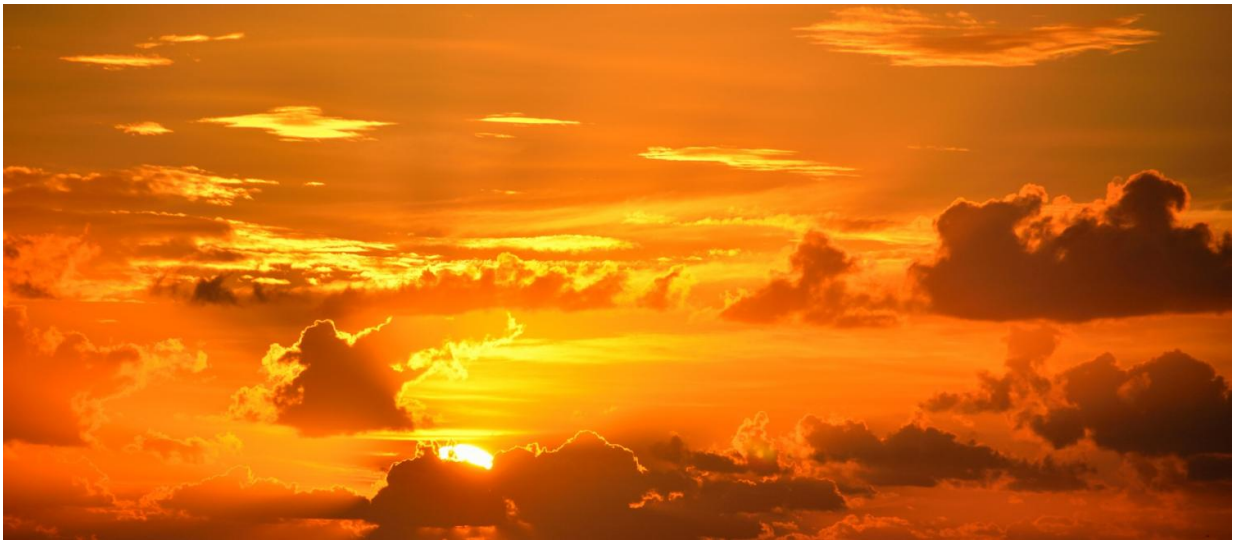
New method of studying sediment could predict climate change impact

April 16 2019



Credit: CC0 Public Domain

Sedimentary deposits tell a story about how the Earth responded to a changing climate in the past and are an important tool for predicting what climate change will mean for the future. A new study by a University of Arkansas researcher focuses on the origins of sediment, an approach that could make interpreting the deposits easier and more accurate.

Scientists often rely on the concept of sediment supply, which is the quantity of sediment deposited in an area over time, to reconstruct

processes such as climate, erosion and tectonic upheaval responsible for the deposits. But the idea can be difficult to apply in real-world scenarios because those same forces alter the sediment supply in many ways, scrambling the story scientists are attempting to decipher. Glenn Sharman, assistant professor in the University of Arkansas Department of Geosciences, is the first author of a new study suggesting that determining where the sediment originated, its "provenance," makes its origin story easier to decode.

"In real world situations, it can be hard to constrain the quantity of sediment in a systematic way," said Sharman, who wrote the paper with colleagues from the University of Texas. "The origin of the sediment is another parameter that can be applied to real world examples."

Sharman and his colleagues started with the idea that research on the sedimentary record was focused on certain parameters, such as sediment supply, that are difficult to quantify because of the variables involved. For their experiment, they created a model comparing sediment origin with supply to determine how each was affected by changes in tectonic uplift and precipitation.

They found that sediment supply and provenance reacted differently to the changes, and that by considering both factors researchers might be able to get a more accurate picture of the forces shaping the landscape. Their results were published in *Nature Scientific Reports*.

"The Earth has had a changing climate in the past, we know that," Sharman said. "We know it is changing now. If you understand how it has responded in the past it might give you some indication of how it will change in the future."

More information: Glenn R. Sharman et al. Conversion of tectonic and climatic forcings into records of sediment supply and provenance,

Scientific Reports (2019). DOI: 10.1038/s41598-019-39754-6