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Sedimantologic and diagenetic parameters with deposition evolution of the Middle-Late Miocene gypsiferious units in the Koluz Member, Eastern Anatolia, Turkey: an inland basin related to the closure of the Neo-Tethys Ocean

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Uplift in Eastern Anatolia due to the continental collision occurred between Arabian and Eurasian Plates during Middle-Late Miocene (12 Ma) resulted in the final closure of the Neo-Tethys Ocean and commencement of lacustrine deposition on large highlands after the termination of marine deposition. In such areas, evaporites are deposited together with river clastics. Kurtdeligi Formation exposed in the Eastern Anatolia at the base of the study area, is one of the terrestrial basin which is a product of regional compressional tectonic regime, and is represented by alluvial-fluvial deposits. Alluvial fans formed by these rivers transformed to fan delta under the effect of lake waters. According to the previous studies gypsiferous units of Kurtdeligi formation was named as Koluz Member, but the facies distribution, depositional conditions (temperature, pressure, salinity, water geochemistry, Eh, pH, bacterial effects), diagenetic evolution, type of the terrestrial evaporitic environment (inland sabhka, playa lake, salina), changes in basin depth and the processes of evaporites formation in the basin have not been studied yet.

In this respect, this study focuses on the diagenetic processes, depositional conditions, deposition model and the paleogeographic evolution of the gypsiferous units of the Koluz member belonging to the highly deformed Middle-Late Miocene Kurtdeliği Formation under the effect of the regional compression by examining their sedimantologic, mineralogic and petrographic characteristics.

According to the results; some lithofacies charaterizing an evaporitic playa lake environment formed both under the effect of tectonism and climate changes were defined in the 200 m thick Koluz Member dominated by gypsums which are intercalated with carbonates and clastics. According to the these lithofacies; fibrous gypsy mudstones and nodular-breccia gypsum were deposited in mud flat, gypsum arenites were deposited at the margins of playa lakes, primary (selenitic) gypsums and radial gypsums were deposited at the marginal-shallow portions of the lake, laminated-banded gypsums were deposited at the shallow areas of the lake, and massive gypsums developed due to the diagenetic processes were deposited at the deeper portions of the lake in Middle-Late Miocene. In addition, lithofacies and sedimantologic characteristics of evaporites of the Koluz member, and the repetition of these lithofacies in the unit was interpreted to occur due to the tectonism, seasonal conditions, flooding, salinity, and changes in water level of the basin. Furthermore, these lithofacies were formed by diagenetic processes such as volumetric compression, recrystallization, replacement, dissolution, new mineral formation and mineral transformation.