Modelling of Source Rock Maturation and Hydrocarbon Formation in Northern Iraq

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Detailed structural analysis carried out recently on the Zagros folded belt and surrounding areas allowed construction of a detailed structural history with complete facies and burial history for all of northern Iraq.

Source rock maturation and hydrocarbon formation was modelled on more than 100 locations, including synthetic sites, using the Fobos Pro Modelling software. The resulting models from all the sites were compared with geochemical data obtained from the area to verify results.

The source rocks of Northern Iraq were subdivided into two main types based on previous geochemical analysis results obtained using conventional methods. The first category of source rocks are those of Middle-Late Jurassic - Early Cretaceous rocks bearing kerogen type II; while the second category of source rocks belong to the pre Middle Jurassic characterised by kerogen type III rocks.

Each modelled site produced the transformation ratio of all possible source rocks encountered, and the total amounts of oil and gas produced and expelled from each site were calculated. Comparison of modelling results from all of the sites with previous geochemical data showed very good matching and reliability. The resulting data from all the studied sites are compiled in an ArcGIS system with two regional maps showing the total oil and total gas for the entire studied area of Northern Iraq.

The total amounts of oil and gas generated and expelled over the last 10 million years (time of formation of the anticlinal structures) are in good correlation with the present amounts of discovered and proven oil reserves in the Kirkuk and the surrounding areas of northern Iraq . This makes the present modelling highly dependable for identifying future hydrocarbon potential in all the unexplored areas of Northern Iraq.