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BİLDİRİLER KİTABI
CONGRESS PROCEEDINGS

Geochemical Characteristics and Depositional Conditions of the Organic-Rich Triassic Facies in the Western Taurides, Turkey

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SUMMARY

Eastern Mediterranean Basin poses importance with respect to not only the drilled and scheduled offshore wells but also the source rock discoveries made in the near past. On the contrary, available limited data and knowledge regarding these source rocks and their spatial distribution throughout the region bring challenges for a solid understanding of the petroleum system of the subject area. To gain an understanding of the petroleum system in the region, it is crucial to undertake a thorough assessment of the source rock units and discern their depositional processes. Utilizing this information as a foundation, conducting field studies on Nappes becomes crucial due to the uncertainty surrounding the number of depocenters in the region. Notably, the presence of Triassic-aged source rock examples in Northern Italy adds to the region's allure for exploration.

METHODOLOGY

This study focuses on the comprehensive analysis of 98 samples collected from Early Triassic-aged 2 different sections in Western Taurides, Turkey. Systematic sampling was conducted every 25 cm, considering changes in lithology and sedimentological texture. Geochemical assessments including Pyrolysis, Sulphur, GC (Gas Chromatography), and GC-MS (Gas Chromatography – Mass Spectrometry), as well as inorganic and organic carbon isotope analysis and elemental analysis, contribute to the understanding of these units. The integration of geochemical analysis with sedimentological data help build the paleoenvironmental setting of the region.

RESULTS

Sahin et al., (in press) in their micropaleontological examination of both Yerindere and Pınargözü sections samples have identified the stratigraphic age of Triassic-Olenekian for the first time, and this finding complies with the geochronology of Sr isotope values in this study. The investigations conducted on the Yerindere section reveal a transition in lithology and source rock potential along the samples (Sahin et al., in press). Prior samples consisted of limestone with high clay and sand content and minimal source rock potential. However, after a point, there is a notable decrease in clay and sand content and presence of significant source rock potential. The samples with source rock potentials show a range from poor to excellent, with the majority falling in the excellent category (Sahin et al., in press). Tmax values indicate that the samples are generally immature. Based on the HI and Tmax values, the potential source rock samples predominantly contain Type II kerogens derived from lacustrine and marine organic matter, indicating the capability of generating liquid hydrocarbons with the highest HI values samples grouped in Type-IIS part. GC and GC-MS analyses on extracted samples indicate a shallow, anoxic depositional environment with a predominantly marine input for all samples. There is a notable increase in the levels of normalized V and P, exhibiting a direct correlation with Total Organic Carbon (TOC). In parallel, the concentrations of Zn, Mo, Cu, and Ni also ascend.

Similar patterns are observed in the Pınargözü section, where normalized V and P samples exhibit a comparable trend to those in the Yerindere section, along with increased concentrations of normalized Zn, Cu, and Mn. The distribution of potential source rock samples in the Pınargözü section appears to be more uniform throughout the sequence. The deposition environment in this section also exhibits sulfidic characteristics, leading to the formation of Type-IIS kerogen, similar to the deposition mechanism observed in the Yerindere section. Hence, a possible interpretation of this deposition scenario is that intrusion of seawater into asymmetrical restricted depocenters promotes bio productivity and converting the environment into relatively deeper anoxic/sulfidic state. In cases where the input of iron is limited (or lower than the Sulfur concentration in the deposition environment), free S binds to the kerogen, promoting the development of Type-IIS kerogen which is capable of generating hydrocarbon at earlier maturation stages.

REFERENCE

Şahin, N., Altıner, D., Dincer-Kırman, Z., 2023. Discovery of Lower Triassic Hydrocarbon Source Rock in a Rift Controlled Tectonic Setting, Antalya Nappes, Southwestern Turkey (in press).

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