

## Patterns of N<sub>2</sub> fixation across the northern North Atlantic

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A more detailed insight into the significance of N<sub>2</sub> fixation in temperate regions of the global ocean, long considered negligible, is crucial for an accurate evaluation of the balance between nitrogen input and output fluxes from the ocean budget. The temperate North Atlantic was shown to harbor remarkable diazotrophic communities, although mainly restricted to shelf areas. Yet, no evidence of significant N<sub>2</sub> fixation has been reported in the open ocean waters.

We explored N<sub>2</sub> fixation during the Belgica BG2014/14 cruise along the Iberian Margin and the cross-Atlantic GEOVIDE expedition (GEOTRACES) both during May-June 2014. Using the dissolution method, we measured substantial N<sub>2</sub> fixation activities in the West European Basin (39–50°N, 9–23°W) ranging from 141 to 1533 μmol N m<sup>-2</sup> d<sup>-1</sup>. Lower rates, although significant, were found off the Southeast Greenland Margin (47–80 μmol N m<sup>-2</sup> d<sup>-1</sup>; ~60°N, 39–43°W) except for a Greenland shelf site where N<sub>2</sub> fixation reached 403 μmol N m<sup>-2</sup> d<sup>-1</sup>. N<sub>2</sub> fixation was low to undetectable in the central Bay of Biscay, the Iceland Basin and the Labrador Sea (< 38 μmol N m<sup>-2</sup> d<sup>-1</sup>).

N<sub>2</sub> fixation in the temperate North Atlantic, particularly in the eastern boundary seems to play a critical role as a source of new N (also evident from nitrate isotopic composition; see abstract of Deman et al.). Environmental factors favoring diazotroph activity, including seasonal spring bloom, atmospheric dust events and shelf water advection will be discussed.