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Predictably Predictable - The Role of Catchment Characteristics and Complexity.

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Accurate hydrologic modelling is critical to effective water resource management. As catchment attributes strongly influence the hydrologic behaviors in an area, they can be used to inform hydrologic models to better predict the discharge in a basin. Some basins may be more difficult to accurately predict than others. The difficulty in predicting discharge may also be related to the complexity of the discharge signal. The study establishes the relationship between a catchment's static attributes and hydrologic model performance in those catchments, and also investigates the link to complexity, which we quantify with measures of compressibility based in information theory.

The project analyzes a large national dataset, comprised of catchment attributes for basins across the United States, paired with established performance metrics for corresponding hydrologic models. Principal Component Analysis (PCA) was completed on the catchment attributes data to determine the strongest modes in the input. The basins were clustered according to their catchment attributes and the performance within the clusters was compared.

Significant differences in model performance emerged between the clusters of basins. For the complexity analysis, details of the implementation and technical challenges will be discussed, as well as preliminary results.