In Eastern Mediterranean (EM) sediments, alternating successions of organic-lean marl and organic-rich sapropel units occur, related to precessional hydroclimate cycles of arid and humid climate episodes. The detailed origin for freshwater sources and related changes therein are still debated. Here, Sr and Nd isotopes and high-resolution elemental ratios are used to unravel and constrain different riverine and eolian supplies to the central Mediterranean over the past 9.8 ka.
Based on Sr and Nd isotopic, and various elemental compositions, the detrital sediments in core CP10BC can be assigned to a 3-endmember mixing system. The three endmembers include Saharan Dust, Aegean/Nile, and Libyan Soil, which respectively represents the eolian supply from North Africa, the riverine inputs from the Aegean/Nile areas, as well as the riverine and shelf-derived fluxes from the Libyan-Tunisian margin.
In particular for sapropel S1 time, we find important detrital supplies from paleo river/wadi systems along the Libyan-Tunisian margin, activated by intensified African monsoon precipitation. A west–east comparison of Sr-Nd isotope data between core CP10BC and 4 other cores throughout the EM shows that, such detrital supplies originated mainly from western Libya and Tunisia, and were transported as far eastward as ~25°E while being diluted by an increasing Nile contribution. Moreover, elemental proxies (Ti/Al, K/Al, Mg/Al, Y/Sc, Ce/Ni, and Zr/Cr) reflect concordant changes in the three endmembers at high resolution. These indicate that during the sapropel period enhanced precipitation and associated detrital fluxes must have occurred not only from North Africa but also from the northern EM borderlands.