



## Phytoplankton size-classes in the Southern Ocean: a remote sensing approach

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During the last years the potential effects of climate change in the polar regions have been recognized globally and the period of March 2007 to March 2009 was declared the 4th International Polar Year (IPY), a large scientific program focused on the Arctic and the Antarctic regions. These regions are considered indicators of global warming by the observation of ice melting and represent a sink of atmospheric carbon due to photosynthesis in the phytoplankton. Through photosynthesis carbon dioxide is fixed in the sea surface. The incorporated carbon is then exported to the deep sea by sinking of organic particles. Fixation and sinking of atmospheric carbon are parts of a process called biological pump. The intensity of this process strongly depends on the size and composition of cells in addition to the structure of the trophic community. Information on phytoplankton composition is needed to estimate the primary production and therefore to access the contribution of different phytoplankton types to the oceanic carbon cycle. In this study, we apply the method developed by Uitz et al. (2006) for quantifying the chlorophyll-a concentration (chl-a) which is associated to three phytoplankton size-classes (microplankton, nanoplankton and picoplankton) in the Southern Ocean (south of 30°S). This method involves the use of depth-resolved pigment data determined by high-performance liquid chromatography (HPLC) and data of chl-a concentration obtained by remote sensing. Each phytoplankton size-class has pigments which are specific of a single group so that phytoplankton types can be used as biomarkers. For example, high levels of fucoxanthin and peridin pigments indicate the predominance of microplankton species in a sample. Here we present a large dataset of HPLC pigment data collected during 37 cruises from 1985 to 2009. These data will be used together with monthly GlobColour data to apply the method of Uitz et al. (2006). Previous results will be compared with distribution maps of the major phytoplankton types retrieved with PhytoDOAS method from SCIAMACHY data (Bracher et al. 2009).

### References:

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Uitz, J., Claustre, H., Morel, A., Hooker, S. B., 2006. Vertical distribution of phytoplankton communities in open ocean: An assessment based on surface chlorophyll. *J. Geophys. Res.* 111: C08005, doi:10.1029/2005JC003207.