

Some Organic Geochemical Characteristics of Oil Shale Deposits in the Ereğli-Bor Basin, (Konya-Niğde), Central Turkey

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Upper Miocene-Pliocene aged oil shale sequence, with an average thickness ranging between 72 and 160 m, has been cross-cut during the drilling studies at Ereğli-Bor basin, Central Turkey. In addition, the live oil show has also been observed in this oil shale sequence.

Paleocene-Eocene aged volcanic, volcano-clastic, clastic and carbonate rocks form the base of this basin. This basin is overlain unconformably by the Oligocene-Middle Miocene aged evaporitic rocks, carbonates and clastic rocks. The upper Miocene-Pliocene aged oil shale bearing sequence overlies this unit. The Kızılbayır formation, is overlain by the Katrandetepe formation which is composed of claystone, sandstone, siltstone, gypsum, anhydrite and oil shale. Sandstone and claystone alternations, known as Beştepeliler formation, form the upper part of the sequence. All these units are overlain unconformably by Upper Pliocene-Holocene aged clastic sediments and volcanic rocks.

According to the Pyrolysis analyses results of the selected oil shale samples, total organic carbon contents (%TOC) of the oil shale range between 1.21 and 13.98, with an average TOC value of 4.75. Hydrogen index (HI) and oxygen index (OI) values, ranging between 127-664 and 7-50 respectively, suggest that oil shales are formed by Type II kerogen. Tmax values (°C) range between 332 and 419. Considering the Tmax values, oil shales are considered to represent the immature stage, although some of them reflect the early mature stage. Pyrolysis data suggest no oil generation in the basin. The live oil show in the basin has probably formed due to the young volcanic rocks cross-cutting the oil shale which resulted oil shales to reach the thermal maturity.

Characterizing the Pb isotopic contribution of dust to seawater

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Different sources of dust to the open ocean have varying effects on seawater chemistry, productivity and plankton community structure due to the release of various amounts of nutrients and trace metals. Pb isotopes in marine sediments have been used to reconstruct these dust sources (provenance). This is typically done by comparing the isotopic signature in the detrital fraction of sediments to the Pb isotope ratios of bulk dust or loess samples from dust source regions. What is missing in these studies is the isotopic composition of the seawater soluble fraction of the dust and its role in the seawater Pb isotope budget.

In this study, we characterized the Pb isotopic contribution of dust to seawater from select source regions to the Pacific Ocean through a direct simulation of dust solubility in seawater. We found that the readily leachable fraction of dust from multiple source regions to the Pacific Ocean is less radiogenic than the bulk source sample or that of the detrital fraction of sediments. Clear differences in the soluble and bulk Pb isotopic ratios of dust between the different source regions were also observed.

Knowing the true dust isotopic contribution to seawater allows for more accurate Pb mass balance calculations and clearer identification of dust sources and/or fluxes. We show preliminary results linking seawater, dust, ferromanganese, and detrital Pb isotope signatures in the Eastern Equatorial Pacific and generate a potential framework for future Pb mass balance calculations.