**Surface reactivity of cyanobacteria: Implications for marine trace metal availability**

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Microbial biomass and dissolved organic carbon (DOC) both impact the cycling of marine trace elements due to their abundance, dominant negative surface charge, and high surface area to volume ratios. Marine trace elements including Co, Ni, Cu, and Zn are bioessential in that they are required for a variety of cellular processes including DNA and RNA synthesis, photosynthesis, respiration, and methanogenesis. However, the bioavailability of these trace elements can be affected by adsorption onto biomass and dissolved organic compounds. In modern marine settings, dissolved organic carbon (DOC) is the largest reservoir of fixed carbon and influences biogeochemical processes and the global carbon cycle. Accordingly, in this study we investigate the surface reactivity of the cyanobacterium *Synechococcus* sp. PCC 7002, and its derivate lysate as an analogue for marine DOC, to assess the affects they exert on marine trace metal cycling using a surface complexation modelling approach.

Unravelling the interplay between marine biomass and trace metals is critical for understanding modern marine trace element cycling, and the long-term evolution of trace metal bioavailability. Adsorption of trace metals to biomass and DOC can reduce their bioavailability in the water column and limited bioavailability of trace metals through time can affect the evolution of the marine biosphere, as well as their expression in the rock record. Additionally, sedimenting biomass can behave as an exit pathway for trace elements into sediments including BIF and black shales. Therefore determining the effects of adsorption to biomass and DOC is important for understanding marine trace metal cycling and trace metal availability through time.