

Analyzing Oil Seeps Manifestations and Petroleum Impregnation in Northwestern Tunisia From Aliphatic Biomarkers and Statistical Data

Authors : Sawsen Jarray, Tahani Hallek, Mabrouk Montacer

Abstract : The tectonically damaged terrain in Tunisia's Northwest is seen in the country's numerous oil leaks. Finding a genetic link between these oil seeps and the area's putative source rocks is the goal of this investigation. Here, we use aliphatic biomarkers assessed by GC-MS to describe the organic geochemical data of 18 oil seeps samples and 4 source rocks (M'Cherga, Fahdene, Bahloul, and BouDabbous). In order to establish correlations between oil and oil and oil and source rock, terpanes, hopanes, and steranes biomarkers were identified. The source rocks under study were deposited in a marine environment and were suboxic, with minor signs of continental input for the M'Cherga Formation. There is no connection between the Fahdene and Bahloul source rocks and the studied oil seeps. According to the biomarkers C₂₇ 18-22,29,30-trisnorhopane (Ts) and C₂₇ 17-22,29,30-trisnorhopane (Tm), these source rocks are mature and have reached the oil window. Regarding oil seeps, geochemical data indicate that, with the exception of four samples that showed some continental markings, the bulk of samples were deposited in an open marine environment. These most recent samples from oil seeps have a unique lithology (marl) that distinguishes them from the others (carbonate). There are two classes of oil seeps, according to statistical analysis of relationships between oil and oil and oil and source rocks. The first comprised samples that showed a positive connection with carbonate-lithological and marine-derived BouDabbous black shales. The second is a result of M'Cherga source rock and is made up of oil seeps with remnants of the terrestrial environment and a lithology with a marl trend. The Fahdene and Bahloul source rocks have no connection to the observed oil seeps. There are two different types of hydrocarbon spills depending on their link to tectonic deformations (oil seeps) and outcropping mature source rocks (oil impregnations), in addition to the existence of two generations of hydrocarbon spills in Northwest Tunisia (Lower Cretaceous/Ypresian).

Keywords : petroleum seeps, source rocks, biomarkers, statistic, Northern Tunisia

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