Towards strongly coupled ocean-sea ice-atmosphere data assimilation for the Global Forecasting System

Anna Shlyaeva (UCAR/CPAESS at NOAA/OMD), Guillaume Vernieres (NOAA/OMD)

The Global Forecasting System (GFS), developed at NOAA Office of Model Development, is used operationally for global weather prediction and to provide initial and boundary conditions for many operational applications. In version 17, its physical model is being updated to the Unified Forecast System (UFS), which couples the atmosphere/land, ocean, sea ice, and wave components, and its data assimilation is being upgraded to a weakly coupled approach. As part of this update, JEDI (Joint Effort for Data assimilation Integration)-based ocean–sea ice data assimilation was introduced in the GFS for the first time. Looking ahead to a future implementation, the GFS atmospheric data assimilation component is also being migrated to JEDI. This change to the data assimilation infrastructure opens the way to strongly coupled data assimilation. In this presentation, we describe progress towards coupled background error covariances using a machine-learning based balance operator.