

Using Sr Isotopes to Test Models of Climate-Modulated Sea-Level Changes in the Circum-Black Sea Region

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Abstract:

Recent studies have called into question models requiring massive freshwater outflow from the Black Sea and models of the timing and effects of marine inflow into the Black Sea. Strontium isotopes can be used as tracers of such water exchange because seawater has a distinct $^{87}\text{Sr}/^{86}\text{Sr}$ ratio and other major water sources have significantly different Sr concentrations and $^{87}\text{Sr}/^{86}\text{Sr}$ ratios. We propose to use the Sr isotopic composition of mollusk shells from the Sea of Marmara, located between the Black and Mediterranean Seas, to investigate the timing of freshwater overflow from the Black Sea and marine overflow from the Aegean/eastern Mediterranean. These preliminary data will be used as a basis to generate external funding to test models of Mediterranean sapropel formation and of Black Sea sill depth, and will have implications for estimates of the timing of meltwater drainage of a large part of Eurasia through the last glacial termination. This study will also test the catastrophic flood model of Ryan et al. (1997), which requires a shallow sill and a Black Sea situated below its outlet.