The regional ecosystem modeling intercomparison project

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As an integral part of recent large-scale observational programs such as JGOFS (Joint Global Ocean Flux Study) and GLOBEC (Global Ocean Ecosystems Dynamics), models have been developed to simulate biogeochemical cycling in specific oceanographic regions; however, few quantitative comparisons of these models across regions have been made. As part of the Regional Ecosystem Modeling 'Testbed' Project, we are conducting intercomparisons to critically examine which ecosystem structures and formulations are best able to simulate observed data across regions, and to explore the reasons for their success. To facilitate these intercomparisons, we are developing a set of regional testbeds that contain one-dimensional physical forcing fields and biogeochemical data that can be used for assimilation or model validation. By running different ecosystem models using identical physical forcing fields, and by implementing the variational adjoint method to assimilate the same biogeochemical data, we can objectively compare different ecosystem models and modeling approaches.

Work to date has focused on two regions: the equatorial Pacific (140W) and the Arabian Sea (15.5N, 61.5E); plans for other regions including the Southern Ocean, BATS, HOT, and IronEx II are currently underway. Results presented will include those obtained from the optimization of models for individual sites, as well as the simultaneous assimilation of data from multiple sites. Participating models vary from the simplest four component (NPZD) models, to complex, multi-nutrient, multi-size class models. Initial results from the Arabian Sea indicate that more complex models do not perform uniformly better than simple ones.