

Streamflow Responses to Sea Surface Temperature Variations Across Oklahoma

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BACKGROUND/QUESTION/METHODS

Precipitation in Oklahoma is dominated by decadal-scale cycles of relatively wet and dry periods primarily controlled by large-scale climatic phenomena such as PDO and AMO. It is not well known how streamflow responds to these decadal-scale cycles of wet and dry periods and how this response varies along a precipitation gradient. In this study, we analyzed precipitation and streamflow data and calculated annual streamflow coefficient (ratio between annual streamflow/annual precipitation) from 1952 to 2015 for 14 meso-scale watersheds across the State of Oklahoma. The wet phases includes: 1957-62 and 1980-2000 and the dry phases includes: 1952-1956, 1965-1979, and 2007-2014.

RESULTS/CONCLUSIONS

In the arid and semiarid panhandle regions, precipitation is a poor indicator for long-term streamflow in general, with a relatively stronger correlation between annual streamflow and precipitation during PDO wet phases. In other regions of the state, precipitation accounts for 30-40% variability of streamflow, with a stronger correlation during the PDO dry phase, especially for the central part of the state. The streamflow coefficient decreases curvilinearly from southeast (up to 53%) towards the panhandle (less than 1%) along the precipitation gradient. Streamflow coefficient for a given watershed remains relatively constant for both dry and wet PDO phases.