

OCEAN OPTICS XXIV

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Tuesday, October 9

Poster Session 2

10:30–12:30

Poster 110

MEASURING BIO-OPTICAL PROPERTIES IN COASTAL WATERS OF THE LAPTEV SEA AND LENA RIVER FOR THE IMPROVEMENT OF OCEAN COLOR ALGORITHMS

Thermal degradation of permafrost and intensified coastal erosion result in remobilization of organic carbon in the Arctic coastal areas, changing transport pathways and the magnitude of land-to-sea fluxes. Near-coastal waters in the Laptev Sea show extremely high absorption by colored dissolved organic matter (aCDOM), most of which derives from the huge discharge of the Lena River. Satellite retrievals of aCDOM and a strong relationship between aCDOM and dissolved organic carbon (DOC) in river-influenced waters offer the potential to identify DOC transport pathways and changes of fluxes. To retrieve aCDOM in Arctic coastal waters, Ocean Color processors and bio-optical models require bio-optical properties parametrized for a specific region. However, we lack in situ information. For example, the contribution of CDOM to the total absorption coefficient and the exponential slopes of aCDOM and non-algal particle absorption (aNAP) are unknown and often set constant in bio-optical models. To parameterize these properties, inherent optical properties (IOPs), apparent optical properties (AOPs) and the concentrations of constituents were simultaneously measured in situ in coastal waters of the Laptev Sea and in the Lena River. These unique multi-year observations show extreme spatial and temporal variations within the transition zone from river to ocean. Turbulent and chaotic regional processes, such as the spring ice break-up and mixing processes of river-, melt- and sea-water, result in rapid changes of optical properties. We implement the observed variability of parameters to semi analytical algorithms. With this we aim to improve the satellite retrieval of aCDOM in optically complex Arctic coastal waters.

Bennet Juhls, Free University Berlin, bjuhls@awi.de

Jürgen Fischer, Freie Universität Berlin, juergen.fischer@fu-berlin.de

Pier Paul Overduin, Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research, paul.overduin@awi.de