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A Generalized Satellite-based Method of Water Depth M Semiparametric Optical Model

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Abstract

Shallow water depth is one of the important factors in science and c
management. However, in-situ measurement is quite costly and time
research efforts have provided a number of optically-based methods
water depth distribution from satellite image, but they cannot proper
heterogeneity in bottom sediment distribution because they require i
assumptions or additional information on bottom reflectivity. It is th
develop a method that can be applied more generally to water areas
bottom material.

In any application of depth prediction methods, we need depth data
validate the results. A leave-one-out cross validation technique enal
for predictive model building without degrading the reliability of pre
From this standpoint, we present a new generalized method over th
methodologies by utilizing depth measurement data.

In the new method, the bottom reflection term of the optical model
nonparametric function of the depth-independent variables (bottom
calculated from the brightness values of the pixels. In this way, the v
by a semiparametric regression model. The ratios of the diffuse atter
which are needed to calculate the bottom index, are optimized to mi
Cross-Validation(GCV).

The new method is applied to 3 coral reef areas and artificially gene
prediction accuracy is compared with those of the methods propos
Stumpf et al., and Kanno et al. As a result, the new method is found
accuracy in cases that enough depth-known pixels are available and
apply well.

Keywords: Depth Estimation, Semiparametric Regression, Nonuni
Coral Reef

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