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# Using MERIS Sun-induced Fluorescence to Investigate Phytoplankton Dynamics in the Arctic

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Ocean colour remote sensing platforms such as the Medium Resolution Imager (MERIS) provide retrievals of chlorophyll-a concentrations (Chl-a) and sun-induced chlorophyll-a fluorescence (SICF). Both parameters offer wide applications for the monitoring of bio-geochemical processes in the ocean. Nevertheless the potential of SICF for future remote sensing operations and research is not fully exploited yet.

This study investigated the relationship between SICF and Chl-a data from 2003-2011. The study domain was limited to open ocean waters in the Arctic above 60° North and the months May to September. The data were retrieved from MERIS onboard ENVISAT and only standard products were used. Spatial and temporal analysis of the climatologies revealed an overall decrease in SICF and low correlation with Chl-a during the summer months compared to higher values and stronger correlations with Chl-a in spring and fall. This pattern aligns with seasonal and regional mixing processes in the study domain. Our comparisons with Mixed Layer Depth (MLD) climatologies for the same time period from the Hybrid Coordinate Ocean Model (HYCOM) displayed that there is a distinct relationship between the depth of the upper mixed layer, Chl-a and SICF. Further research promises to be useful for retrieving additional information such as the physiological state of the algae.