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Temporal and regional variability of vertical attenuation coefficient for downwelling irradiance in the Baltic Sea derived from SeaWiFS ocean color

Malgorzata Stramska (1,2) and Jagoda Bialogrodzka (1)

(1) Institute of Oceanology Polish Academy of Sciences, Poland, (2) San Diego State University, United States (mstramska@ucsd.edu)

Satellite-derived ocean color data improved substantially our understanding of phytoplankton biomass and primary production distributions within the world's oceans. Unfortunately, the interpretation of ocean color data still has significant limitations in the optically complex case 2 waters. One example of such an optically challenging region is the Baltic Sea. It has been shown in the past that, in the Baltic Sea, standard NASA ocean color algorithms generally do not produce good results (Darecki and Stramski, 2002). The best performance among all standard algorithms examined was achieved with the MODIS K_490 algorithm for estimating the diffuse attenuation coefficient of downwelling irradiance (Kd). The derivation of Kd with a semianalytical method performed even better, and the average of absolute percentage difference between in situ measured and semianalitically derived Kd was less than 14% (Lee et al., 2005). In this paper we present the results from an analysis of the the year-to-year temporal variability and spatial distributions of Kd in the Baltic Sea during the spring-summer months using SeaWiFs-derived data covering 10 years (1998–2007). We have compared interannual variability of Kd with patterns in local weather and physical properties of water masses. Note, that the diffuse attenuation coefficient of solar downward irradiance plays a critical role in many oceanographic research problems. For example, Kd is taken into account in parameterizations of radiative heating of the ocean, in models of primary production, and in studies discussing turbidity and water quality in oceanic and coastal regions. Thus, the analysis of the spatial and temporal variability of Kd in the Baltic Sea can lead to better understanding of this marine environment.