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Scientists from National Institute of Ocean Technology (NIOT) find a novel approach to predict chlorophyll- α in coastal-marine ecosystems

Scientists **Jayaseelan Benjamin Franklin, Thadikamala Sathish and Nambali Valsalan Vinithkumara** of **Atal Center for Ocean Science and Marine Biotechnology Division (Port Blair)**, Ocean Science and Technology for Oceans and National Institute of Ocean Technology, Ministry of Earth Sciences, Government of India, and **Ramalingam Kirubagaran** from **Marine Biotechnology Division (Pallikaranai, Chennai)**, Ocean Science and Technology for Islands, National Institute of Ocean Technology, Ministry of Earth Sciences, Government of India, recently developed a mathematical model based on the multiple linear regression and principal component scores (PCS-MLR) approach to predict Chlorophyll-α levels in coastal-marine ecosystems with maximum predictive power of 83.6% and 91.2% of variations in biotic and abiotic parameters and published in Marine Pollution Bulletin. This study improved the regression model by removing non-significant and indirect effective variables on the paradigm variable. A data-driven approach using the predictive power and limiting parameters derived from the current model promotes the validity of our model in predicting chlorophyll-α levels in other segments, provided that there are sufficient data with comparable biotic and abiotic conditions. In effect, the model or approach developed in this study could be a valuable tool to access and regulate Chlorophyll-α levels in coastal marine ecosystems. Understanding and modeling chlorophyll levels as a function of environmental parameters have been found to be very beneficial for the management of coastal ecosystems.

Chlorophyll-α is an established marker for phytoplankton wealth and biomass among essential nourishment makers in an oceanic biological system. The degree of Chlorophyll- α as a component of natural parameters have been seen as very beneficial for the administration of the seaside biological systems. This examination built up a scientific model to foresee Chlorophyll-α fixations dependent on an information driven demonstrating approach. Understanding and modeling the level of Chlorophyll- α as a function of environmental

parameters have been found to be very beneficial for the management of the coastal ecosystems. This study developed a mathematical model to predict Chlorophyll-α concentrations based on a data driven modeling approach. The prediction model was developed using Principal Component Analysis (PCA) and Multiple Linear Regression analysis (MLR) approaches. The predictive success (R^2) of the model was found to be ~ 84.8% for first approach and ~83.8% for the second approach. A final model was generated using a combined principal component scores (PCS) and MLR approach that involves fewer parameters and has a predictive ability of 83.6%. The PCS-MLR method helped to identify the relationship amongst dependent as well as predictor variables and eliminated collinearity problems. The final model is very straightforward and intuitive and can be used to understand real system operations.

The detailed paper which was made available online on 14 January, 2020 at:
https://sci-hub.tw/https://www.ncbi.nlm.nih.gov/pubmed/31957679

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