Towards Improved Seasonal Streamflow: Historical Climate Data Weighting or Climate Forecast for Hydrologic Model Forcing?

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The performance of Ensemble Streamflow Prediction (ESP) is compared with the one from a hydrologic model forced with climate model outputs. Weights are assigned to ESP ensemble members using large scale climate signals which are selected based on the spearman correlation. Principle Component Analysis (PCA) is found to increase the accuracy of the weighting scheme considerably. Fuzzy C-Means clustering, Formal Likelihood, Informal Likelihood and K- Nearest Neighbor approaches are applied for the weighting scheme. As an alternative approach to ESP, an additional climate dataset, the Climate Forecast System Reanalysis (CFSR) provided via the National Center for Atmospheric Research (NCAR) in its most recent reanalysis project is tested. Analysis is performed over the snow dominated East River basin to improve the spring ensemble streamflow volume forecast. The application of the bias corrected CFSR showed a considerable improvement to the conventional ESP. In addition employing the new weighting approaches in more accurately selecting the climate signals, and choosing the right number of PCs showed an improvement as compared with the conventional and CFSR data in ESP generation.