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Canyon Creek revisited: New investigations of a late prehispanic turquoise mine, Arizona, USA

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ABSTRACT

Turquoise has been used in the American Southwest since "time immemorial," and remains an important material for contemporary indigenous groups of the region. Detailed studies of ancient turquoise mines are few, however, and inferences of turquoise procurement and provenance have been limited. Our intensive investigation of one mine, the Canyon Creek locale in Arizona, integrates archaeology and geochemistry to enhance understanding of the mine and its output. A detailed description of the mine's morphology and geologic setting lays foundations for interpreting an isotopic analysis of specimens from the mine's four localities. The analysis reveals extremely radiogenic Pb isotope ratios, which distinguish Canyon Creek turquoise from that of other known sources in the American Southwest. Its distinctive isotopic signature makes Canyon Creek turquoise readily identifiable in archaeological assemblages. The presence of turquoise from Canyon Creek at late prehispanic settlements in east-central Arizona helps clarify the mine's chronology of use and regional distribution. Our observations suggest the mine was larger than previously supposed, and that it provided an important source of turquoise for inhabitants of the region during the thirteenth and fourteenth centuries AD.

1. Introduction

Turquoise is an icon of the American Southwest. As color and material, turquoise is fundamental to the worldviews of numerous indigenous groups of the region, with notable links to moisture, sky, and personal and familial vitality (Bennett, 1966; Ferguson and Hart, 1985; Hedquist, 2017; Hill, 1938, 1947; Parsons, 1939; Pogue, 1915; Whiteley, 2004, 2012). Archaeological occurrences, often concentrated in extraordinary contexts like ritual caches and burials, further demonstrate the ancient and enduring importance of turquoise (Hedquist, 2016; Hodge, 1921; Mathien, 2001; Mills, 2008; Mills and Ferguson, 2008; Plog, 2003; Windes, 1992).

Previous surveys have identified at least two dozen turquoise deposits in the American Southwest with clear evidence of prehispanic exploitation (Weigand and Harbottle, 1993; Weigand et al., 1977; see also Johnston, 1964; Leonard and Drover, 1980; Mathien, 1995; Warren and Mathien, 1985; Welch and Triadan, 1991). An unknown number of additional prehispanic sources are likely to have been exhausted or destroyed by historical or modern mining practices, such as the open-pit mining of copper (Mathien, 2000). To date, however, few archaeological studies of turquoise mines have been undertaken (for examples, see Leonard and Drover, 1980; Warren and Mathien, 1985; Welch and Triadan, 1991). The lack of comparable data sets on, for example, the size of workings, chronology of use, cultural affinities of the miners, and distribution of extracted minerals has inhibited comparative and synthetic assessments of prehispanic turquoise mining and trade in the American Southwest and beyond.

In this paper, we seek to enhance knowledge of ancient turquoise mining and exchange by providing new documentation of the Canyon Creek mine, a prehispanic turquoise source located on the Fort Apache Indian Reservation in Arizona (Fig. 1). Building upon earlier work, we refine measurements of the mine's morphology and reconstruct estimates of mining intensity. In addition, we examine the archaeological distribution of turquoise from the mine using measurements of lead (Pb) and strontium (Sr) isotopes. Our findings confirm the mine served as a significant source of turquoise for Ancestral Pueblo settlements of the American Southwest during the thirteenth and fourteenth centuries AD.

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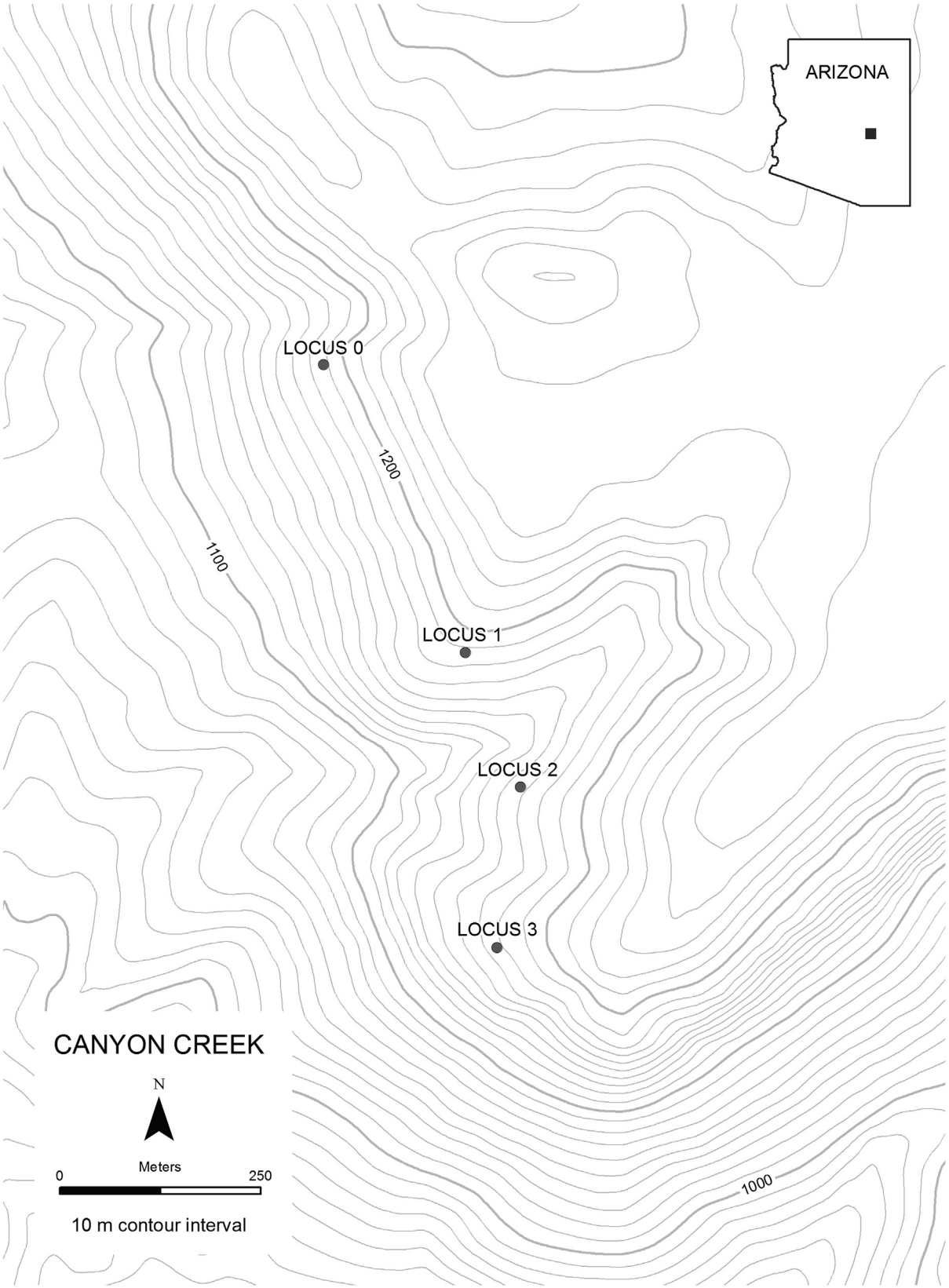

Fig. 1. Mine overview. Contours are in meters above mean sea level.