



Global impact of pCO₂-sensitive increases in carbon export and nitrogen fixation

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A new model of global climate, ocean circulation and biogeochemical cycling is used to include recent experimental evidence of increases in biological C:N drawdown and in nitrogen fixation with increasing pCO₂. By the end of this century, our model results suggest a significant slowdown of the increase in atmospheric carbon by these two pCO₂-sensitive mechanisms not included in earlier studies that assumed constant stoichiometry. However, the same feedbacks lead to further increases in the volume of suboxic waters and in microbial reduction of fixed nitrogen. These changes brought about by non-Redfield biology are of a similar size as those induced by simulated changes in ocean physics. When combined with current estimates of oxygen sensitive N₂O production, the net impact of these non-Redfield biological processes may well turn out to further enhance global warming.