

PROPOSED TITLE: Investigating the influence of historic alterations in land use and irrigation on local weather patterns over the Mississippi River Valley

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PROJECT SUMMARY: The Mississippi River Valley alluvial aquifer is a water-bearing assemblage of gravels and sands that underlies about 32,000 square miles of Missouri, Kentucky, Tennessee, Mississippi, Louisiana, and Arkansas.

The aquifer is overlain by a silt and clay unit that may be as little as 10 feet thick, and there is evidence that in some places the surface of the aquifer is influenced by the evapotranspiration of the deep-rooted trees in the bottomland hardwood forests which historically dominated the landscape.

There is also speculation that the movement of water from the aquifer, through the evaporation of the trees, significantly contributed moisture to the atmosphere, thus influencing local weather patterns, such as late summer thunderstorms.

Shallow rooted crops, such as soybeans and corn, would not have the ability to directly withdraw water from the aquifer and would potentially transpire less moisture to the atmosphere.

The goal of this thesis project would be to analyze hydroclimatic data in the geographic area of alluvial aquifer and compare them to historic alterations in land use and irrigation in an effort to detect evidence for changes in local weather patterns.

The selected student should be familiar with basic probabilistic and statistical methods, undergraduate-level hydrology, and hydraulics.

Excellent communication, interpersonal and organizational skills, and the ability to use independent judgment are required.



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