JWARP> Vol.3 No.1, January 2011

OPEN ACCESS

Spectral Geometric Triangle Properties of Chlorophyll-A Inversion in Taihu Lake Based on TM Data

PDF (Size:525KB) PP. 67-75 DOI: 10.4236/jwarp.2011.31008

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ABSTRACT

The main objective of this study was to develop and validate the applicability of the Area Chlorophyll-a Concentration Retrieved Model (ACCRM), Height Chlorophyll-a Concentration Retrieved Model (HCCRM), Angle Chlorophyll-a Concentration Retrieved Model (AgCCRM), and Ratio Model of TM2/TM3 (RM) in estimating the chlorophyll-a concentration in Case II water bodies, such as Taihu Lake in Jiangsu Province, China. Water samples were collected from 23 stations on the 27th and 28th of October, 2003. The four empirical models were calibrated against the calibration dataset (samples from 19 stations) and validated using the validation dataset (samples from 4 stations). The regression analysis showed higher correlation coefficients for the ACCRM and the HCCRM than for the AgCCRM and the Ratio Model; and the HCCRM was slightly superior to the ACCRM. The performance of the ACCRM and the HCCRM was validated, and the ACCRM underestimated concentration values more than the HCCRM. The distribution of chlorophyll-a concentrations in Taihu Lake on October 27, 2003 was estimated based on the Landsat/TM data using the ACCRM and the HCCRM. Both models indicated higher chlorophyll-a concentrations in the east, north and center of the lake, but lower concentrations in the south. The accuracy of results obtained from the HCCRM and the ACCRM were also supported by the validation dataset. The study revealed that the HCCRM and the ACCRM had the best potential for accurately assessing the chlorophyll-a concentration in the highly turbid water bodies.

KEYWORDS

Water Quality, Remote Sensing, Invsersion Model, Chlorophyll-a Concentration, Taihu Lake

Cite this paper

J. Chen, Z. Wen and Z. Xiao, "Spectral Geometric Triangle Properties of Chlorophyll-A Inversion in Taihu Lake Based on TM Data," *Journal of Water Resource and Protection*, Vol. 3 No. 1, 2011, pp. 67-75. doi: 10.4236/jwarp.2011.31008.

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