ISIS Consortium release

Feb 22, 2011

With a mission of exploring the potential impact of iron fertilization of the oceans to reduce the amount of carbon dioxide (CO_2) in the Earth's atmosphere, an initial group of twelve universities and research centers from around the world has come together to form the ISIS (in situ iron studies) Consortium. The consortium has a website available at http://isisconsortium.org/ .

ISIS is a group of institutions and scientists who are motivated to answer the unknowns regarding the role of iron in regulating the ocean's capacity to remove atmospheric carbon dioxide. One approach to improve our understanding is to conduct open ocean studies of natural and deliberate iron fertilization (both in situ and with carefully designed numerical experiments) which allow scientists to study the impact of iron on marine ecosystems and to quantify its potential for CO_2 removal.

Consortium members have signed a Memorandum of Understanding that recommends the support of open experiments and the independence of each participant. The consortium will follow internationally accepted practices regulating ocean iron fertilization (OIF) research being developed under the London Convention/London Protocol. The ISIS mission was developed at a meeting in July 2010 (http://isisconsortium.org/workshop.pdf) by an initial group of academic and non-academic participants, where the motivation for further OIF research was explored. Support for that mission and has grown since that time to include additional scientists and their institutions. It is also important that non-Consortium members can become involved in ISIS related activities.

Iron fertilization to this point has been done mainly in research projects aimed at testing its effectiveness to stimulate plankton growth in limited areas of the ocean. In addition to 'macronutrients' such as phosphate and nitrate, phytoplankton also need 'micronutrients' such as iron. However, large tracts of the sunlit surface ocean are iron deficient, which limits phytoplankton growth. In these areas, iron can serve as a large lever on carbon sequestration.

Deliberate iron fertilization involves adding iron—usually chemical-grade iron sulfate—to an area of the sea in an effort to promote the growth of plankton, which, through photosynthesis, use CO_2 in the surface to produce organic carbon. When they die, a small fraction of this carbon sinks to the ocean depths where it can remain locked away for decades or even centuries.

It is already known that that iron fertilization can stimulate phytoplankton growth in the open ocean. However, previous open ocean studies of artificial and naturally occurring blooms conducted since 1993 have been limited in terms of spatial area, duration and the measurements made. These studies have been insufficient to

understand both the promise and the potential repercussions of the use of OIF as a carbon mitigation tool.

The ISIS group was formed to conduct an international scientific appraisal of iron and its impacts, intended and unintended, and its ability to sequester carbon and thus impact atmospheric CO_2. This will be achieved through further studies on both deliberate and natural fertilizations at larger scales of up to several hundred kilometers across, monitoring for months or years with more numerous and diverse instruments and leveraging the power of supercomputers to help design the experiments.

Ocean fertilization has not been without its detractors. Some opponents cite the risk of unintended environmental impacts, while others say it could distract from efforts to reduce industry-related carbon emissions into the atmosphere. The goal of the proposed research is to help answer the first set of questions.

The ISIS consortium recognizes that governments, scientific organizations and academies are now calling for more research into geoengineering techniques as climate change threats become more worrying. The consortium believes we are not yet ready to deploy these schemes, but that without good science governments may move ahead before enough is known about their efficacy and potential impacts.

The consortium also notes that no geoengineering approaches known today could ever play a dominant role in an overall portfolio response to climate change. If ever deployed, they must be part of a comprehensive and aggressive global effort to limit and eventually eliminate carbon emissions.

The initial twelve ISIS institutions that recently signed a memorandum of understanding and members of the ISIS Scientific Steering Committee include:

Antarctic Climate and Ecosystems Cooperative Research Centre, Australia—Tom Trull
National Oceanography Centre, United Kingdom—Richard Lampitt
Moss Landing Marine Laboratories—Kenneth Coale
Netherlands Institute for Sea Research—Hein de Baar
School of Ocean and Earth Science and Technology, University of Hawaii—Dave Karl
University of Illinois at Urbana-Champaign—Don Wuebbles
University of Maine—Fei Chai
University of Massachusetts Boston- Meng Zhou
University of Plymouth, Marine Institute—Maeve Lohan
University of Rhode Island—Lew Rothstein
Woods Hole Oceanographic Institution—Ken Buesseler
Xiamen University, China—Minhan Dai

For questions or public comments regarding this release, please contact Ken Buesseler (kbuesseler@whoi.edu) (US) or Richard Lampitt (r.lampitt@noc.soton.ac.uk) (UK)