Mineralogical and geochemical composition, and isotope geochemistry of upper Neogene deposits (Polatlı, central Turkey)

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The study focused specifically on the mineralogical and geochemical properties, and origin of carbonate sediments partially intercalated sepiolite-rich clayey carbonates in the study area. The Upper Pliocene-Pleistocene sediments contain commercial sepiolite deposits. Dolomite and dolomite +sepiolite were found in the bottom and intermediate layers while calcite+dolomite and calcite-rich deposits occurred at top of the sequence. Fossil-rich clay beds are partially intercalated with brown sepiolitic and mostly rich in limestone beds.

The composition of most calcites is relatively homogeneous and low-Mg to near stoichiometry. The dolomites are Ca-rich dolomite composition, disordered, and idiomorphic and/or subidometric. $\delta^{13}C$ values of dolomite and calcite range from -0.6 to -4.7 and 1.0 to -5.4, respectively. $\delta^{18}O$ values of dolomite and calcite vary from -1.0 to -4.2, and -1.8 to -10.0‰, respectively, and values indicate that they precipitated from more evaluated water with a higher contribution of atmospheric CO_2 to the total dissolved C than those of calcites. Negative $\delta^{18}O$ (-10.0‰) and slightly positive $\delta^{13}C$ (1.0‰) values of calcites indicate evaporative condition while slightly negative $\delta^{18}O$ (-2.9‰) and $\delta^{13}C$ (-5.4‰) values related to fresh or meteoric water influx during the calcite precipitation.