

Ocean acidification-driven changes to the supply of micro- and macronutrients in future oceans

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The world's oceans are acidifying at a rate that is at least ten-fold faster than at any time in the last 300 million years, with models predicting a doubling of atmospheric carbon dioxide by 2100. Over the last decade, a number of experimental studies have revealed potentially significant direct and/or indirect effects of ocean acidification on biogeochemical cycling, bioavailability, and biological requirements of micro- and macronutrient elements, including (but not limited to) C, N, Fe, and Zn. For instance, elevated carbon dioxide treatments in some cases have resulted in higher cyanobacterial N fixation rates, lower rates of microbially-mediated nitrification, altered C:N:P molar ratios and lower Fe and Zn requirements by phytoplankton, and changes in bioavailability of complexed Fe and Zn. The cycling of nutrient elements in future oceans will also likely be strongly coupled to changes in physical interactions between the atmosphere, ocean, and land, as well as changes in community structure and foodwebs. In this talk, I will summarize key findings regarding the expected ocean acidification-driven changes in nutrient biogeochemical cycles, discuss uncertainties, and identify gaps in our current knowledge that deserve attention.