



Petrographic characterization and identification of temper sources in local ceramics during the Inca domination and early Spanish colony (Mendoza, west-central Argentina)

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ABSTRACT

This work relies on the potential use of petrography to determine temper provenance and applies it to ceramics of west-central Argentina. Petrography is used to identify the raw materials, production technologies and, for the first time in this region, temper provenance of the Viluco ceramics of mixed Inca type produced by local Mendoza Valley populations during the Inca domination and early Spanish colony (XV–XVII centuries), along the eastern-meridional boundary of both empires. Although the area is geologically complex, being characterized by the Andes Cordillera to the west and the arid plains to the east, isolated outcrops were identified near archaeological sites and comparative petrographic studies of ceramic and geological samples were conducted. The results show that the ceramics were produced with locally available raw materials. The comparative analysis permitted identifying two sources of temper located near the archaeological sites in the Mendoza Valley: the granite stock of Cerro Cacheuta and the volcanic ash (tephra) from El Borbollón. The evidence allows suggesting that the population concentration process that was developed in the short period between the Inca Empire and the early Spanish colony in the Mendoza Valley, required the local production of Viluco ceramics. The use of local tephra inclusions, confirms that this particular tradition related to the Inca expansion and infused with symbolic significance in the marginal southern borders, was developed locally by potters as part of their membership to the Inca Empire.

1. Introduction

The purpose of this paper is to petrographically characterize and study the provenance of the temper of Viluco ceramics of the mixed Inca type. This pottery was made by the local population in west-central Argentina between the 15th and 17th centuries, a short and complex period characterized by the Inca domination and followed by the early Spanish colony. This is the first temper provenance study on the Viluco ceramics from the eastern meridional border of both empires.

It has been proposed that “*petrography is a powerful method for determining pottery provenance based on the composition of rock and mineral inclusions incorporated within the clay body at the time of production*” (Whitbread and Mari, 2014:79). This proves a difficult task because, according to the provenance hypothesis, the variation between potential sources needs to be greater than that within a single source (Wilson and

Pollard, 2001). Therefore, using the compositions of rock and mineral inclusions to determine provenance involves demanding requirements because all potential sources should be taken into consideration when identifying (a) whether the pottery at a site was locally produced or imported and (b) if the latter, then identifying its likely origin (Whitbread and Mari, 2014:79). As mentioned, fulfilling these requirements is particularly challenging in geologically complex areas, where similar raw materials may occur in several locations (Whitbread and Mari, 2014). In the north of the Mendoza province, the geology is complex and many outcrops are very widespread. However, there are also isolated outcrops that are well characterized geologically and are located near the archaeological sites of the Mendoza Valley (city of Mendoza) where the Viluco pottery is concentrated. The comparative study was conducted on the petrography of the ceramics from these sites and the geological samples from these isolated outcrops.

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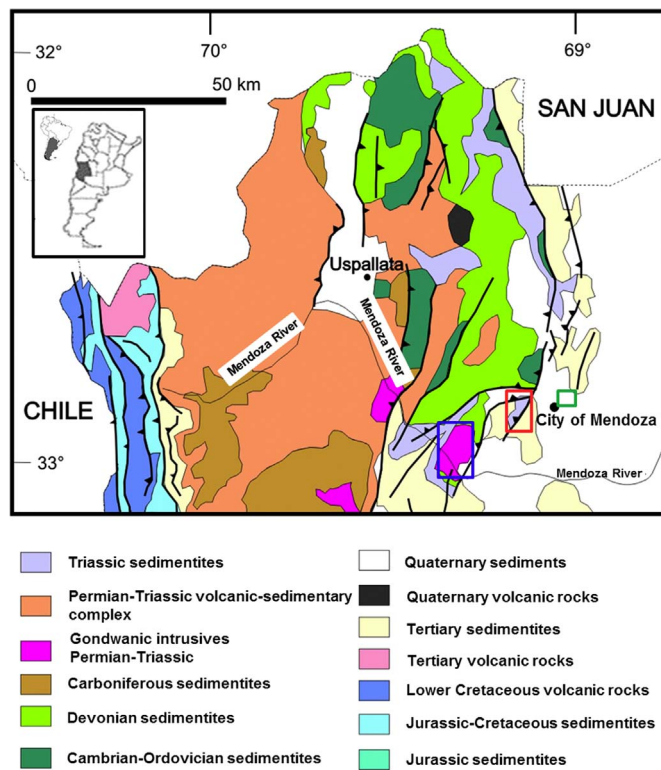


Fig. 1. Geologic sketch of the northern part of the province of Mendoza, with the location of the studied archaeological sites (city of Mendoza) and the sampled geological formations (blue rectangle: Cerro Cacheuta; red rectangle: Divisadero Largo; green rectangle: El Borbollón). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

Source: modified from Spalletti and Veiga (2007).

