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Planned multi-model ensemble hydrologic predictions in support of NOAA NWS-River Forecast Systems

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The NOAA National Weather Service (NWS) has 13 River Forecast Centers providing daily stream flow forecasts through their River Forecast Systems (RFS) throughout the U.S. to address a range of issues, including peak and low flow predictions as well as river floods and flash floods. Quantifying the RFS hydrologic prediction uncertainty is a primary need for NWS RFCs to identify the risk associated with the predictions and to identify areas of needed improvement. We plan to address this challenge by exploring multi-model ensemble initialization, calibration and constraint (data assimilation) within the NASA Land Information System (LIS). By enhancing LIS's calibration and data assimilation tools for multi-model ensemble application, and including multi-model ensemble channel routing, we will enable a platform for improved NWSRFS ensemble streamflow predictions. This project partially builds on an ongoing NASA - NOAA activity integrating the NOAA Sacramento and Snow-17 models in to LIS. An end goal of this planned work is to use the LIS multi-model data assimilation and data integration capability in conjunction with NOAA Office of Hydrology Development (OHD) hydrologic prediction expertise to study ensemble hydrologic predictions for selected NOAA and HEPEX test beds. We plan to improve hydrological forecast ensembles ($<$ 15-days) through data assimilation of NASA satellite products and the implementation of multi-objective calibrations of hydrologic model parameters. We further plan to develop, apply and validate NASA LIS-derived ensemble hydrological predictions with application and validation through the HEPEX Great Lakes Test Bed

and the NOAA NWS OHD Core Project Hydrological Sierra Nevada Test Bed.