

EGU21-12759

<https://doi.org/10.5194/egusphere-egu21-12759>

EGU General Assembly 2021

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The GMAO High-Resolution Coupled Model and Assimilation System for Seasonal Prediction

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The Global Modeling and Assimilation Office (GMAO) is about to release a new version of the Goddard Earth Observing System (GEOS) Subseasonal to Seasonal prediction (S2S) system, GEOS-S2S-3, that represents an improvement in performance and infrastructure over the previous system, GEOS-S2S-2. The system will be described briefly, highlighting some features unique to GEOS-S2S, such as the coupled interactive aerosol model and ensemble perturbation strategy and size. Results are presented from forecasts and from climate equilibrium simulations. GEOS-S2S-3 will be used to produce a long term weakly coupled reanalysis called MERRA-2 Ocean.

The climate or equilibrium state of the atmosphere and ocean shows a reduction in systematic error relative to GEOS-S2S-2, attributed in part to an increase in ocean resolution and to the upgrade in the glacier runoff scheme. The forecast skill shows improved prediction of the North Atlantic Oscillation, attributed to the increase in forecast ensemble members.

With the release of GEOS-S2S-3 and MERRA-2 Ocean, GMAO will continue its tradition of maintaining a state-of-the-art seasonal prediction system for use in evaluating the impact on seasonal and decadal forecasts of assimilating newly available satellite observations, as well as evaluating additional sources of predictability in the Earth system through the expanded coupling of the Earth system model and assimilation components.

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