

环境科学

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太湖梅梁湾水体组分吸收特性季节差异分析

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中文摘要

利用2006年8月、11月和2007年3月太湖梅梁湾水样实验室测定的水体组分固有光学特性数据和水质分析数据,分析水体中各组分在不同季节的吸收特性,并讨论不同季节光谱吸收的主导因子.结果表明,各组分在不同季节其吸收特性存在一定的差异,总悬浮吸收系数在夏季最大,在440 nm平均吸收系数为 $(7.49 \pm 3.0) \text{ m}^{-1}$,春季最小,440 nm平均吸收系数为 $(2.86 \pm 0.73) \text{ m}^{-1}$,且不同季节其吸收类型不同;非藻类颗粒吸收特性的季节性差异相对较小,其吸收系数和S值的差异主要是由于无机悬浮物含量和组成的不同导致的;由于藻类含量的差异导致浮游藻类吸收系数在夏季最大,675 nm平均吸收系数为 $(5.49 \pm 3.5) \text{ m}^{-1}$,秋季次之675 nm平均吸收系数为 $(2.03 \pm 1.14) \text{ m}^{-1}$,春季最小,675 nm平均吸收系数为 $(0.62 \pm 0.25) \text{ m}^{-1}$;而有色可溶性有机物(chromophoric dissolved organic matter, CDOM)吸收系数和S值的季节性差异性主要是由于其来源的不同,导致其浓度和成分的不同形成的.春、秋季由于无机悬浮物含量较高,非藻类颗粒物对总吸收的贡献大于其他组分,是水体总吸收的主导因子.而夏季由于浮游藻类含量较高,使其成为水下光谱的主要影响因素.

英文摘要

Seasonal variance in absorption properties of water constituents was analyzed and predominant factor of spectrum absorption in different seasons was discussed using the data sets collected in August and November 2006 and March 2007 from Meiliang Bay in Taihu Lake. The results indicate that, the absorption of water constitutions has seasonal variation characteristic. Total suspended sediment has the greatest absorption coefficient in summer, the average absorption at band 440 nm is $(7.49 \pm 3.0) \text{ m}^{-1}$, while the least absorption presents in spring, with average absorption value of $(2.86 \pm 0.73) \text{ m}^{-1}$ at band 440 nm. The total absorption type varies with seasons. Non-algal particle absorption has less seasonal variation than total absorption. The difference of non-algal particle absorption coefficient and slope S were caused by different concentration and composition of non-algal particles. Because of high chlorophyll a concentration, phytoplankton absorption coefficient was great in summer, with average absorption value of $(5.49 \pm 3.5) \text{ m}^{-1}$ at band 675 nm. The average of phytoplankton absorption at band 675 nm in autumn is $(2.03 \pm 1.14) \text{ m}^{-1}$, less than that in summer. The least absorption presents in spring, with average absorption value of $(0.62 \pm 0.25) \text{ m}^{-1}$ at band 675 nm. Difference of chromophoric dissolved organic matter (CDOM) concentration and constitution, mainly resulted by different source of CDOM, causes the seasonal variation of its absorption coefficient and slope S value. The predominant absorption factor varies with seasons. In spring and autumn, non-algal particles were the predominant spectrum absorption factor in water, because the concentration of inorganic matter is higher than organic matters in the two seasons. While in summer, phytoplankton becomes the main effect factor of spectrum absorption in water.

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