Research Highlights

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More acid, less iron

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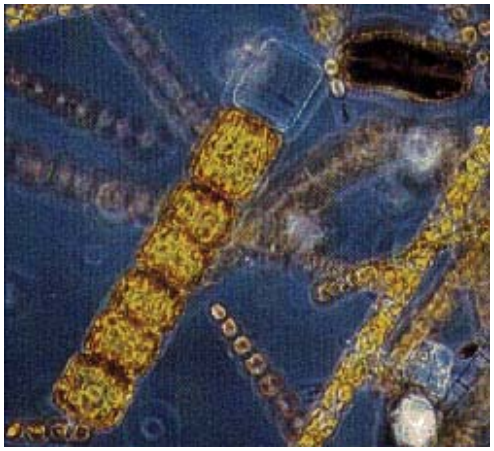

NASA

Rising carbon dioxide in the oceans may hinder, not help, marine phytoplankton blooms — because increasingly acidic waters could stifle their supply of iron, a crucial nutrient.

Dalin Shi and researchers at Princeton University, New Jersey, recorded a decrease in the uptake of iron by four species of plankton as their laboratory-controlled culture medium was acidified, changing from pH 8.6 to 7.7. At the same time, the concentration of bioavailable dissolved iron — in other words, iron not chemically bound by organic matter — dropped proportionately, suggesting that the phytoplankton's enforced diet was due to pH-induced changes in iron chemistry that made the nutrient less available to them, and not because of a physiological reaction to more acidic conditions. In samples of Atlantic surface waters, the team saw the same effect: on average, iron uptake by a marine diatom in these field experiments dropped 10–20% as ocean acidity increased by 0.6 pH units.

By 2100, ocean acidity is projected to increase by 0.3–0.4 pH units under a 'business as usual' emissions pathway. The researchers did not find that acidified waters reduced phytoplankton's intrinsic need for iron, suggesting that iron shortages could well diminish phytoplankton in many ocean areas as acidity increases.

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