



## **Multi-Variate Salinity Assimilation Pre- and Post-Argo**

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Salinity data taking has increased rapidly in the period since the inception of the Argo profiling float array project. The impact of the assimilation of this data on the accuracy of the Predictive Ocean Atmosphere Model for Australia (POAMA) in re-analysis over the period 2000 to 2007 inclusive is studied using four re-analysis runs. The POAMA Ensemble Ocean Data Assimilation System (PEODAS) is employed to assimilate the data and model fields. PEODAS can be described as a poor-persons ensemble Kalman filter. An ensemble of perturbed model integrations is used to represent the system's time-dependent background error covariance field, and the resultant field utilised in the assimilation of data with a separate central model run. The background error covariance fields are multi-variate, and can be used to balance non-assimilated fields with the result of the analysis. A re-analysis which includes the assimilation of temperature and salinity data is compared with two re-analyses of varying levels of salinity field adjustment and a control run of continuous model integration without data assimilation. The ensemble-based multi-variate error covariances are found to greatly improve the accuracy of the modeled salinity fields in a data sparse environment, validating their use in pre-Argo hindcast projects.