Tuesday, October 9
Poster Session 2
10:30–12:30

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Poster 158

INVESTIGATING THE PHYTOPLANKTON DIVERSITY IN THE GREAT CALCITE BELT: PERSPECTIVES FROM HYPER- AND MULTI-SPECTRAL SATELLITE RETRIEVALS AND NUMERICAL MODELING

This study highlights benefits and challenges of applying coupled physical/biogeochemical modeling and the synergistic use of different satellite retrieval algorithms for investigating the phytoplankton diversity in the Great Calcite Belt. This area is of great interest for understanding biogeochemical cycling and ecosystem functioning under present climate changes observed in the Southern Ocean. Our coupled model simulations of the phenology of various Phytoplankton Functional Types (PFT) are based on a version of the Darwin biogeochemical model coupled to the MITgcm ocean general circulation model, where both - the physical (including sea ice) and biogeochemical modules - are adapted for the Southern Ocean. The biogeochemical module, among 42 biogeochemical compartments, describes 6 various phytoplankton functional types: analogues of (large) diatoms, other micro-phytoplankton, prochlorophytes, other pico-phytoplankton (including small diatoms to represent required diversity in diatoms), nitrogen fixing phytoplankton and coccolithophores (as nano-phytoplankton with corrected physiology to account for high affinity for nutrients and ability to escape grazing control). As satellite-based PFT information, we consider products of the Differential Optical Absorption Spectroscopy applied to Phytoplankton (PhytoDOAS) using SCIAMACHY and OMI hyper-spectral optical satellite measurements. We also address aspects of combining this information synergistically (SynSenPFT) with the phytoplankton composition retrieved with OC-PFT based on multi-spectral optical satellite data (OC-CCI) and obtained by numerical modelling to allow for long time-series on the Southern Ocean phytoplankton diversity. To evaluate the satellite retrievals and model simulations we use in situ PFT observations obtained by a diagnostic pigment analysis as well as by scanning electron microscopy.

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