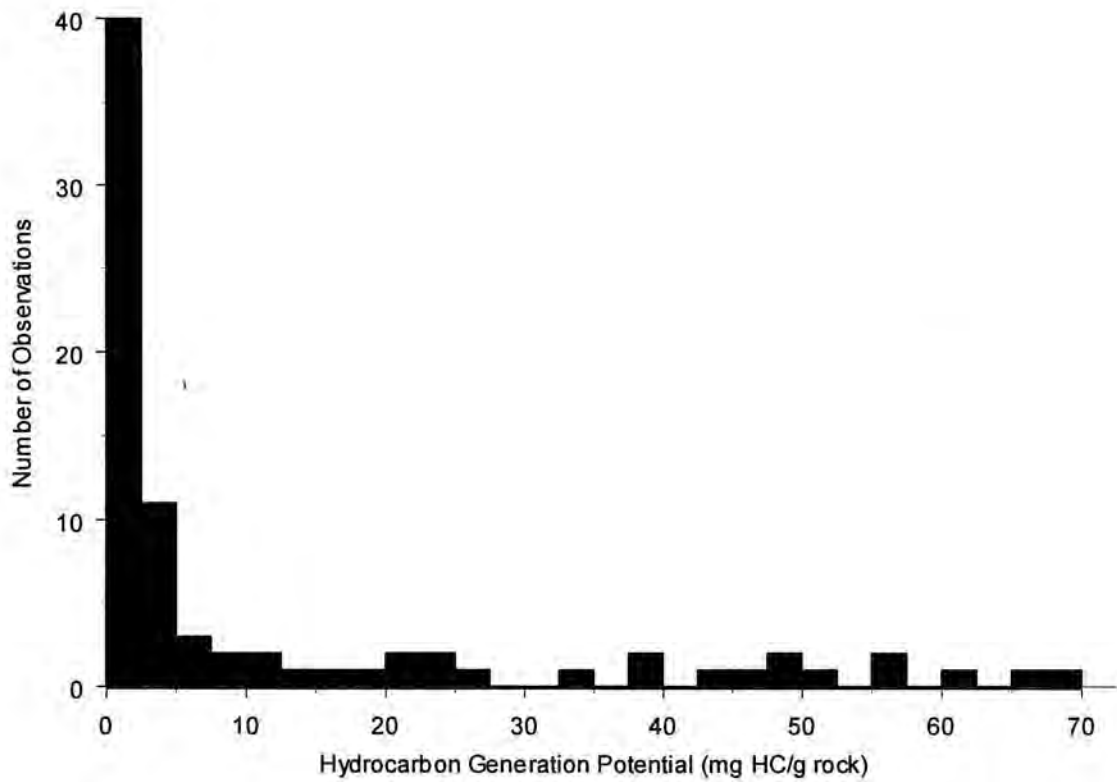
Commercial hydrocarbons have been produced from the South Caspian basin for more than a century. The details of the geochemical characteristics of the petroleum systems are, however, poorly understood. There are several reasons for this uncertainty including limited penetrations of the source rock interval, the severity of surface weathering, and data quality and completeness. The details of the basin's petroleum systems are not simply of academic interest as exploration is extended beyond the limits of the known system into the deeper water portions of the basin. A multifaceted geochemical program was undertaken to better characterize the basin's petroleum system. This study included a detailed examination of possible source rock horizons and the characterization of a limited number of produced hydrocarbons.

This current study confirmed the Maykop Suite as an oil source, but restricted its stratigraphic distribution. It also suggested that source rock deposition was cyclic and included within the organic-rich portions of the Maykop were both oil- and gas-prone intervals. These new data also confirmed the presence of a secular trend in the stable carbon isotopic composition of the preserved organic matter. Sufficient differences were observed within the Maykop to suggest that the diverse oils present actually are members of a single petroleum system (Maykop-Productive Series). The detailed molecular chemistry also suggested that diatoms played a major role in the development of the source rock's organic matter.

