Design of Interactive Maps for Ocean Dynamics Data

by

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Submitted to the Department of Mechanical Engineering
in partial fulfillment of the requirements for the degree of

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Abstract

Comprehensive spatiotemporal modeling and forecasting systems for ocean dynamics necessitate robust and efficient data delivery and visualization techniques. The multi-disciplinary simulation, estimation, and assimilation systems group at MIT (MSEAS) focuses on capturing and predicting diverse ocean dynamics, including physics, acoustics, and biology on varied scales, thereby developing new methods for multi-resolution ocean prediction and analysis, including data generation and assimilation. The group has primarily used non-interactive ocean plots to visualize its simulated and measured data. Although these maps and sections allow for analysis of ocean physics and the underlying numerical schemes, more interactive maps provide more user control over depicted data, allowing easier study and pattern identification on multiple scales. Integrating static and geospatial data in dynamic visualization creates a heightened viewpoint for analysis, enhances ocean monitoring and prediction, and contributes to building scientific knowledge. This thesis focuses on explaining the motivation behind and the methodologies applied in designing these interactive maps.

Thesis Supervisor: Pierre Lermusiaux
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