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# Operationalizing Continental-Domain Hydrologic Models: What can we learn?

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The explosion in the number of hydrologic models and technological advances in cloud infrastructure have combined to create new opportunities in operationalization of hydrologic science and models over the past decade. Colloquially, operationalization has been used to refer to deployments of previously existing model codes, themselves realizations of existing hydrologic science and conceptualizations, run in an unsupervised manner (e.g., automatically) driven by climate input variables that are contemporary (now-casting) or projected (forecasting). With advances in computational infrastructure and power, it has become possible to read, run, and visualize output from automated, operational models across continental domains. In the United States, recent endeavors include U.S. Geological Survey's integrated water availability assessments, an operational configuration of the Precipitation Runoff Modeling System in the National Hydrologic Model Infrastructure; the National Water Model, an operational configuration of WRF-Hydro for flood forecasting; and several more nascent efforts. While these efforts show significant technological advances in the communication of results of hydrologic models, we ask how they have contributed to advances towards expanding knowledge of the hydrologic sciences more generally. Operational configurations of continental-domain models build upon advances of catchment-scale hydrology generally focused on addressing a single management scenario. The extent to which these model configurations have the fidelity to address a wider range of management scenarios and the translation across spatial and temporal scales is not straightforward. In addition, continental-domain operational deployments allow for the visualization of large-scale hydrologic events (e.g., droughts and floods), but perpetuate problems with communication of accuracy and uncertainty at management-relevant scales. Here we explore how these technological advances can be leveraged to advance the hydrologic science that underlies our models.