Statistical Model for the Forecasting of Spatial Chlorophyll Concentration in the Red Sea

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The phytoplankton is the basis of the marine food chain, and, as such, plays a key role in the ecosystem and fisheries. Thanks to satellite images we can estimate its concentration in space and time using the chlorophyll level as a proxy. In this work we propose a statistical model for the chlorophyll concentration spatio-temporal process. This model is twofold: A multivariate statistical model for the seasonal means and a physical statistical model for the modelling of the anomalies. We formulate this model in a Bayesian hierarchical modeling framework for inferring its parameters from the data. We also evaluate how the proposed model performs for filtering and forecasting the data compared to descriptive statistical models.