



Investigating the nature and timing of the earliest human occupation of North America using a novel integration of biogeochemistry and sediment micromorphology

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Coprolites contain a suite of biomolecules and microfossils, making them incredibly useful palaeoenvironmental and palaeodietary archives. The short-term nature of their production within the human body offers a very high temporal resolution, contrasting with traditional dietary proxies in archaeology such as skeletal C/N isotopes, which give an average lifetime signal. Some of the earliest evidence of human occupation in North America is a coprolite from Paisley Caves (Oregon, USA) which contained ancient human DNA in a matrix dated between 14,170 to 14,340 cal BP. However, there have been debates over the stratigraphic integrity and preservation of the aDNA. This debate is difficult to resolve as there is currently little understanding of the nature of biomolecule taphonomy and movement within the cave environment. Before broader questions of palaeodiet and resource use of these early settlers can be investigated, the identification of coprolite proxies as human or otherwise must be confirmed, and their stratigraphic integrity assessed. This research aims to address these issues by using a novel integration of biogeochemistry and sediment microstratigraphy to investigate the survival and taphonomy of different biomolecules within the cave environment and to understand how these early settlers interacted with their seasonal environment.