Marine ecosystems

Pumping Iron

Iron feeding, the quick-fix for climate control is not the most eco-friendly

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RUSTED IRONY: Iron catalysed algae blooms instantly absorb CO2 from surroundings

TO FE OR NOT TO FE? That is the question the scientific community seeks to answer since the past 25 years, when John Martin, an oceanographer at the Moss Landing Marine Laboratory in California, suggested that addition of iron (Fe) to oceanic waters could spur the growth of algae and hence absorb greater amounts of carbon dioxide (CO_2) — a gas that contributes significantly to global warming — from the atmosphere.

In spite of high nutrient — such as nitrogen and potassium — presence, in certain oceanic regions, the growth of algae is stifled by lack of iron — its chemical symbol is Fe — which is a micronutrient. Micronutrients are essential nutrients, trace minerals or vitamins which are required by an organism in minute amounts. When added in small quantities in a process called ocean iron fertilisation (OIF), Fe induces the growth of algae that eventually die and sink to deep sea beds, taking particulate carbon along with them and thus, keep it out of circulation.

While about 11 expeditions have been undertaken to gauge the efficacy of this process as a viable option — and which could then be used in the carbon credit markets — it's not proven yet. On giving the ocean system such an iron 'jolt', a number of not-so-good consequences are inevitable: the depletion of oxygen from deep sea regions due to dead algae decomposition, emission of other greenhouse gases, such as methane and nitrous oxide, and an imbalance in aquatic food chain due to excessive absorption of nutrients by algae. Such effects are not restricted to the area under fertilisation alone. The demand for nutrients in the region under fertilisation will result in leaching off nutrients from other areas leaving them unproductive.

Taking another shot at unravelling the mystery of how much carbon is actually taken out of circulation and how much of it finds its way back into the ecosystem, Wajid Naqvi, scientist at National Institute of Oceanography in Goa, is heading a planned $4-million Indo-German expedition, LOHAFEX, to the north of the Antarctic in early 2009. The one-and-a-half-month expedition, a joint venture between India's Council of Scientific and Industrial Research and Alfred Wegner Institue for Polar and Marine Research of Germany, will observe the effects of fertilising a 2,500-sq km area with 20 tonnes of ferrous sulphate. While the scientific community is yet to determine the repercussions of ocean iron fertilisation, some commercial organisations have gone ahead and deployed the mechanism live. For instance, on 6 November 2007, San Francisco-based Planktos, a for-profit ecorestoration company with offices in the European Union and British Columbia, pumped in Fe into an undisclosed region in equatorial Atlantic Ocean in fear of being persued by environmentalists, the Sea Shepherd Conservation Society, in particular.

Scientists, obviously, are not thrilled. "We are not convinced that as yet, there is any scientific basis for issuing carbon credits for OIF," says Naqvi. "While the concept holds potential, the time is not yet right. When OIF is applied on a mass scale, it should be done by a body such as the UN to ensure no commercial interest."