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# CSUB Geology Seminar

Fall 2021

**Dr. Julie Griffin**

## Orbital Forcing of Precipitation Recorded in an upper Paleozoic Cyclothem of the Midcontinent, USA



Dr. Julie Griffin first became interested in Geology at Bryn Mawr College, where she earned a Bachelors in Arts. She continued her exploration into Earth's climatic history at the University of California, Davis, where she earned a Master's and PhD in Geology. She currently works at California State University - Sacramento as an Assistant Professor, teaching students about the Earth's sediments, geochemistry, history, and natural disasters.

Events repeated through Earth history within different boundary conditions reveal fundamental mechanisms of the climate system. One such mechanism is potentially shifts in tropical precipitation patterns caused by orbitally forced changes in the distribution of solar energy. These latitudinal oscillations in precipitation patterns occur annually and over 20,000-year periods in the Pleistocene but have not been recognized further back in time. Here we show that orbitally forced changes in precipitation also occurred during the late Paleozoic Ice Age. Geochemical records from the Swope cyclothem of Kansas, USA, reveal periodic influxes of fresh water to the Midcontinent Sea during the Pennsylvanian. These freshwater influx events were likely caused by increased tropical precipitation. Sequence stratigraphic analysis and correlation other Missourian/Kasimovian (~305 Ma) deposits provides a temporal framework for these events and suggests an orbital driver. Orbital forcing of tropical precipitation must be considered a fundamental mechanism of Earth's climate since it is now recognized annually, during the Pleistocene, and during the Paleozoic.

**Date: Wednesday, Sep 22<sup>nd</sup>, 2021, Noon to 1 pm**

**Zoom link - <https://csub.zoom.us/j/98967782285>**