2. Archaeological background

The study area is located in the northern part of the Mendoza province, west-central Argentina, between $32^{\circ}06'31.33''$ S– $68^{\circ}55'51.23''$ W and $33^{\circ}03'02.37''$ S– $68^{\circ}49'42.17''$ W (Fig. 1). The area belongs to the South American Arid Diagonal, which is characterized by a large difference in altitude from west to east among the main geomorphological regions: mountains (comprising the Andean Cordillera and the Precordillera), foothills (piedmont) and plains.

The local population that produced Viluco ceramics occupied the southern San Juan province and the northern and central Mendoza province (Lagiglia, 1978; Chiavazza, 2010; Prieto Olavarría, 2012) between the middle of the 15th and 17th centuries. During the Inca domination (between 1470/1480 and 1532/1536 A.D.), they inhabited and worked in Inca *tambos* in the inter-Andean Uspallata Valley under the direct control of imperial administrators. Furthermore, this group settled in the Mendoza Valley (piedmont) as a result of a population

concentration process that began during the Inca Empire (Bárcena, 1994) and was continued by the European conquerors (Parisii, 1994) who founded the city of Mendoza there in 1561.

Complex societies, such as the Inca state, have made use of different supports to communicate cultural values and determine relationships. The Inca ceramics played an active role in state legitimization and control through the diffusion of designs (shape and decoration) and production technology (D'Altroy et al., 1994; Bray, 2003; Williams et al., 2005). In distant regions from the imperial centre in Cusco, such as northern Mendoza (Prieto Olavarría, 2012), the authority continued in local leaders who were politically and ideologically integrated into the empire and pottery acted as a political tool for the legitimation of power and hospitality (Williams et al., 2005). The imperial Inca ceramic had the highest value among the different ceramic types that circulated through the empire, but it is scarcely represented in the periphery of the state, as is the case in the Southern Andes. In this context, some ceramic types of diverse origins circulated through the provinces while others were produced locally. Many of these local types had imperial legality and their stylistic variety evidences the interaction between different socio-political and ethnic groups, whereby some stylistic elements are associated with ceramic traditions of the governing groups and others with those of the dominated groups (D'Altroy et al., 1994).

The Viluco mixed Inca type analysed in this paper is one of these local types and is represented in funerary (Fig. 2a–b) and domestic contexts of west-central Argentina (Lagiglia, 1978; Novellino et al., 2003; Ots, 2008; Prieto Olavarría, 2012). It is characterized by shapes and decorations made according to parameters of Inca pottery but also inspired by other nearby pottery traditions, such as those of Central Chile, Chilean Norte Chico and traditions of the Southern Andean region like from north-west Argentina (Lagiglia, 1978; Prieto Olavarría and Tobar, 2017). This ceramic type is very abundant in the Mendoza Valley domestic sites (Fig. 2c–d), and in view of the permanent character of the occupations and the population concentration process, it has been proposed that pottery was manufactured in those settlements (Prieto Olavarría, 2012).

Preliminary petrographic studies suggested a close relationship between raw materials and local geology. The non-plastic inclusions are mainly of felsic minerals (quartz and feldspars) and mesosilicic to acid igneous rocks, both volcanic (andesites, dacites and rhyolites) and plutonic (granites and granodiorites). Fragments of low-grade metamorphic rocks (quartzites/metapelites) are scarce and can be correlated to the regional crystalline basement (Prieto Olavarría, 2012).

A group of Viluco vessels containing high percentages of volcanic ash temper (Prieto Olavarría and Castro de Machuca, 2015) is part of an extended tradition present in local ceramic types of north-west Argentina and such a tradition was introduced during the Inca domination (Cremonte, 1994; Páez and Armosio, 2009). Exploratory petrographic and Scanning Electron Microscope studies indicated that these Viluco ceramics were manufactured locally and it was postulated hypothetically that the raw materials came from pyroclastic deposits (Prieto Olavarría and D'Angelo, 2013).



Fig. 2. Viluco ceramics of the mixed Inca type. a) funerary jar from Beltrán y Liniers (city of Godoy Cruz, Mendoza Valley); b) funerary bowl from Agua Amarga (Tupungato, Uco Valley); c–d) fragments of jar (c) and bowl (d) from Ruinas de San Francisco domestic site (city of Mendoza, Mendoza Valley).

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