

## Foraminifera-bound nitrogen isotopes during the last 160 ka in the Mediterranean Sea

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Nitrogen isotopes are a powerful tool to study past changes in the nitrogen cycle. So far, reconstructions in the Mediterranean Sea were performed on bulk sediments to infer changes in the nutrient supply during sapropel deposition in the eastern basin. Sapropels are quasi-periodically occurring organic-rich layers in Mediterranean sediments believed to form under anoxic conditions. Bulk sediment nitrogen isotope ( $\delta^{15}\text{N}$  vs. Air) measurements indicate strong negative shifts of  $\sim 5\text{--}6\text{‰}$  in sapropel layers compared to marl layers. This has been assigned to increased rates of  $\text{N}_2$  fixation, a process that introduces atmospheric nitrogen with a low  $\delta^{15}\text{N}$  into the ocean. However, bulk sediments are prone to diagenetic alteration and contamination, and therefore may not preserve the initial  $\delta^{15}\text{N}$  values. Measurement of nitrogen isotopes in the organic matter bound within the shells of planktonic foraminifera has emerged as an approach to overcome these limitations. In this study, we present new high-resolution records of foraminifera-bound  $\delta^{15}\text{N}$  in both the eastern and western Mediterranean Sea. Our findings reveal that during the last glacial cycle, the  $\delta^{15}\text{N}$  decrease of export production during sapropel deposition was considerably smaller ( $\sim 1\text{--}2\text{‰}$ ) than what was inferred from bulk sediment analyses. In addition, this dataset provides novel insights into how the nitrogen cycle in the Mediterranean Sea responds to glacial-interglacial forcing.