

## HYDROCARBON HABITAT IN THE CAUCASUS PETROLEUM PROVINCE

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The Caucasus Petroleum Province can be considered as encompassing the region from Crimea and Sea of Azov in the west to the South Caspian in the east. The region has extremely large proven hydrocarbon reserves (approximately 30 billion barrels oil equivalent) and speculation in the industry is that there is perhaps as much again yet to find. Outcrop based studies of potential reservoirs and source rock intervals helps to constrain the uncertainty over the future potential of the region and can help reduce risk and increase exploration success rates.

The Caucasus region has undergone a complex tectonic history of back-arc rifting, subsidence, compression and inversion which has interacted with sediment supply to lead to the deposition of unusually thick Mesozoic and Cenozoic sedimentary succession. This interaction between sediment supply and basin subsidence is the primary control of the development of the Caucasus petroleum system.

Following collision of Africa and Eurasia, the Caucasus Mountains began developing during Eocene times. By Oligocene-Miocene times a foreland basin had developed which was initially starved of sediment and had a stratified water column, leading to the preservation of organic matter. This was the time of the deposition of the Maykop Suite, and the presence of this source rock across the Caucasus Petroleum Province is the key reason for the existence of its hydrocarbon reserves. Outcrop based studies indicate that although other source rocks may exist, these are of relatively minor importance and it is the Maykop Suite which is the key source rock and can be geochemically correlated with oils from fields in the province. Major reservoirs are therefore typically stratigraphically above the Maykop Suite source or thrown up by faulting to be on migration routes from Maykop source kitchens.

Outcrop based studies indicate that high quality reservoirs occur within a number of stratigraphic intervals with the Mesozoic and Cenozoic succession, but, as noted above, the most successful tend to be above or within the Maykop Suite. However, in the east of the region there are working reservoirs with the Cretaceous interval (both sands and fractured carbonates) which are either in faulted juxtaposition with the Maykop Suite or are associated with source rocks of Mesozoic age generating relatively minor volumes of hydrocarbons (mainly gas). Enclosure and isolation of the Caucasus-South Caspian Basin from Miocene times onwards was associated with major increases in sediment supply from fluvial systems sourced in the Caucasus or the Russian Plain to the north and Pamirs to the east. Outcrop studies can characterize the precise depositional modeling of these important reservoirs, and coupled with petrographic studies can note variations in reservoir quality. This information is useful both for helping efficient development of existing fields and for predicting reservoir presence in exploration areas.

Although the region clearly has significant yet to find reserves, outcrop-based studies suggest that some caution should be exercised as to the presence of reservoirs away from existing fields and with regard to the likely phase of hydrocarbon which may be encountered.