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Multiple Petroleum Systems in the Caspian Region: Implications for Prospectivity Evaluation and Oil Quality Prediction

From available oil and source rock data, four major petroleum systems (PS) can be recognized in the Caspian Region:

- 1) Devonian / Carboniferous PS, which has given rise to most of the discoveries in the Precaspian Basin, including the supergiant Kashagan field
- 2) Triassic (?) PS, which is the source for the oil fields in the Mangyshlak area, including the giant Uzen field
- 3) Jurassic PS, which is thought to be the main source for the recent Lukoil discoveries in the Central Caspian
- 4) Oligocene-Miocene PS, which is the source for most of the oil and gas found in the South Caspian Basin

Although the existence of these different petroleum systems has been fairly well established, much less is known about their lateral extents and maturity histories. This is largely due to the small amount of available source rock data, in combination with limited well control offshore.

A thorough understanding of the petroleum systems is a pre-requisite for succesful exploration. This is true both for evaluation of charge probability and prediction of petroleum composition.

An example is given from the transition zone between the North and Central Caspian, where multiple petroleum systems can be active. Obviously, this has a major impact on the charge risk. In this particular case, it is also important with regard to the expected oil quality as different source rocks are expected to provide distinctly different oil qualities.