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The Value of Humans in the Operational River Forecasting Enterprise

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The extent of human control over operational river forecasts, such as by adjusting model inputs and outputs, varies from nearly completely automated systems to those where forecasts are generated after discussion among a group of experts. Historical and realtime data availability, the complexity of hydrologic processes, forecast user needs, and forecasting institution support/resource availability (e.g. computing power, money for model maintenance) influence the character and effectiveness of operational forecasting systems.

Automated data quality algorithms, if used at all, are typically very basic (e.g. checks for impossible values); substantial human effort is devoted to cleaning up forcing data using subjective methods. Similarly, although it is an active research topic, nearly all operational forecasting systems struggle to make quantitative use of Numerical Weather Prediction model-based precipitation forecasts, instead relying on the assessment of meteorologists. Conversely, while there is a strong tradition in meteorology of making raw model outputs available to forecast users via the Internet, this is rarely done in hydrology; Operational river forecasters express concerns about exposing users to raw guidance, due to the potential for misinterpretation and misuse. However, this limits the ability of users to build their confidence in operational products through their own value-added analyses.

Forecasting agencies also struggle with provenance (i.e. documenting the production process and archiving the pieces that went into creating a forecast) although this is necessary for quantifying the benefits of human involvement in forecasting and diagnosing weak links in the forecasting chain. In hydrology, the space between model outputs and final operational products is nearly unstudied by the academic community, although some studies exist in other fields such as meteorology.