

Estimates of anthropogenic nitrogen in the ocean may be high

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Inundation of nitrogen into the atmosphere and terrestrial environments, through fossil fuel combustion and extensive fertilization, has risen tenfold since preindustrial times according to research published in *Global Biogeochemical Cycles*. Excess nitrogen can infiltrate water tables and can trigger extensive algal blooms that deplete aquatic environments of oxygen, among other damaging effects.

Although scientists have extensively studied the effects of excess nitrogen in terrestrial habitats, the effect on the [open ocean](#) remains unknown. Altieri et al. point out that it is incredibly important to understand where [excess nitrogen](#) is ending up so that scientists can better quantify the human impact on the Earth's [biogeochemical processes](#).

To investigate the origin of nitrogen that reaches the open ocean, the authors analyzed rain samples from Bermuda. The authors specifically looked at the different isotopes of nitrogen found in the rainwater's ammonium molecules, which indicates whether the nitrogen originated from anthropogenic sources, from land, or from the ocean.

Using a model that described sources and sinks of the nitrogen, the authors found that certain nitrogen isotopes likely represent ammonium recycled from the ocean, rather than ammonium inputted from an external source, such as pollution from human activities. The authors note that although these findings imply that the anthropogenic contribution of ammonium to the open ocean could be smaller than

previously thought, further research is needed on a larger scale to fully understand nitrogen transfer in the marine atmosphere.

More information: Altieri, K. E., M. G. Hastings, A. J. Peters, S. Oleynik, and D. M. Sigman (2014), Isotopic evidence for a marine ammonium source in rainwater at Bermuda, *Global Biogeochem. Cycles*, 28, 1066-1080, [DOI: 10.1002/2014GB004809](https://doi.org/10.1002/2014GB004809).

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