

Category

BE Biology, Ecology, Ecosystems, Biodiversity

Session Number

BE-2

Session Title

Phytoplankton, productivity and carbon export dynamics

Session Description

The biological fixation of carbon and its export to the deep in the Polar Regions strongly influence the global carbon cycle and the drawdown of atmospheric carbon dioxide (CO₂). Within the Polar Regions, the Southern Ocean accounts for 40% of uptake of anthropogenic CO₂ uptake, but its productivity is impacted by the limitation of the trace metal iron. Complex biological interactions take place in response to low iron (Fe) bioavailability, modulating biodiversity and Fe chemistry. Next to primary productivity, the export of carbon from the surface to the deep ocean (biological carbon pump) regulates atmospheric CO₂ concentrations. The degree to which this carbon is exported to the ocean interior is strongly regulated by the interaction of many different processes including: mineral ballast effects, biogeochemical factors, and ecosystem structure. Zooplankton behavior may channel this carbon through a number of routes (vertical migration, faecal pellet production). In the Polar Regions, determination of whether the ocean is a sink or source of CO₂ is strongly dependent on the dynamics of particulate organic and inorganic carbon export. This session aims to:

1-Explores the multiple impacts that iron limitation impose on phytoplankton productivity, ecosystem functioning and biogeochemistry across the Southern Ocean.

2- Disentangle the main drivers controlling the magnitude and transfer efficiency of carbon to the mesopelagic and deep ocean in both Polar Regions.

Keywords: primary production, carbon export, iron limitation, biogeochemistry, phytoplankton, zooplankton

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