family expansions, differential losses and gains of genes and introns, and differential mobilsability of transposable elements. Most significantly, we found the unprecedented presence of hundreds of genes from bacteria. The ancient origins of these gene transfers are confirmed by the finding that more than 300 are found in both diatoms, and many are likely to provide novel possibilities for metabolic metabolism and for perception of environmental signals. These findings go a long way toward explaining the incredible diversity and success of the diatoms in contemporary oceans.

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DISSOLVED COBALT DISTRIBUTION AND ITS ORGANIC SPECIATION IN THE ATLANTIC SECTOR OF THE SOUTHERN OCEAN DURING THE BONUS-GOODHOPE CRUISE (IPY-GEOTrACES).

In open-ocean waters, dissolved cobalt concentrations are low, typically in the nanomolar to picomolar range. It is known that cobalt is involved in biochemical functions such as the carboxyl anhydrase and the vitamin B12 in microorganisms. Studies using biochemical techniques have demonstrated that in surface seawaters most of the cobalt is chelated by strong metal-binding organic ligands. Determining dissolved cobalt and its organic speciation brought us interesting data to confront with other biogeochemical and physical parameters, allowing us to better constrain the biogeochemical cycle of this element. Here we present the preliminary results of the analysis of cobalt speciation and dissolved cobalt distributions from samples collected during the BONUS-GOODHOPE cruise between South Africa and the Weddell gyre. The cruise track crossed several frontal systems of the Antarctic Circumpolar current (ACC), giving us five deep profiles respectively sampled in Subtropical, Subantarctic, Polar, Southern ACC and the southern boundary of the ACC. We discuss cobalt biogeochemistry cycle along the BONUS-GOODHOPE transect in the light of biochemical and physical parameters such as macronutrients, chlorophyll and mass water characteristics.

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EN vi rONMENTAL CONTROL OF PHYTOPLANKTON FUNCTIONAL GROUPS – WHAT DO WE KNOW?

In the last decade there has been an increasing awareness of the relationship between phytoplankton groups and their pivotal role in the biogeochemical cycles of a range of elements such as carbon, nitrogen, phosphorus and sulphur. Other phytoplankton groups including diatoms, Phaeocystis spp., Nitrogen fixers, and cyanobacteria. We now have a relatively key phytoplankton groups and their pivotal role in the biogeochemical cycles of a range

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ORGANIC MATTER EXPORT IN THE OCEAN NOW AND IN THE FUTURE

The downward export of both dissolved (DOC) and particulate (POC) organic matter represent a crucial carbon for the ocean's interior. Future changes in both the magnitude and relative proportion of DOC and POC export potentially represent significant feedbacks to climate change. In this tutorial, I will apprise our current understanding of the factors that set export out of the surface ocean, and modify export; how ocean properties will be altered due to climate change, from coupled ocean atmosphere interactions with different biogeochemical cycles. However, what is less clear are the environmental factors that determine bottom-up control on each of these phytoplankton groups. Developing a mechanistic understanding of what factor(s) control the functioning of each group is needed before we can determine how climate change will impact phytoplankton community structure in the open ocean, and what the likely sign and magnitude of any feedbacks resulting from climate-change mediated floristic shifts. Here, I will explore the current status of our understanding using a range of approaches – from perturbation and lab culture experiments, to lessons from climate variability time-series and modelling studies.

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GLOBAL OBSERVATION OF DIFFERENT PHYTOPLANKTON GROUPS USING PHYTOODAS ON REMOTE SENSING DATA FROM SICAMACHY AND GOME-2 DATA.

In order to understand the marine phytoplankton role in the global marine ecosystem, it is necessary to derive global information on the distribution of major functional phytoplankton types (PFT) in the world oceans. So far only the dominant PFTs can be analysed from ocean color sensors such as CZCS, SeaWIFS, MODIS or MERIS. In our study we use PhytoODAS, a method of Differential Optical Absorption Spectroscopy (DOAS) specialized for phytoplankton, to retrieve the absorption spectra and concentrations of various phytoplankton groups from high spectrally resolved satellite data of SICAMACHY (Scanning Imaging Absorption Spectrometer for Atmospheric Cartography) on ENVISAT and GOME-2 (Global Ozone Measurement Experiment 2) on Meteosat. In situ measured phytoplankton absorption spectra were used to identify these characteristic absorption spectra in SICAMACHY data in the range of 430-530 and 530-590 nm. Pigment concentrations of in situ measurements were used to validate the satellite data, which showed a good agreement with the colocated in-situ measurements and with the NASA Ocean Biogeochemical Model. Results are of great importance for global modeling of marine ecosystems and climate change studies.

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Meeting Abstracts