Is It Hot Enough Yet? Reconstructing Firing Temperatures for Prehistoric Honduran Ceramics Through Re-Firing Experiments

Caroline Del Giudice
Kenyon College, delgiudicec@kenyon.edu

Follow this and additional works at: https://digital.kenyon.edu/anthropology_posters

Part of the Archaeological Anthropology Commons

Recommended Citation
https://digital.kenyon.edu/anthropology_posters/3
Canoas sherds were refired at 500°C or higher. Only one sherd was found to be fired below 400°C. The median temperature at Las Canoas was higher than at La Sierra, 500°C. Seventy percent of the Las Canoas sherds, about 66%, showed color change between 400 and 500°C, within the expected range for the refiring process. A total of 70 sherds from Las Canoas were refired to establish their original firing temperatures. The results of these tests were used to reconstruct the various workshops that fabricated different classes of vessels in diverse regions might have participated in the area's political economy and to infer how their roles in those relations of production changed over time. We aimed to test the idea that, from AD 600-1000, complex firing structures were built and utilized in the Naco Valley, their usage spreading as the power of elites decentralized. We hypothesized that these firing structures were built in order to obtain high firing temperatures to produce high quality pottery as well as to increase scales and volumes of production.

Methods

The controlled-refiring of pottery is an electricity use computer-automated apparatus used to determine the ancient original firing temperature. This project was executed on the premise that the surface and pale color of a ceramic sherd changes when it is reheated to a temperature higher than one at which it was originally fired. For example, there is no color change noted in a shard according to a handmade color chart made by refiring at 300°C or less. A controlled-refiring of 700°C, one-sherd, was later being originally fired around 300°C. Changes in color, as the color of the firing process, can be used to attribute the atmosphere of the original firing as well as the level of reduction.

To produce a representative sample, 206 sherds from the sites of La Sierra and Las Canoas were selected to be refired. Each of these sherds were subjected to a controlled-referencing melting removing of kiln firing conditions, dating to the Late and Terminal Classic periods. Each sherd was weighed, aged, and assigned a color value. Alternations of color value, color change, or color shifting were noted. Using the Marum Color Scale, the surface pale color and the exterior color of each sherd were determined under natural, over direct sunlight.

The refiring experiments were evaluated qualitatively using a different digital camera with a thirty frame/second (30 FPS) revolution. The first group of sherds that was refired consisted of a variety from five locations recovered at La Sierra. Initial experimentation with them established the range of temperatures to be tested. Increasing intervals of 10°C, the sherds were fired at 350, 400, 450, 500, and 550°C. The kiln was set to heat as rapidly as possible, 178°C per hour, so it would reach the peak temperature for 10 minutes before cooling. Sherds were removed after they reached a cooler temperature to be weighed and their colors observed. The second round of testing focused on sherds from operations in Las Canoas. Based on the color changes observed in the previous firings, these sherds were fired at a lower running temperature, 280–500°C, or 10°C intervals. The initial process of weighing and color assessment was followed.

Results

The refiring experiments of the 206 sherd yielded surprising data. Despite the refiring process of 350°C, only half of La Sierra and Las Canoas firing temperatures were from both sites proved to be reliable. Overall, the original temperature of Las Canoas sherds varied between 350 and 500°C, while the median temperature was 450°C. The bulk of the sherds, about 70%, showed a significant color change between 350 and 450°C, while only 30% showed color change at 400°C as well as within the range of 500°C. Only 30 of Las Canoas sherds were refired to establish their original firing temperature. The median temperature of the original firing of these sherds was slightly higher than 300°C, 350°C. Seventy percent of the Las Canoas sherds were refired at 500°C. Only one sherd was found to be fired below 400°C.

Discussion

Overall, the data are fairly suitable. The color changes observed in this sherd suggest that the vast majority of pottery from La Sierra and Las Canoas was fired at temperatures between 350 and 500°C. Seventy percent of the sherds, the refired firing temperatures were almost exclusively in this range. This relates an uncertainty of firing temperatures suggests that Las Sierra and Las Canoas villages are the late and Terminal Classic periods underwent substantial comparable activities in the Las Canoas and La Sierra. Despite the presence of enclosed firing facilities, however, the potter's goal does not seem to have been to achieve especially high firing temperatures. The appearance of this experiment, therefore, suggests that people in the sherd and middle Chacronas solely use kilns if they are not achieving very high firing temperatures.

There are many possible explanations for the residence of kilns at relatively low temperatures. The technological choices made by potters are usually contextualized and based on factors that have greater relevance than simply technological advantages. For example, the use of refiring kilns for production may be an expression of household-level technology, the process of kiln building, or the process of making kilns for the production of specific products.

In the refiring technology that does not emphasize achieving high firing temperatures for the sake of color consumption, Las Sierra and Las Canoas were constructed at lower clay in the kiln. The majority of the sherds are marked with black clay deposits, possibly for the production of metal casting, most notably with low melting points. As kilns allow for an efficient use of heat, their construction facilitated high volumes of production and social rates of relatively low fuel costs. More potters of production were likely to be able to reproduce both, goals of new technologies.

The integration of ceramic production into the domestic economies of Late and Terminal Classic households or centers may have involved labor. Despite the high firing temperature, the physical presence of a kiln in someone's domain may emphasize a household-specific focus on society, noting the presence of the household social structures. The refiring experiments of kilns are a convenient means to visually express the nuances and social roles of potters rather than a technological innovation to elevate firing temperatures. La Sierra potters, for example, may have encouraged the material conditions offered, offering their specialized knowledge to improve their scales of production and volumes of sharing in space, for exchange in political support and control over productive locations and the symbols that accompanied it at some venues. The technological requirements associated with kilns, e.g., high social costs, facilitated its proliferation. The kilns could point to the eventual monopolization of ceramic production by artisans in the Terminal Classic period. They maintained these knowledge and technical resources to other kilns and as ceramic centers within them. It is likely that their kilns, however, were not simply used to produce specific products.

Ammendes, commoners have been used to craft production from the late Classic period as a means of distinguishing themselves within the context of Las Sierra and Las Canoas, a statement of ancestor and their social status. The ability to control the output of pottery power symbolically connotes the importance of a potters' role in society. This project is possible at Las Canoas, where the firing structure was not attributed to households and could have been more common. Here it is important that individual and household-level results have been a fundamental pottery vessel needed for the space, and results for mud. With the use of the production associated with kiln, even effect would add independent. Potters could have controlled messages conveyed through symbols intertwined in the vessels, thus modifying the presence that was also shared with other cultures.

Is It Hot Enough Yet? Reconstructing Firing Temperatures for Prehistoric Honduras Ceramics Through Re-Firing Experiments Caroline Del Giudice, Kenyon College

Investigations conducted in the Naco Valley and its neighboring areas in northwestern Honduras conducted from 1975-2008 have revealed facilities in which ceramic containers were fired. The vast majority of these data to the late site (AD 600-800) and Terminal Classic (AD 800-1000) periods. Their diverse dimensions and suggest variations in aspects of production including the temperatures at which the vessels were heated and the degree of control artisans exercised over the manufacturing process. This experiment studies the refiring of a sample of 206 pottery sherds with the goal of identifying their original firing temperatures. The results of these tests are used to reconstruct the varied workshops that manufactured different classes of vessels in diverse regions might have participated in the area's political economy and to infer how their roles in those relations of production changed over time. We aimed to test the idea that, from AD 600-1000, complex firing structures were built and utilized in the Naco Valley, their usage spreading as the power of elites decentralized. We hypothesized that these firing structures were built in order to obtain high firing temperatures to produce high quality pottery as well as to increase scales and volumes of production.