

# **Changes in the marine primary productivity in the Marmara Sea (Turkey) during the past millennia inferred from the marine sediment biogeochemistry**

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Marine primary production (MPP) is the first and largest chain of the marine ecosystem. Increase in the nutrient concentrations can cause phytoplankton blooms which affect the water quality, zooplankton and fish. Today, Marmara Sea is under a great damage due to eutrophication. Extreme mucilage outbreaks occurred in 2021 in the entire Marmara Sea that were described as an environmental disaster. Primary productivity in the Marmara Sea had changed several times in geological-scales due to paleoceanographic and paleoclimate changes. However, high resolution changes in the nutrient conditions and the primary production in the past 1000-years has not been studied so far. In this study, the nutrient and primary productivity changes in the last 1000 years in high time-resolution (~50 years) by using sediment biogeochemistry. Marine push cores that were retrieved from the Tekirdağ Basin in the west and from the çınarcık Basin in the east of Marmara Sea were used for sediment proxy analyses. TOC, C/N ratio, biogenic barium, diatom cell count were used as proxy parameters for marine organic production. Also, past seawater nitrate conditions were inferred from isotopic ratio of nitrogen ( $\delta^{15}\text{N}$ ) in the organic matter and further paleoceanographic conditions were inferred from isotopic ratio of oxygen and carbon ( $\delta^{18}\text{O}$ ,  $\delta^{13}\text{C}$ ). The results of this study enables to better understand to time and basin dependent trends in the MPP in the Marmara Sea and to what extent the industrialization/ pollution impacted the Marmara Sea ecosystem.