

1 Introduction

The period between 2000 to 1200 years before present (circa 50–750 CE) encompasses significant climatic transitions that influenced environmental and societal developments. While much research has focused on Eurasian contexts, North American stalagmite records also offer valuable perspectives on regional hydroclimate variability during this interval. Previous findings reveal that the Late Holocene was a period of significant hydroclimate instability across eastern North America, with implications for vegetation dynamics, agricultural productivity, and human settlement patterns. Droughts and wetter intervals appear to have exerted considerable pressure on ecosystems and societies, influencing resource distribution and resilience strategies. Moreover, the synchronization of hydroclimate changes with global climatic events underscores the role of broader drivers such as solar activity and ocean-atmosphere interactions. Stalagmite-based reconstructions thus provide a critical baseline for assessing natural variability before anthropogenic climate forcing and offer valuable insights into how societies historically adapted to environmental challenges.

In my research I focused on stalagmites of late Holocene age from three different caves in Midwestern USA (Donnehue's Cave and Eller's Cave in S Indiana and Flogelpole Cave in SW Illinois).

2 Activities and Findings

We milled three stalagmites - one from each of the studied caves. (DC14, EC2 and FC1) and collected sub-samples at a 0.2 mm interval in order to obtain a high resolution for the isotope profile. We then analyzed the stable isotopes ($\delta^{18}\text{O}$ and $\delta^{13}\text{C}$) for these three stalagmites and observed variations of up to 4 per mil in the $\delta^{13}\text{C}$ and up to 2 per mil in the $\delta^{18}\text{O}$. We also obtained preliminary U-Th ages for these stalagmites. In order to accurately interpret these results we need to obtain additional U-Th ages and construct a complete age-depth profile for each of the stalagmites.

3 Collaborations

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