



First Steps Toward a GMAO Coupled Reanalysis Using JEDI

NASA's Global Modeling and Assimilation Office (GMAO) is developing a new version of its long-term coupled reanalysis product. This forthcoming reanalysis will employ a Weakly-coupled Data Assimilation (WCDA) approach, integrating multiple Earth system components, including the atmosphere, ocean, sea ice, and land, via the Goddard Earth Observing System (GEOS) global coupled model. Central to this effort is the modernization of GMAO's existing Data Assimilation (DA) systems into the Joint Effort for Data Assimilation Integration (JEDI) unified DA framework, developed in partnership with the Joint Centers for Satellite Data Assimilation (JCSDA) consortium. The ocean DA component will utilize JEDI's Three-Dimensional First Guess at Appropriate Time (3DFGAT) methodology. Two hierarchies of results will be displayed in this presentation. Preliminary ocean-only DA experiments using JEDI and the GEOS coupled model have shown promising results, particularly in improving initial conditions for surface, satellite-derived fields such as Sea Surface Temperature (SST), Sea Surface Height (SSH), and Sea Surface Salinity (SSS). These advancements in ocean DA technology are critical in enhancing the accuracy of ocean predictions and understanding the impacts between the ocean and other Earth system components. The next phase will incorporate a greater number of ocean observations (e.g., in situ observations like Argo) along with sea ice concentration data to explore further improvements in ocean and sea-ice states via cycled ocean and sea-ice DA setup.

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