

## **A biography of obsidian: Using a combined approach to compile the material culture of volcanic glass**

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Obsidian has been a useful material throughout archaeological time. The history of a single piece or artefact of obsidian can contain evidence for the conditions and timescales of pre-volcanic magma storage, volcanic formation, subsequent quarrying techniques, provenance and shaping in antiquity, use by people, and the burial conditions and timings. In this way, obsidian is a special class of object which records much of its own history, including both the natural and the anthropogenic components, which makes it particularly useful in reconstructing material biographies. Here we survey those details that can be recorded and those that cannot and the techniques available to decipher this history. We show that geochemical provenance techniques, purposeful abrasion and shaping of obsidian objects, and post-burial timescales by diffusive mass transfer, are the three major classes of biographical information that can be gleaned from an artefact of volcanic glass. These three classes of information yield details of distinct periods of the object's history. We contrast these classes with the biographical tools available to study non-glassy volcanic and archaeological materials. We propose that the combination of glass science, volcanology and archaeology can yield uniquely detailed constraints on the material culture of obsidian and, indeed, other glass objects, natural or human-made, through human history. As volcanic glass was traded widely and over long periods, we explore the cycles of use, discard and re-use and the way that complex histories can challenge an analytical object biographer. We conclude that volcanic glass holds an especially detailed record of human relationships with volcanic materials in general.