Geophysical Research Abstracts,
Vol. 11, EGU2009-10960, 2009
EGU General Assembly 2009

The next generation of Ocean Iron Fertilisation Experiments

R. Lampitt (1) and L Rothstein (2)

(1) National Oceanography Centre, Southampton, United Kingdom (R.Lampitt@noc.soton.ac.uk / 44 23 80596247), (2) Graduate School of Oceanography, University of Rhode Island, Narragansett, USA (lrothstein@gso.uri.edu / 1 401-874-6889)

The potential of ocean iron fertilisation (OIF) to reduce atmospheric carbon dioxide has been widely discussed leading to a diversity of views as to whether this is an appropriate means to reduce global warming. Over a dozen open ocean purposeful fertilisation experiments have been conducted to date while several studies have examined natural fertilisation processes. Almost all of them have demonstrated that iron is in some locations a micronutrient that limits productivity. Application of this element can therefore remove limitation and generate phytoplankton blooms which may then lead to long term carbon sequestration. One of the shortcomings of past release experiments is that they have been of insufficient duration and covered too small an area of ocean. The range of processes studied has also frequently been limited such that conclusions about the magnitude of additional carbon that has been sequestered are somewhat speculative. Conclusions as to whether this is a viable geoengineering option have, as a result, large uncertainties and furthermore the risks of unintended consequences of fertilisation are poorly known.

We will present plans for an experiment which will be larger and of longer duration than previously achieved. An essential and unique component of the experiment will be a comprehensive numerical modelling program, designed to both inform the observing system (via simulation experiments) as well as to use the observations to 'upscale' regional information to forecast environmental impacts (e.g. to determine the quantity and duration of sequestration and potential downstream effects on nutrients). The modelling program will also highlight ecological, biogeochemical and physical process-oriented experiments, very high-resolution 'focus site' experiments, and significant data fusion, synthesis and model validation efforts.

The experiment will last for several years during which repeated fertilisation will be accomplished. It will draw on the highest standards of recent technology and techniques for observing the effects of the fertilisation process and it is hoped it will lead to a dramatic reduction in the uncertainties associated with OIF as a potential mitigation strategy.