Increased iron bioavailability due to photochemical reduction at the ocean surface

K.M. BOLSTER[1]*, J.W. MOFFETT[1]

[1]Department of Earth Science, University of Southern California, Los Angeles, CA, 90089, USA (*correspondence: kbolster@usc.edu, jmoffett@usc.edu)

In the vast majority of the ocean, the thermodynamically favorable form of iron is iron(III), which rapidly forms insoluble oxyhydroxides or is bound by strong ligands [1]. However, iron(II) specific transporters such as feoAB have been identified by genomic studies of marine organisms, which suggests that iron(II) may be prevalent in the upper water column [2]. Photochemical reduction of iron(III)-containing minerals, or iron(III) ligand complexes could be a significant source of iron(II) to marine microbes, but measurement of the iron(II) produced is complicated by the presence of other compounds which accumulate at the ocean surface. Using DTPA as a masking ligand to account for those interferences, we have measured diel patterns of iron(II) at the surface which correlates strongly with incident sunlight. Organisms with iron(II) transporters could be taking advantage of this pool of bioavailable iron.

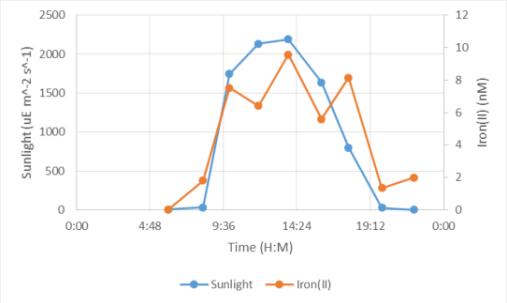

Figure 1. Diel cycling of iron and sunlight

[1] Rue & Bruland (1995) *Mar. Chem.* **50**, 117-138. [2] Hopkinson & Barbeau (2012) *Environ. Microbiol.* **14**, 114-128.