# High rates of nitrogen fixation measured in equatorial upwelling region

April 5 2013

Surface waters in upwelling regions of the ocean are generally rich in nutrients. Scientists had thought that these areas would have low rates of nitrogen fixation because diazotrophs-microbes that convert nitrogen gas from the atmosphere into usable forms, such as ammonia-could use the nutrients in the water directly instead of having to fix nitrogen gas. However, researchers recently recorded high rates of nitrogen fixation in an upwelling region in the equatorial Atlantic.

Subramaniam et al. studied the extent of diazotrophic activity in the equatorial Atlantic during the upwelling period in May and June 2009. They measured rates of nitrogen fixation as well as nutrient concentrations and the structure of the phytoplankton community. The researchers observe rates of nitrogen fixation 2- to-7 times higher during the upwelling period than had been reported during non- upwelling periods.

They suggest that as waters rich in iron but with a low nitrate-to-phosphate ratio upwell, a bloom of non-diazotrophic phytoplankton grows and removes the upwelled nitrate. Diazotrophs then use the residual phosphate and iron, and nitrogen fixation increases. The study could help improve scientists' understanding of nitrogen and carbon dynamics in upwelling regions.

**More information:** Equatorial Upwelling Enhances Nitrogen Fixation in the Atlantic Ocean, *Geophysical Research Letters*, doi:10.1002/grl.50250, 2013. onlinelibrary.wiley.com/doi/10 …

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