**EVALUATION OF BIO-OPTICAL MODELS FOR DISCRIMINATING PHYTOPLANKTON FUNCTIONAL TYPES IN THE CHUKCHI SEA**

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The vulnerability of the Arctic coastlines to climate change has become a well-studied question. Thinner ice and longer summers in the warmer Arctic are predicted results of climate change. Less ice means more light penetrating the water column. The influence of climate change on nutrient and carbon input from river runoff and thawing permafrost are difficult to predict. Current nutrient data for the Arctic Ocean are scarce. The consequences to phytoplankton community composition and, subsequently, on such processes as CO2 drawdown and primary productivity are not well understood.

Phytoplankton species are separated into phytoplankton functional types (PFTs) based on similar morphological and physiological characteristics. Bio-optical models have been developed to use satellite-derived products to discriminate PFTs, a recommended field measurement for the future NASA Pre-Aerosol, Clouds and ocean Ecosystem mission (PACE). The proposed 5 nm spectral resolution of the new ocean color sensor will improve detection of PFTs by discriminating finer optical features not detected at the spectral resolution of current satellite-borne instruments. In preparation for PACE, new and advanced PFT models are under development that require accurate data for validation.

Phytoplankton pigment data have long been collected from coastal and estuarine environments and are widely used to model phytoplankton size structure (Micro-, Nano-, and Picoplankton) or PFT abundances using two well-known methods: Diagnostic Pigment Analysis (DPA) and Chemical Taxonomy (ChemTax), respectively. Here we present the results of an effort to evaluate bio-optical PFT models based either on biomass (Chlorophyll a) or on light absorption properties of phytoplankton using data from the Chukchi Sea. PFT model performance is evaluated using flow cytometric data and output from DPA and ChemTax. Relative strengths of the model approaches are presented in the context of model needs for understanding anticipated changes in response to climate for this Arctic coastal ecosystem.

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