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A Comparison of the Temporal Sequencing of National Gridded Climate Datasets and the Effects of Climate Input Choice on Simulations Utilizing the USGS National Hydrologic Model

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Abstract: The U.S. Geological Survey (USGS) National Water Census is assessing the current state of water resources for the United States. The literature has consistently shown that various hydrologic models including distributed-parameter process-based, water balance, and statistical, have difficulty simulating hydrologic response in the semi-arid central U.S.; a north-south region from North Dakota to Texas. Inaccurate model simulations may result from inadequate or scarce data (e.g., climate and streamflow data), complex geology, undocumented anthropogenic impacts (water withdrawals or additions), limitations in model conceptualization, or limitations of model parameterization. One measure of hydrologic model performance is the ability to match observed streamflow volume and timing. Daily time step streamflow simulations have been developed using spatially-distributed, deterministic hydrologic models extracted from the USGS National Hydrologic Model parameterized for the Precipitation-Runoff Modeling System. Each hydrologic model uses four gridded climate datasets that have been developed for the conterminous United States using various distribution algorithms and spatial resolutions. To quantify the effects of climate inputs on model performance, this research focuses on (1) comparing the occurrence of precipitation for the four gridded climate datasets and (2) evaluating the effects of the choice of climate forcings on daily time step hydrologic simulation performance in the semi-arid central U.S.

***Keywords**:* hydrologic modeling; national hydrologic model; climate