



Remote sensing of the cyanobacterial pigment phycocyanin in turbid inland water

Simis, Stefan G. H., Steef W. M. Peters, Herman J. Gons

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ABSTRACT: The pigment phycocyanin (PC) is a marker for cyanobacterial presence in eutrophic inland water. We present a reflectance band-ratio algorithm for retrieval of cyanobacterial PC. The model conforms to the band settings of the Medium Resolution Imaging Spectrometer. The parameters of the algorithm were optimized using reflectance and absorption data from two highly eutrophic lakes. Using measured specific absorption coefficients for PC [$a_{pc}^*(620)$] for every sample, the error in the predicted PC concentrations was 19.7% ($r^2 = 0.94$, $n = 34$) for measured PC concentrations up to 80 mg m⁻³. Applying a fixed value of $a_{pc}^*(620)$ caused an overestimation of the PC content that increased toward lower PC concentrations. The PC prediction best matched observed values during periods of high relative abundance of cyanobacteria in the plankton community. The results suggest strong seasonal variation in $a_{pc}^*(620)$. The presence of pigments other than PC and chlorophyll *a* (Chl *a*) and a variable influence of Chl *a* on retrieved absorption at 620 nm are potential causes of errors in PC retrieval. The algorithm in its current form is considered to be suitable for detection of the PC concentration in turbid, cyanobacteria-dominated waters.

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