Petrographic Analysis and Provenance of Ground Stone Tools from the Northern Channel Islands and Coastal Southern California*

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Abstract

Eighteenth century Spanish explorers observed and documented the exchange of tools and goods between various Chumash tribes in Southern California. Mortar, pestle, and matate samples from documented archeological sites on the northern Channel Islands and within the northern California Bight Regions consist of a range of lithologies, including sandstone, volcanic rocks, and sedimentary concretions. By identifying where stone tools were produced in relation to the locations where they were ultimately found, our study attempts to provide constraints on the reconstruction of trade relationships of the indigenous people. Petrographic analyses and detailed descriptions on a sample set of these tools will aid in determining the correlative source lithologies from the area, providing insights to the extent of Chumash trade networks within the late Holocene. Exposures of volcanic rocks and resistant sandstones located throughout the northern Channel Islands are known resources and stone tool production sites used by the Chumash. Archaeologists and geologists have rapidly progressed the understanding of many cultures throughout the world by determining provenance of implement artifacts. The Chumash have an extensive history, and by applying petrographic analysis and detailed descriptions of these samples, we can further grasp the culture of these prominent and important peoples.

References Cited


Petrographic Analysis and Provenance of Ground Stone Tools from the Northern Channel Islands and Coastal Southern California

Shawna Couplin, California State University Northridge; Marsaglia, Kathleen, California State University Northridge; Delaney, Colleen, California State University Channel Islands

Abstract:

Mortar and matate samples from documented archaeological sites on the northern Channel Islands and the northern California bight region consist of a range of lithologies, including sandstone, volcanic rocks, and sedimentary concretions. Eighteenth century Spanish explorers observed and documented the exchange of tools and goods between various Chumash tribes in southern California. By identifying where stone tools were produced in relation to the locations that they were ultimately found, our study attempts to provide constraints on the recognition of trade relationships of the indigenous people. Petrographic analysis and detailed descriptions on a sample set of these tools will aid in determining the correlation of source lithologies from the area, providing insights into the extent of Chumash trade networks within the late Holocene. Exposures of volcanic rocks and resistant sandstones located throughout the northern Channel Islands are known resources and stone tool production sites exploited by the Chumash. By identifying potential source outcrops, we have found that sources for this set of tools are in some cases relatively limited. Archaeologists and geologists have rapidly progressed the understanding of many cultures throughout the world by determining the provenance of implement artifacts. The Chumash have an extensive history, and by applying petrographic analysis and detailed descriptions of these samples, we can further grasp the culture of their unique society.

Methods:

A set of groundstone mortars and mortates was compiled from collections from the Anthropology departments of CSUN and CSUCI. The samples were carefully cleaned and photographed prior to destructive analysis for thin section production. The hand samples were described using classification schemes after Williams et al. (1982) for sedimentary samples, and Le Maitre et al. (2002) for igneous rocks. Using unit descriptions on geologic maps, such as those by Dibble et al. (largest scale 1:24,000), a "potential source" map was created using an open source GIS system. The potential units that have viable sandstone and volcanic units based on the sample descriptions show the limits of outcrop sources. Thin sections of each sample were made and stained for identification of calcium, sodium and potassium feldspars. This section descriptions followed, and artifacts were grouped based on their components and characteristics (i.e. grain size, sorting, cementation, etc.). While describing the thin sections, careful attention was paid to unique mineralogy and textural features that were used to group the samples. In cases where sandstones are particularly ambiguous, the Gazzzi-Dickinson point counting method has been implemented to constrain source lithologies and to either differentiate or assemble such sandstones.

Preliminary Results & Discussion:

The native Americans of the region had an incredibly complex chieftaincy society. Tribes were specialized in crafting canoes known as 'flower pot mortars', given its size and shape. Stone tools on the islands has been focused on tribes specialized in crafting canoes known as 'flower pot mortars', given its size and shape. Stone tools on the islands has been focused on tribes specialized in crafting canoes known as 'flower pot mortars', given its size and shape. Stone tools on the islands has been focused on tribes specialized in crafting canoes known as 'flower pot mortars', given its size and shape. Stone tools on the islands has been focused on tribes specialized in crafting canoes known as 'flower pot mortars', given its size and shape. Stone tools on the islands has been focused on tribes specialized in crafting canoes known as 'flower pot mortars', given its size and shape.

Sandstone types and site localities:

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