

# **Evaluating the factors controlling the dissolution of aerosol iron in seawater**

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The nanonutrient Fe is known to play an important role in phytoplankton metabolism. It can limit primary production and also influence phytoplankton community structures in certain regions of the world's oceans and indirectly influences climate change. The main source of iron to the euphotic zone of the oceans is from the atmosphere, by wet and dry depositions. The solubility of iron in the oceans is constrained and will vary both on spatial and temporal scales. The extent and kinetics of the seawater solubility of aerosol Fe are influenced by a complex array of chemical and physical processes. The impacts of these factors on aerosol Fe solubility are currently being investigated using FI-CL detection. These include (i) chemical influences i.e. end-member aerosols sources (urban /crustal); with/without additions of model siderophores, (ii) physical influences i.e. dark/light conditions, seawater aerosol concentrations, temperature (5°C and 25°C). Initial studies (dark/25°C) using NIST 1648 (representing an urban end-member) showed the fast release of dissolved iron, up to a concentration of 6.2 nM (representing a solubility of 0.45 %) from the aerosols within the first two hours. After this time the dissolved Fe (dFe) concentration decreases to 1.95 nM (0.14 %) after two days, possible as a result of re-adsorption onto aerosol particles and/or colloidal formation as a result of speciation changes of the dissolved Fe. Equilibrium was shown to be reached at day 5 with dFe concentration being 1 nM (0.07 % soluble). This talk will present results from kinetic studies taking into account some of the above factors.