IDENTIFICATION OF TEMPORAL PATTERNS OF LONG-TERM HYDROLOGICAL SIGNALS IN LOWER MISSISSIPPI RIVER BASIN USING WAVELET ANALYSIS

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Estimates of surface hydrological characteristics in watershed ecosystems are essential to climate change assessment, water supply planning, water quality protection, ecological restoration, and water resources management. Wavelet analysis is one of the major data analysis methods developed during the last couple decades and has been proved to be a very successful technique for signal process, meteorology, oceanography, and water quality assessment. Using wavelet analysis, we analyzed the temporal patterns of hydrological signals, including precipitation, stream flow, and air temperature, in the Lower Mississippi River Basin (LMRB). The long-term (> 60 years) measured hydrological data used in the study were obtained from USGS surface water monitoring stations located in the headwater upstream areas (or quasi-pristine areas) within the LMRB. Our specific objectives were to: (1) identify the decadal temporal patterns of precipitation, stream flow, and air temperature in conjunction with the past climate change impacts in the LMRB; and (2) estimate the annual and seasonal temporal patterns of stream flow associated with recurrence intervals of low flow in the LMRB. Results and conclusions from this study will be presented.

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