Temporal-Spatial Analysis of Missouri Weather and its Impact on Water and Natural Resources

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Since the onset of industrialization, air temperature over land areas has risen 1.53 ºC, twice as much as the global surface temperature (land and water) increase of 0.87 ºC. Climate change, including changing frequency and intensity of precipitation and extreme heat, severely impacts multiple ecosystem services and public health. In addition, changing weather dynamics makes growing crops and raising animals more difficult, negatively impacting food security worldwide.

Land provides the principal basis for human livelihoods and well-being including the supply of food and freshwater. In Missouri, agriculture, livestock production, and nature-based tourism are large economic drivers; all of which are impacted by vagaries of nature and climate dynamics. Furthermore, land is both a source and a sink of greenhouse gases (GHGs) and plays a key role in the exchange of energy, water and aerosols between the land surface and atmosphere. With increased global temperatures, extreme weather events (including heat waves and droughts) are projected to increase in frequency, complicating food, feed and fuel production and water management worldwide. Such climate-related consequences have been shown to increase rates of agricultural pests and diseases and overall reduce agricultural production. Understanding historical weather changes in Missouri and its interaction with land and water management allows for effective planning for climate adaptation.

Our study aims to establish vulnerabilities of Missouri land use to climate change. We use 40-year daily records of precipitation and temperature from 933 sites and develop a suite of climate change indices that reveal the state-wide picture of trends in extreme events related to temperature and precipitation. Our results will be valuable for planners and policy makers who are involved in Missouri's land and water resources management.

http://etccdi.pacificclimate.org/list_27_indices.shtml

https://www.ipcc.ch/srccl/