BLACK SEA AND SOUTH CASPIAN BASINS: COMPARISON OF THE OIL POSSIBILITIES OF THE CRETACEOUS FORMATIONS

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Geological and geophysical evaluations reveal that certain similarities of petroleum possibilities of the Cretaceous formations exist in the Black Sea in Turkey and South Caspian basins in Azerbaijan (Fig. 1). The Murathanli oil field is a good example for an oil field producing from the Cretaceous effusives (porphyres) in Azerbaijan which contains about 55 million barrels of recoverable oil. In the Murathanli oil field, Eocene carbonates, Oligo-Miocene Maykop and Chokrak formations are also oil producers. According to the drilling data, more than 200 meters thick porphyres exist in the field, while the underlying formations are still unknown. As the overlying Eocene formations do not contain any good oil source rock, one can consider an important maturation-generation relationship between the oil in effusives, underlying formations and volcanic activities in the area (Fig. 2).

The same situation exists in the Black Sea and Pontide basins. From west to east, many similar examples can be observed. For example, in the Akcakoca region, western Black Sea, the TPAO's Akcakoca-1 well, drilled in 1976, discovered 4 million cuft/day of gas in the Eocene section, coming throughout a big fault zone, obvious on the FDC-CNL log (Fig. 3). The geochemical and drilling results indicate also that the entire stratigraphic section does not contain any good oil source rock. This well penetrated in the Cretaceous volcanics (equivalent of the Hamsoros formation in the Sinop area) at about 2000 meters and after coring, abandoned in the volcanic rocks. According to the well and seismic data, this big fault cuts the Cretaceous volcanics and underlying formations. Then, one can think that the generation and occurrence of gas are related to the volcanic activities, like in the Azeri Murathanli oilfield.

A second example can be mentioned from the Ekinveren (Sinop) area. The well known Ekinveren oil seep occurs at the tectonic contact of the Paleozoic Ilgaz metamorphics and the Cretaceous quartzitic Caglayan sandstones (Fig. 4). Oil seeps from the tectonized and fractured zones. These sandstones are thicker at the bottom section of the Caglayan formation which is accepted as a weak oil source rock in the Pontides. Even, if one can consider oil generation in the upper shaly section, it is difficult to accept a reverse oil migration. Then, the basement tectonic of the Ilgaz Massif has a crucial role in the occurrence of oil at the basement-Cretaceous contact in the central Pontides.

From Sinop towards east, between Sinop and Rize, Pontides are generally constituted by the volcanics, instead of the sedimentarly rocks. An offshore oilsleep, at the margin of Rize in the eastern Black Sea area, is well known which reaches the sea bottom throughout a big fault. Due to the absence of the field and drilling data, the underlying formations beneath the volcanics are not clearly determined. Then, the Cretaceous volcanics has also an important influence on the occurrence of the oil seeps in this area.

Another example in the Pontides can be given from the Pasinler (Erzurum) basin. Here, very abundant oil seeps exist at the surface. The Pasinler-1 well, drilled bu MTA in 1970, penetrated in the volcanic rocks after drilling 110 meters of clay and claystones. No oil source rock is present in the area, but abundant oil seeps appear across the faults and fractures, related to the volcanic activities (Fig. 5).

From the above examples, it is obvious that the oil possibilities of the Cretaceous volcanics of the Murathanli field in the South Caspian basin and oil and gas occurrence in the Black Sea and Pontides resemble each other. That conclusion is very important for oil exploration activities in the Black Sea and Pontides where Cretaceous volcanism and its influence on the oil generation-migration and accumulation should be investigated in detail with field, well and geophysical data.

Figure 1. Location map, showing oil and gas field and oilseeps along the Pontides and Caucasus in Turkey and in Azerbaijan.

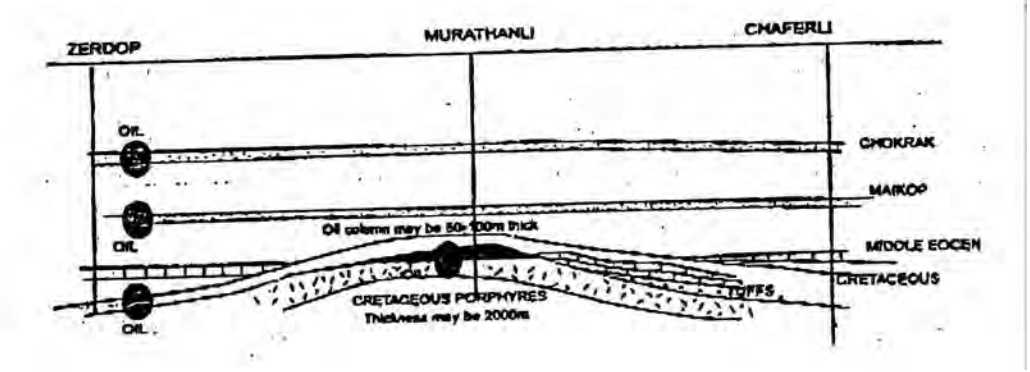

Figure 2. Murathanli oil field in Azaebaijan, producing from the Cretaceous porphyres.

