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Redox Sensitive Trace Element Enrichments of Organic Matter Rich Rocks (Kürnüç-Göynük/Bolu, Turkey)

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The oil shale deposits of Himmetoğlu and Hatıldağ nearby Göynük (Bolu/Türkiye) are well known oil shale deposits in Turkey. However, there is no detailed study about shale and marl type organic matter rich rocks of Kürnüç (Göynük (Bolu/Türkiye) currently available in the literature. This study aims to determine the enrichment of redox sensitive trace elements of organic matter rich rocks deposited at Kürnüç. The Kızılçay formation which outcrops in the vicinity of Kürnüç contains organic matter-rich rocks of marl and shale type. TOC %wt contents of Kürnüç vicinity rocks varies between 2,52-8,38 with an average of 6,13. The enrichments of S and Fe in these rocks and S% vs Fe% plot indicate the presence of pyrite and/or marcasite occurrences (r = 0,56). Also C-Fe-S relationship for the Kürnüç vicinity organic rich rocks suggest oxic and partially suboxic conditions. Some information about redox conditions of depositional environment of organic-rich rocks are obtained using redox sensitive element ratios such as V/(V+Ni), Ni/Co, U/Th and V/Sc. V/(V+Ni) ratios came out to be between 0,44-0,67, indicating suboxic-anoxic conditions; Ni/Co values are between 4,08-11,76, which indicates oxic-suboxic conditions; U/Th values are between 0,46-6,00, indicating suboxic-anoxic conditions; V/Sc values are between 5,53-24,50, pointing out oxic-suboxic condition. According to these values, Kürnüç vicinity organic matter-rich rocks are generally deposited in oxic to anoxic redox conditions. The redox sensitive elements Ni (20 – 129 ppm, with an average of 51,73 ppm), Co (0,2 – 20,6 ppm, with an average of 10,29 ppm), Cr (0,002 – 0,068%, with an average of 0,01%), Th (0,5 – 7,1 ppm, with an average of 4,02 ppm), Sc (1 – 13 ppm, with an average of 7,51 ppm), V (8 – 153 ppm, with an average of 70,55 ppm), U (0,6 – 35 ppm, with an average of 3,49 ppm) are obtained from the organic matter rich rocks. These elements are enriched 1-10 times relative to Average Shale, Coast of Peru, UCC (Upper Continental Crust), PAAS (Post Archean Average Shale), NASC (North American Shale Composit).