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## 1 Advances in Data Assimilation and Ensemble Hydrologic Forecasting: From Ensemble Kalman Filter to Particle Filter

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Accurate hydrologic forecasting is of paramount importance for effective water resources management. However, hydrologic forecasts are subject to hydrolometeorological uncertainties that pose a major challenge in operational setting. The development and application of uncertainty information is considerably complex but it holds significant advantage for several users including emergency services, flood control and hydro power producers and water resources managers. Therefore, a cohesive framework is needed to understand, characterize and reduce these uncertainties. A popular and effective framework to deal with the underlying uncertainties is the ensemble filtering methods. The present research focuses on the development of sequential Bayesian methods from Ensemble Kalman filter (EnKF) to Particle filter (PF) while the usefulness of these updating procedures to characterize and reduce the uncertainty in hydrologic predictions including parameter estimation, state estimation, and streamflow is elaborated.