**PRIMARY PRODUCTIVITY ALGORITHMS IMPLEMENTATIONS**

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Remote sensing of ocean-color is a powerful tool to assess changes of the marine ecosystem in a warming Arctic Ocean. One of the key parameters to assess the health of the marine ecosystem and monitor its variation over time is primary productivity. Here we present a spectrally resolved, depth integrated primary productivity model (Bélanger et al., 2013) that computes primary productivity at a 3-hour time step. The model uses ancillary data from microwave sensor to derive sea-ice concentration for masking purpose and MODIS data to derive atmospheric properties (i.e., cloud fraction, optical thickness and ozone content) that are fed to a look-up-table to derive spectral irradiance at the sea-surface. Propagation of light through the water column is computed using bio-optical algorithms for IOPs (i.e., absorption and backscattering coefficients) and AOPs (diffuse attenuation coefficient). An implementation of this model that accounts for heterogeneous chlorophyll a vertical profile and phytoplankton phenology (Ardyna et al., 2013) is also presented. These algorithms are regionally tuned for the Arctic. We present a detailed description of the model with a constant chlorophyll a vertical profile and results obtained using MODIS data. Finally, we present brief results regarding the Primary Productivity Algorithm Round Robin-5 (PPARR5).

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