

## **Insights into modern and past marine nutrient cycles - Nitrogen stable isotope analyses of chlorins and porphyrins**

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The nitrogen isotopic composition of porphyrins can be used to understand changes in nutrient budgets of the oceans. Isotope ratios measured for bulk sediments may be prone to diagenetic alteration, but intact sedimentary chlorins and porphyrins, derived from chlorophyll, represent primary signals that are specific to their surface-water phytoplanktonic origins. Recently we described a new method for the separation and purification of geoporphyrins from sediment samples using liquid chromatography and HPLC, wet chemical oxidation of the nitrogen, and isotopic analysis of the resulting nitrate using the denitrifier method. The high sensitivity of the denitrifier method allows measurement of small samples, including those that contain low concentrations of porphyrins (< 20 nanomoles of nitrogen). The overall method is rapid and has enabled us to obtain records of  $\delta^{15}\text{N}$  values for geological and ecological applications. These include a record for the Cenomanian-Turonian Oceanic Anoxic Event 2 (Demerara Rise), as well as a record for the late Pleistocene sapropels of the Eastern Mediterranean Sea. Both environments are characterized by episodic, high total organic carbon depositional events. We will report on the compound-specific nitrogen isotopic values obtained from these locations, and present scenarios of nutrient regimes that could permit the observed patterns of chlorin and porphyrin  $\delta^{15}\text{N}$  values.