

ISOTOPIC and TRACE-ELEMENT ANALYSIS of THE CONTINENTAL CARBONATES in THE BALLIK AREA, DENİZLİ, TURKEY

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Abstract: The Ballik continental carbonates were geochemically characterized using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES) and a $\delta^{18}\text{O}$, $\delta^{13}\text{C}$ and strontium stable isotopic analysis. The geochemical delineation of the lithofacies, characterizing certain depositional environments, can be used in a chemo-stratigraphic approach to correlate the geobodies. Based on the stable isotopic composition the fluid characteristics and possible source rocks are deduced. The combination of these results contributes to the reconstruction of the depositional history of the studied travertines.

The continental carbonates are characterized by low trace element concentrations compared to marine carbonates, with the exception of high strontium concentrations. Aluminum, iron, nickel, titanium and silicon show similar trends within the different vertical lithologies, what makes them suited for correlation. Progressive alteration due to diagenetic stabilization with meteoric waters, as described by Brand and Veizer (1980), is recognized by a decrease of strontium, sodium, magnesium and a coinciding increase of manganese and iron towards the top of the different sections.

The Ballik continental carbonates have $\delta^{13}\text{C}$ values between -3.83 and 2.60 ‰ V-PDB and $\delta^{18}\text{O}$ values from -9.39 to -5.72 ‰ V-PDB. $\delta^{13}\text{C}$ values decrease towards the top of the different vertical sections, while $\delta^{18}\text{O}$ stays more or less constant. The $^{87}\text{Sr}/^{86}\text{Sr}$ isotopic ratio for the analyzed samples is 0.70786 ± 0.00005 . These results point to deposits from a fluid, that inherited the carbon and strontium isotopic signature of dissolved Triassic marine carbonates, and indicate the Lycian Nappes as possible source rock.

Key Words: Travertine - Tufa - Geochemistry - Isotopes - Ballik