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# The JEDI-GEOS application: NASA's development pathway for coupled Earth system data assimilation

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## Abstract

NASA's Global Modeling and Assimilation Office is developing a unified coupled data assimilation system based on the GEOS model and the JCSDA's Joint Effort for Data assimilation Integration (JEDI) infrastructure, to achieve its objectives in weather analysis and prediction, reanalysis, composition forecasting, and S2S prediction. The unified system does not mean a single configuration for all GEOS applications, but rather a configurable GEOS system within the JEDI framework. The focusing vehicle for building this capability is the recently initiated JEDI-GEOS application – a continuously evolving, continuously functional testbed encompassing the configuration files, workflows, and data access for instantiating end-to-end tests of new developments and establishing trusted baselines. An important objective of JEDI-GEOS is to produce the first JEDI-based candidates for replacing current-generation GEOS production systems. This talk summarizes the plans and progress in developing the JEDI-GEOS application. Work is progressing on three separate but convergent subprojects: (i) development of the GEOS-configured unified forward operator (UFO), to produce the JEDI-based observing system configurations for GEOS systems; (ii) development of a prototype weakly coupled atmosphere-ocean data assimilation system based on the coupled GEOS-MOM6 model currently operating within JCSDA's Sea-Ice Ocean and Coupled Assimilation (SOCA) framework; and (iii) development of the GEOS-JEDI applications workflow environment based on JCSDA's Experiments and Workflows Orchestration Kit (EWOK) and Research Repository for Data and Diagnostics (R2D2) into which (i) and (ii), and their extensions, will be incorporated.

**Keywords:** Coupled data assimilation, GEOS, JEDI, GMAO

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