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Title: Communicating Uncertainty and Risk in Water Resources: Using Innovative Displays of Hydrologic Ensemble Data

Abstract: The hydrologic ensemble forecasts produced by NOAA's National Weather Service contain useful information for decision support by water resources professionals. Existing products are based on the aggregate composition of ensemble members (hydrologic simulations) such as overall probabilistic flow volumes. However, other information can be derived by examining the flow simulations themselves. The hydrologic ensemble traces are best represented by using a time-based GIS-like approach to produce "raster hydrographs" which show configuration patterns within and between the different simulations.

Such configuration information can be the basis for a new suite of hydrologic products that would provide the manager, researcher or general user with a clearer picture of the uncertainty contained within hydrologic ensembles. A conditional analysis "time map" that incorporates exceedance probabilities is one such product. User driven customization of data displays is an area of hydrologic ensemble forecasting that has potential to improve the entire forecast product process. A case study based on 2018 seasonal water supply forecast for the Upper Colorado River at Cameo, CO site is provided to demonstrate the potential of this approach.