

The GMAO Ocean Retrospective Analysis from the GEOS-5 Coupled System

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The GMAO ocean retrospective analysis spans 32 years from 1979 to the present day. The reanalysis uses the GEOS-5 coupled atmosphere-ocean model (GFDL's MOM4 ocean model coupled to the GEOS-5 atmospheric model) and an ensemble optimal interpolation method to assimilate ocean and sea-ice observations while the atmosphere is constrained to the GMAO's Modern-Era Retrospective analysis for Research and Applications (MERRA).

The ensembles used for estimating the background error covariances consist of 12 monthly ensembles of 30 forecast anomalies derived from a series of GEOS-5 seasonal hindcasts initialized every 5 days from 1981 to present. The choice of flow-dependent localization methods is validated during the Argo period when the need of flexibility in the covariance scale is most important. We present our estimate of the ocean state through the analysis of typical diagnostics, heat and salt content and climate variability in several regions as well as innovation statistics for assimilated and independent observations.

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