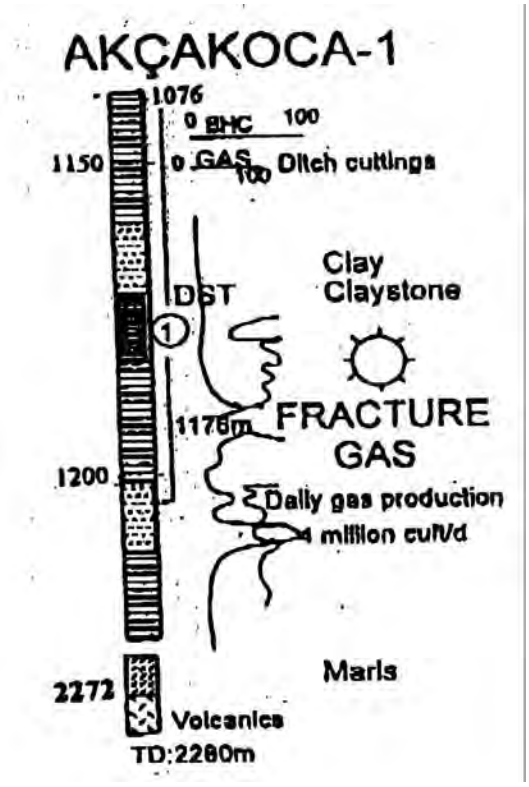

Figure 3. Akcakoca-1 well. Gas occurs across the fault zone.

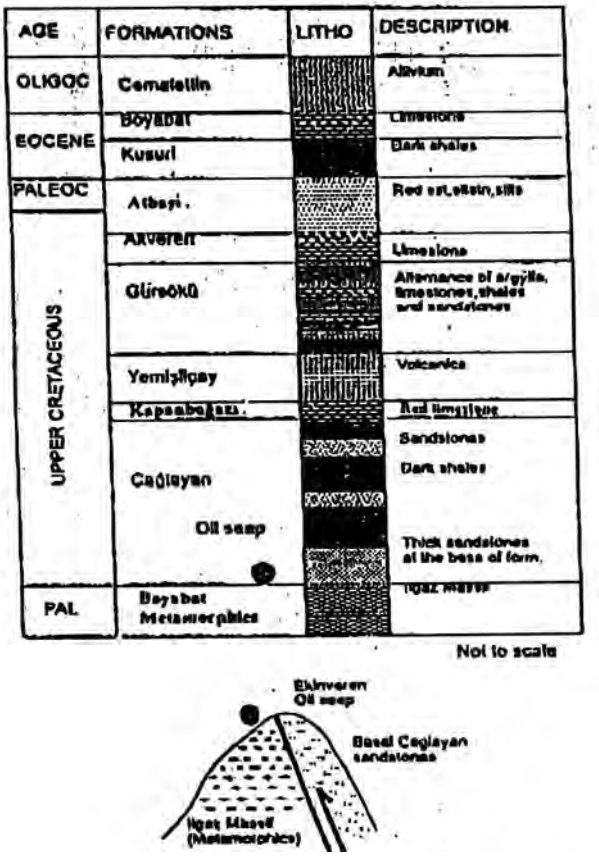

Figure 4. Ekinveren oil seep which occurs at the tectonic contact of the Ilgaz metamorphics and the Cretaceous Caglayan quartzites.

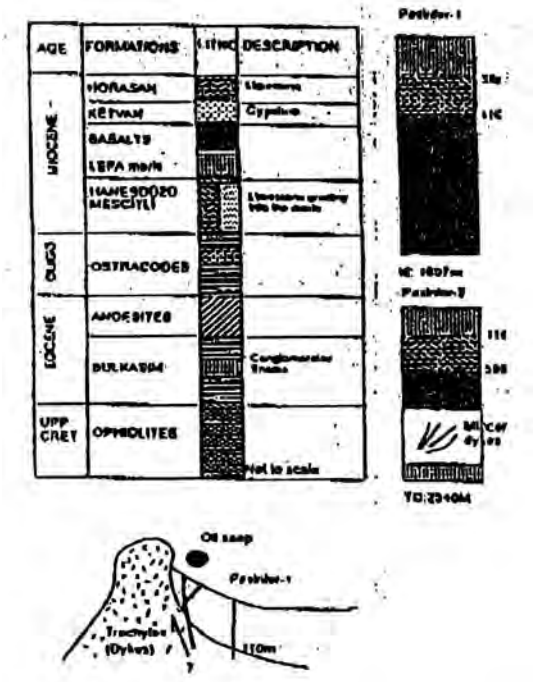

Figure 5. Stratigraphic column and oil seepage in the Pasinler area. Oil comes throughout the fractures, generated by volcanic activities.