

## Satellite inspired hydrology in an uncertain future: a H SAF and HEPEX workshop



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Type: **Poster presentation**

### Ensemble streamflow data assimilation with NOAA's National Water Model: Novel methods and evaluation applied to hurricane Florence hindcasts.

The National Oceanic and Atmospheric Administration (NOAA) Office of Water Prediction runs the National Water Model (NWM) operationally over the continental US. The model is forced by NWP products from NOAA's National Weather Service. The NWM simulates land surface and hydrologic states and fluxes: 1km land model, 250m overland and subsurface hydrologic routing, and streams at ~1.5 km.

We isolate a submodel of the NWM containing streamflow, lake, and deep groundwater ("bucket") components (all forced by upstream fluxes). Uncertainty is introduced via perturbations to deterministic forcing and the parameters of the streamflow and bucket models.

Ensemble assimilation is performed within NCAR's Data Assimilation Research Testbed (DART). The spatially- and temporally-adaptive inflation algorithm of El Gharamti (2018) is used. An along-stream localization strategy is introduced and a gaussian anamorphosis technique is used for the non-gaussian updated states.

We assimilate observations from the operational feed and a corrected version to demonstrate quality control issues on the forecast.

Methods are evaluated via OSSEs and then applied to a regional hindcast of hurricane Florence. Analyses and forecasts are compared to those based on the nudging assimilation currently employed in NWM operations. Standard streamflow forecast metrics are supplemented by a novel, wavelet-based event timing error metric.

#### Which session would you like to present in?

1. Novel hydrological data sources and assimilation techniques

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