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Toward real-time water quality forecasts

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Toward Real-Time Water Quality Forecasts

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Abstract: Forecasts of river solute concentrations 1 hour to 30 days in the future could aid in predicting harmful algal blooms and engaging a now-focused public in discussions of local environmental conditions. Additionally, because first-generation concentration forecasts are likely to contain large inaccuracies, making these forecasts readily available opens doors to detecting new or previously unrecognized point sources, transformation hot spots, and other influential drivers. We applied calibrated solute models to near-term flow predictions at river and stream sites across the US, linking the extensive work of the United States Geological Survey's (USGS) National Water Quality Assessment Project with that of the National Oceanic and Atmospheric Administration's (NOAA) National Water Model discharge prediction web service. Our model integration produces uncertain and yet best-available water quality forecasts at sites across the nation. Here we propose and illustrate several metrics of model performance for those forecasts. In addition to quantifying current model skill, these proposed metrics could serve as benchmarks against which future models can demonstrate advancement toward a valuable and novel national forecasting capability.

Keywords: Solute; load; concentration; National Water Model; forecast