

## ABSTRACT

---

Iron is limiting the growth of phytoplankton in 30% of the world's oceans. Organisms living in these HNLC (High Nutrient Low Chlorophyll) areas have developed a number of strategies to cope with this stress. These adaptations include optimization of iron uptake by the cell, special high-affinity iron uptake mechanisms that are up to 1000 times more efficient than in terrestrial plants but also in related lineages from eutrophicated coastal waters. In addition to efficient iron uptake, these organisms spare iron through modification of the enzymatic, especially photosynthetic apparatus as well as by storing iron using specialized proteins when its concentration in the environment increases sporadically. A closer understanding of these organisms will help us to better understand their problems in a changing climate. It will also help us to understand how they can be used to help mitigate the global climate change.

**Keywords:** adaptation, extreme environment, photosynthesis, phytoplankton, HNLC, climate change, ocean, iron