



Small impacts of atmospheric N deposition on ocean carbon cycle.

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Simulations with the global ocean biogeochemical model PlankTOM10 (a Dynamic Green Ocean Model with 10 PFTs) forced with RCP8.5 scenario atmospheric N-deposition, show that by the 2090s the impact of a 22.07 Tg N/y (+175%) increase relative to the preindustrial control results in only a 1.5 Tg N/y increase in export @100m. The preindustrial control uses preindustrial N-deposition, while both simulations are forced with RCP8.5 climate. This small impact is due to compensating processes: a decrease in N₂-fixation of 13.65 Tg N/y (-11%) and an increase in denitrification of 3.12 Tg N/y (+2%). The impact on N₂O production is also quite small at 0.08 Tg N/y (+3.4%). The ocean N inventory increases by 4.52 Tg N/y, which is almost entirely inorganic N. The contribution of an increase in DOM inventory is negligible (0.05 Tg N/y). There appears to be substantial subduction of inorganic carbon into the deep sea that is not used by phytoplankton, and therefore is presumably deposited at times and places that primary production is not nitrogen limited.