



Improved synthetic ocean profiles for assimilation into operational ocean models

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Operational ocean data assimilation aims to transform simulations of realistic ocean conditions into an accurate representation of the ocean as it exists in real time. In such a system, ocean observations form the basis for assessing the difference between the true ocean and its modeled approximation. Relatively dense coverage from remote sensing facilitates such comparisons at the ocean surface; for example, real time global remote sensing provides on the order of 6 million surface temperature measurements per day, roughly 1 per 50 km². In contrast, global coverage of the subsurface is closer to 600 profiles per day, or 1 per 500,000 km². Faced with this data distribution, we seek methods that utilize surface remote sensing information and leverage climatological data for more informed subsurface predictions. We evaluate the performance of subsurface estimates developed through the Improved Synthetic Ocean Profiles (ISOP) project. These are incorporated into the Navy Couple Ocean Data Assimilation System (NCODA) for use in global Hybrid Coordinate Ocean and regionally nested ocean Navy Coastal Ocean models (HYCOM and NCOM). The impact is evaluated by comparing predictions from models in the standard operational and ISOP-assimilative configurations relative to unassimilated observations. Such comparisons are a basis for recommending transition of ISOP for operational Navy ocean prediction systems.