

The Field Museum

DEPARTMENT OF ANTHROPOLOGY PROPOSAL FOR DESTRUCTIVE ANALYSIS

Requesting Party: Mark Golitko

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Research Facility (if different from above): Field Museum Elemental Analysis Facility (EAF)

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Purpose of proposed research: I propose to chemically analyze pigments used to paint the hafts of obsidian tipped daggers housed in the museum's Pacific collections using Laser Ablation-Inductively Coupled Plasma-Mass Spectrometry (LA-ICP-MS). The data collected will be compared to source data generated non-destructively using PXRF on the obsidian tips of the same daggers. These data will be utilized to examine whether or not differences can be established between pigments utilized on daggers made from different obsidian sources (suggesting that the daggers may have been entirely produced in the same place) or whether pigment chemistry suggests that blades produced from different obsidian sources may have been transported to other communities for hafting.

Description of sampling and testing procedures: During this pilot study, 20 daggers will be sampled stratified by blade source material and decorative motif from a set already analyzed by PXRF. A small flake of pigment will be removed using a metal blade over an area of ~2x2 mm from the haft of each dagger. In cases where pigment has flaked off during storage, this material will be sampled rather than removing a fresh flake of pigment. Sampling will be restricted to areas of red hematite based pigment. These pigment flakes will be analyzed using LA-ICP-MS. Chemical analysis by ICP-MS involves ablating 555 micron wide, 5 micron deep raster lines across the surface of each pigment flake. This produces damage that is invisible to the naked eye. After analysis, all pigment flakes will be bagged and rehoused with the dagger from which they were sampled. Depending on results, this pilot study will form the basis for a future larger scale analysis of pigments combining both LA-ICP-MS and PXRF.

Proposed Objects:

Field Museum Number:	Description:	No. of samples required:
99698	Knife	1
99774	Dagger	1
99777	Dagger	1
106209	Dagger	1
134687	Dagger	1
134696	Dagger	1
134701	Dagger	1
134702	Dagger	1
134705	Dagger	1
134707	Dagger	1
134730	Dagger	1
134739	Dagger	1
134747	Dagger	1
134748	Dagger	1
134751	Dagger	1
134781	Dagger	1
134784	Dagger	1
134798	Dagger	1
134799	Dagger	1


Desired timeframe: Analysis will be conducted during August and September of 2012.

Plans for publication: These results will be presented at the Eastern Analytical Symposium in Somerset, New Jersey during November of 2012, and will form part of a publication in collaboration with Dr. Robin Torrence (Australian Museum) detailing the results of analysis of obsidian blades and hafts housed at several museum including the Field, Australian Museum, and Ashmolean Museum (Oxford). We are not certain of where this will be submitted, but it will go to a major peer-reviewed journal such as Asian Perspectives, Current Anthropology, or similar.

Proposed digital result delivery format: Results of chemical analysis and any resulting publications will be uploaded to the museum's KE EMu digital collections database as an EAF project cross-linked to individual object records.

Are you willing to sign a Destructive Testing Agreement regarding research results and disposition of unexpected portions of samples?

☒ YES ☐ NO



Applicant Signature



Date