

Statement of interest: The isotopes of nitrate along the US GEOTRACES Alaska-Tahiti Section

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We will propose to measure the nitrogen and oxygen isotopes of nitrate along the upcoming US GEOTRACES Alaska-Tahiti Section at all stations (super, deep, and shallow) and depths as part of a collaborative effort. This section will substantially expand our knowledge of the global ocean distributions of the N and O isotopic compositions of nitrate, and it will simultaneously address questions regarding modern ocean biogeochemical processes and improve our groundtruthing database for N isotope reconstructions of biogeochemical changes in the past. The northern end of the section will clarify nitrate supply and consumption in the Subarctic North Pacific, the isotope systematics of these processes, and their influence on the nitrate isotopic composition of thermocline and intermediate depth nitrate southward from the subarctic region. The data will support ongoing paleoceanographic work in the region using the organic N bound in diatom frustules (H. Ren and A. Studer, unpublished). The temperate to tropical portion of the section should capture and allow for quantification of the transport of  $^{15}\text{N}$ - and  $^{18}\text{O}$ -elevated nitrate from the suboxic zones into the North Pacific gyre to complement studies conducted on GP16. The portion of the section across the equatorial Pacific stretching to Tahiti will provide a detailed picture of the interactions of equatorial Pacific circulation, nitrate supply to the surface, and progressive nitrate consumption away from the region of upwelling. For example, previous work has demonstrated that these processes lead to the accumulation of low  $\delta^{15}\text{N}$  nitrate in the thermocline under the region of upwelling. The GP15 Alaska-Tahiti section will provide the best picture to date of the consequences of the remaining high  $\delta^{15}\text{N}$  surface nitrate (resulting from nitrate assimilation) that is advected off-axis and (communicated by eventual assimilation, export, and remineralization) may contribute to elevation nitrate  $\delta^{15}\text{N}$  in the tropical thermocline. The proposed collaboration will allow for continued intercalibration between the two participating laboratories and will serve complementary interests in use of these data for modern and paleoceanographic research.