

Response of phytoplankton metal quotas to oceanic gradients in dissolved and particulate metals

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Trace metals such as Mn, Fe, Co, Ni, Cu and Zn are required for numerous physiological functions in marine phytoplankton, and their availability can limit phytoplankton growth and community composition. Cellular metal quotas vary in response to dissolved concentrations in culture, but much less is known about quota variability in natural phytoplankton communities. Synchrotron x-ray fluorescence analysis was used to measure metal quotas of phytoplankton collected across oceanic gradients in dissolved and particulate metals in the northeast Pacific Ocean (GeoMICS cruise) and North Atlantic Ocean (US GEOTRACES cruise). In general, cellular responses to metal gradients are highly taxon-specific, with some groups clearly responding to gradients and others remaining relatively constant. Simultaneous shifts in community composition between coastal and oceanic environments further complicate our ability to discern relationships. I will summarize findings from both cruises and draw conclusions for representation of quota plasticity in biogeochemical models.