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Functional representation of nitrogen fixation in a Dynamic Green Ocean Model

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The processes of nitrogen fixation and denitrification are rarely considered in biogeochemical models. When included these processes are typically constrained by a fixed ratio of nitrogen to phosphorus. From a physiological perspective using a fixed N:P to describe nitrogen fixation appears limited, with nitrogen-fixing organisms decoupling nitrogen and phosphorus cycles. This is particularly important when considering the nutrient fluxes associated with bloom forming nitrogen fixers such as *Trichodesmium* spp. and their influence on ocean nutrient cycling.

This presentation shows results from the inclusion of nitrogen-fixing cyanobacteria, the response of denitrifying bacteria and the interactions with carbon and phosphorus cycles in a Dynamic Green Ocean Model. This is accomplished through the development of a Plankton Functional Type to simulate nitrogen fixation derived from previously developed physiological modelling studies. This approach allows the ability to simulate the interactions between the different biogeochemical cycles represented and the response of nitrogen fixation to physical ocean changes such as warming, stratification, and changes in circulation. Using this approach changes to primary productivity and export, induced by changes to the nitrogen cycle can be evaluated to assess the potential impact on climate.