

Title:

Frontiers in operational global ocean forecast modeling

Speaker:

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Abstract:

We discuss some new developments in operational global ocean forecast modeling, in particular, the inclusion of internal tides and gravity waves in such efforts. Internal gravity waves (IGWs) are waves that exist along the interfaces of oceanic layers of different densities. Internal tides are IGWs of tidal frequency. At frequencies beyond tidal frequencies, there is a spectrum of IGWs known as the IGW continuum. Operational forecast models are used by the Navy and by European centers for near real-time applications such as anti-submarine warfare, search-and-rescue, oil spill forecasting, fisheries, and others. Traditionally, global ocean forecast models have been forced only by atmospheric fields. We show that when tidal forcing is added, we obtain fields of internal tides and the IGW continuum that compare reasonably well with observations from satellite altimetry, moored thermistors, and moored current meters. We pioneered the introduction of tidal forcing into global Navy ocean forecast models, and our lead has been followed in ocean models run on NASA supercomputers, and by the European ocean forecast group in Toulouse. We briefly discuss applications of such models for planning future satellite missions, and achieving a better understanding of ocean mixing.