



Practical Implication of Data Assimilation for Operational Seasonal Water Supply Forecasting

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Ensemble Streamflow Prediction (ESP) has become a popular method for operational seasonal streamflow predictions. ESP relies both on the estimation of initial conditions and historically resampled forcing data to produce seasonal volumetric forecasts. The accuracy of initial condition estimation is, however, particularly important due to the large quantities of water stored as snowpack or soil moisture. To improve the estimation of initial condition while better characterizing its uncertainty, we employed the ensemble data assimilation (DA) and linked it, with the ESP. Rather than relying entirely on the model to create single deterministic initial water storage, as currently implemented in many operational forecasting systems, this study incorporates in-situ data along with model predictions to create an ensemble based probabilistic estimation of water storage. This creates a framework to account for initial condition uncertainty in addition to forcing data uncertainty. The results presented in this study suggest that data assimilation has the potential to improve ESP for probabilistic volumetric forecasts while providing a more reliable predictive uncertainty in operational settings.