

Gene Expression as a Biological Reporter of Trace Metal Biogeochemistry: A Case Study with Diatoms Living in Different Iron Regimes in The North Pacific Ocean

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Rapid methodological advances in both analytical measurements of ocean chemistry and for detecting cellular readout in terms of genes and proteins expressed in response to *in situ* concentrations of biologically available trace metals are revolutionizing our understanding of trace metal biogeochemistry. This presentation will highlight how recent gene expression studies of natural diatom communities in the North Pacific are beginning to reveal the similarities and differences in strategies different taxonomic groups use to adapt to iron limitation. This presentation will also emphasize how laboratory studies of iron utilization with ecologically relevant organisms are important for revealing novel biological strategies for adapting to limiting conditions in the environment and for calibrating and interpreting an *in situ* biological response. Finally, we will present data showing that the *in situ* genetic response of diatoms indicates when sources of iron may not be biologically available in the coastal North Pacific and how biological assays may motivate more detailed future studies of metal bioavailability.