Probabilistic predictions in an era of change

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Hydrologists routinely produce probabilistic predictions spanning time scales from seconds to centuries in order to provide advance warning of floods, drought, and the possible impacts of climate change. The research community has recently demonstrated remarkable advances in probabilistic hydrologic prediction capabilities, but much work remains to be done. This presentation will summarize recent advances in generating station-based probabilistic spatial meteorological fields, in ensemble hydrologic data assimilation methods, in characterizing uncertainty in hydrologic models, and in developing probabilistic methods for spatial downscaling of Numerical Weather Prediction and Earth System models. We will illustrate important research advances in the key application areas of probabilistic streamflow forecasting and climate impacts assessment, discuss outstanding research challenges, and define practical steps to address major research challenges.