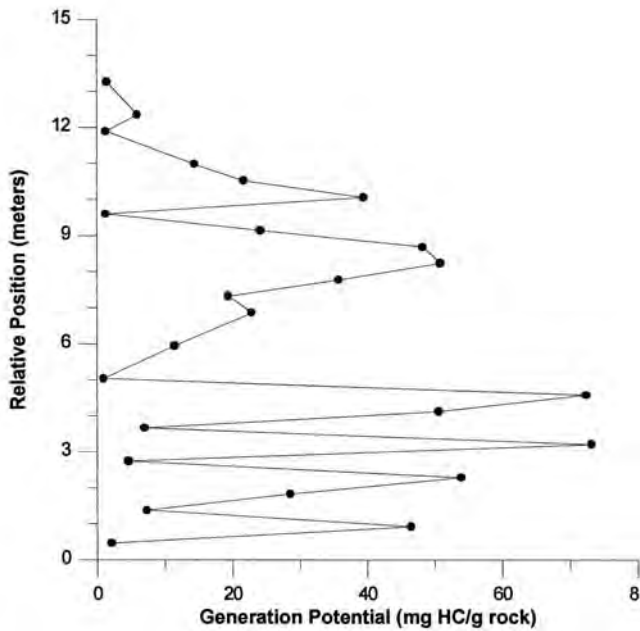
The geochemical characteristics of the studied oils were highly variable as a result of their complex and variable migration and alteration histories. Unlike earlier studies, this study showed that all of the oils were generated within the conventional "oil-window", over a narrow thermal maturity range (Ro 0.9-1.0%). There is evidence that migration was episodic, possibly related to the activity of mud diapirs. The oils display similar molecular and isotopic compositions to the extracted Maykop samples confirming their genetic relationship.



**Figure 1.** Organic carbon content of Maykop Suite samples collected during 1997.

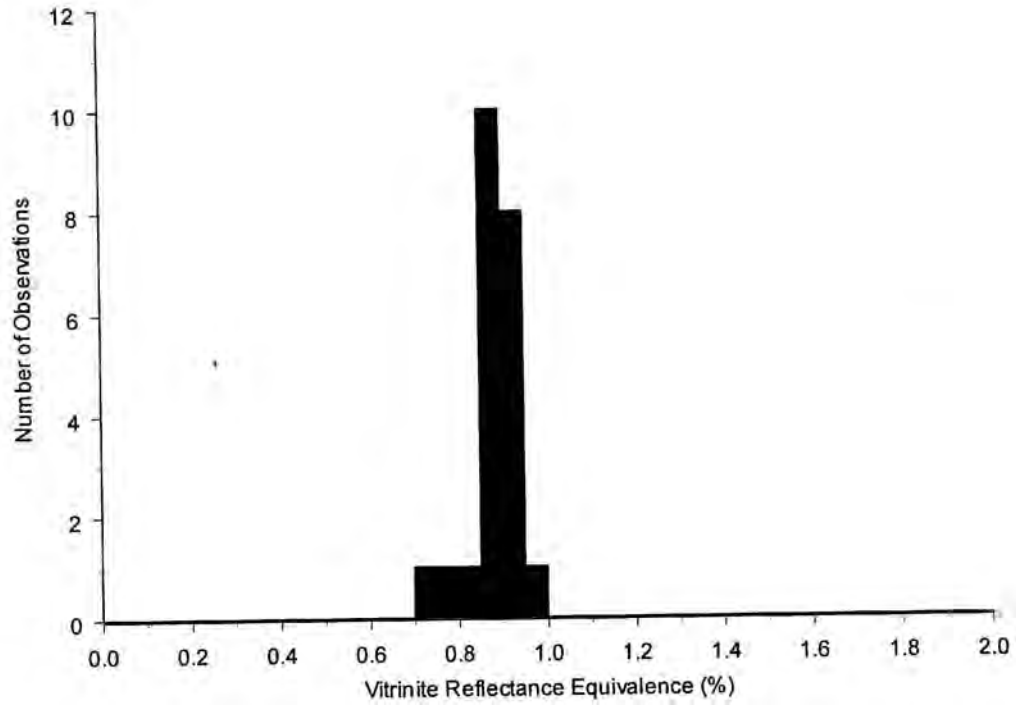


**Figure 2.** S<sub>2</sub> hydrocarbon yields of Maykop Suite samples collected during 1997 with greater than 1.0 wt.% TOC.



**Figure 3.** Cyclic nature of hydrocarbon source rock potential within the upper portions of the Maykop Suite.





**Figure 6.** Estimated oil thermal maturity values based on the MPI-3 index.