



Twelve Cooling Effects of Iron Salt Aerosol

Sunlight Reflection

1. **Cloud Albedo:** Iron-based particles act as cloud condensation nuclei that increase cloud growth, whiteness and duration.
2. **Plankton gases:** Dimethyl Sulphide and Methyl Chloride are cloud-producing gases released by phytoplankton produced by ISA.
3. **Algae:** ISA makes the ocean more reflective by enhancing growth of calcium carbonate grown by widespread light-coloured coccolith algae species.

Atmospheric Removal of Greenhouse Gases

4. **Methane:** Iron Chloride generates chlorine radical atoms in sunlight that convert methane to carbon dioxide, cutting its global warming potential by about 97%. ISA also removes atmospheric methane through reaction with dry rock surfaces and production of hydrogen chloride and sulphate aerosols by plankton gases.
5. **Ozone:** Chlorine and bromine atoms generated by ISA convert low level ozone to non-warming oxygen, with no effect on the high-level ozone layer.
6. **Minor greenhouse gases:** Chlorine radicals destroy trace gases with high global warming potential such as hydrochlorofluorocarbons and remove dangerous pollutants such as carbon monoxide and volatile organic compounds.
7. **Black Carbon and Soot:** ISA increases the outwash of fine black and brown carbon soot particles that cause warming and air pollution.

Carbon Dioxide Removal

8. **Plankton Fertilization:** Each atom of iron added to the ocean can enable photosynthesis of up to 100,000 carbon atoms, increasing biological abundance, biodiversity and carbon storage.
9. **Land Plants:** Growth of forests and other plants in many regions is constrained by iron deficiency, known as chlorosis, which is alleviated by ISA.

Other Effects

10. **Mineral Weathering:** Erosion of silicate rocks from plant root and fungi growth is enhanced by ISA, increasing transfer of carbon dioxide from air into rocks.
11. **Ocean Circulation:** ISA cools ocean water, increasing the transport of oxygen, carbon and nutrients between the air, the ocean surface and deep ocean water and increasing carbon storage in ocean sediments and deep ocean waters.
12. **Methane Storage and Emission Reduction:** ISA protects existing methane storage in permafrost and inhibits microbial methane generation from wetlands and lakes.