



Archaeomagnetic evidence of pre-Hispanic origin of Mezcal

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ABSTRACT

For centuries, and until a few years ago, it was considered that the distillation process had been brought to the new world by the Spaniards, who in turn learned it from the Arabs. For this reason, it was believed that the only alcoholic beverage of the Mesoamerican societies was *pulque* - a ferment of maguey. However, recent archaeological investigations revealed that the alcohol distillation was known in Mesoamerica long before the arrival of Europeans, for at least 25 centuries. The direct evidence comes from the ceremonial and administrative center of Xochitcatl-Cacaxtla (state of Tlaxcala) with several ovens where cooked maguey remains were discovered. The corresponding archaeological context was radiometrically dated from 600 to 400 BCE. Here, we report a detailed archaeomagnetic study on burned archaeological artifacts found in these cooking ovens. 35 specimens belonging to two pottery fragments, one burned rock and two burned soil samples were pre-selected for archaeointensity experiments. Pottery samples exhibited essentially reversible behavior during thermomagnetic experiments pointing to Ti-poor titanomagnetite (almost magnetite phase) as main magnetic carrier while two ferromagnetic phase seems to co-exist in burned soils. In contrast, burned rock samples exhibited some instabilities during the heating at high temperatures and indirect evidence of the presence of antiferromagnetic hematite grains. In total, 29 specimens allowed the estimation of absolute geomagnetic intensity recorded during the last use of the furnace. Archaeomagnetic dating yielded two possible time intervals between 878 to 693 BCE and 557 to 487 BCE. These new data reinforce the initial hypothesis and corroborate the temporality of these pre-Hispanic kilns.

1. Introduction

The pre-Hispanic evidence of distilled beverages still remains highly controversial in Mesoamerica. A fermented drinks from the agave plant known as *pulque* (agave wine) was systematically consumed in central and northern Mesoamerica before European conquest. Tequila, however, was first produced in the 16th century in the town of Tequila (State of Jalisco, Western Mexico). The distillation procedure of Tequila involves only the blue agave (*tequiliana weber*), while any type of agave may be used to produce Mezcal. Thus, Tequila is a type of Mezcal. It is produced in almost everywhere in Mexico, being Oaxaca State the major Mezcal producer.

The origin of mezcal is a matter of debate and it is still unclear whether distilled drinks were produced in Mexico before the Spaniards arrival (Zizumbo-Villarreal et al., 2009). The idea about the pre-Hispanic origin became popular (Serra Puche, 1994, 1997a, 1997b; Serra Puche and Lazcano, 1997, 1998a, 1998b; Serra Puche and Palavicini,

1996; Serra Puche et al., 2000) since middle 90th. Serra Puche et al. (2000) and Serra Puche and Lazcano (2002a, 2002b), based on the study of pre-Hispanic conical kilns, argued that around 400 BCE the inhabitants of Xochitcatl-Cacaxtla (state of Tlaxcala) already knew the process of fermentation and distillation of Mezcal as a ritual drink. On the other hand, Colunga et al. (2013) found some vessels that may have been used to distill beverages between 1500 through 1000 BCE in the state of Colima (western Mexico). The great importance of agave as food since approximately 8000 BCE was first underlined by Flannery (1986) and Smith (1986) while other authors like Benz (2002), Benz et al. (2006), Schöndube, 2000, Zizumbo-Villarreal et al., 2009 documented its use as fiber and fermented beverage since the Late Formative period in western Mesoamerica (Colima and Jalisco states mainly). In this context, Kelly (1974, 1980) studied Capacha (Colima State) gourd and trid vessels belonging to the Early Formative period (approx. 1500 through 1000 BCE) that could be used to produce distilled beverages.

The investigation conducted by Serra Puche and Lazcano (2016)

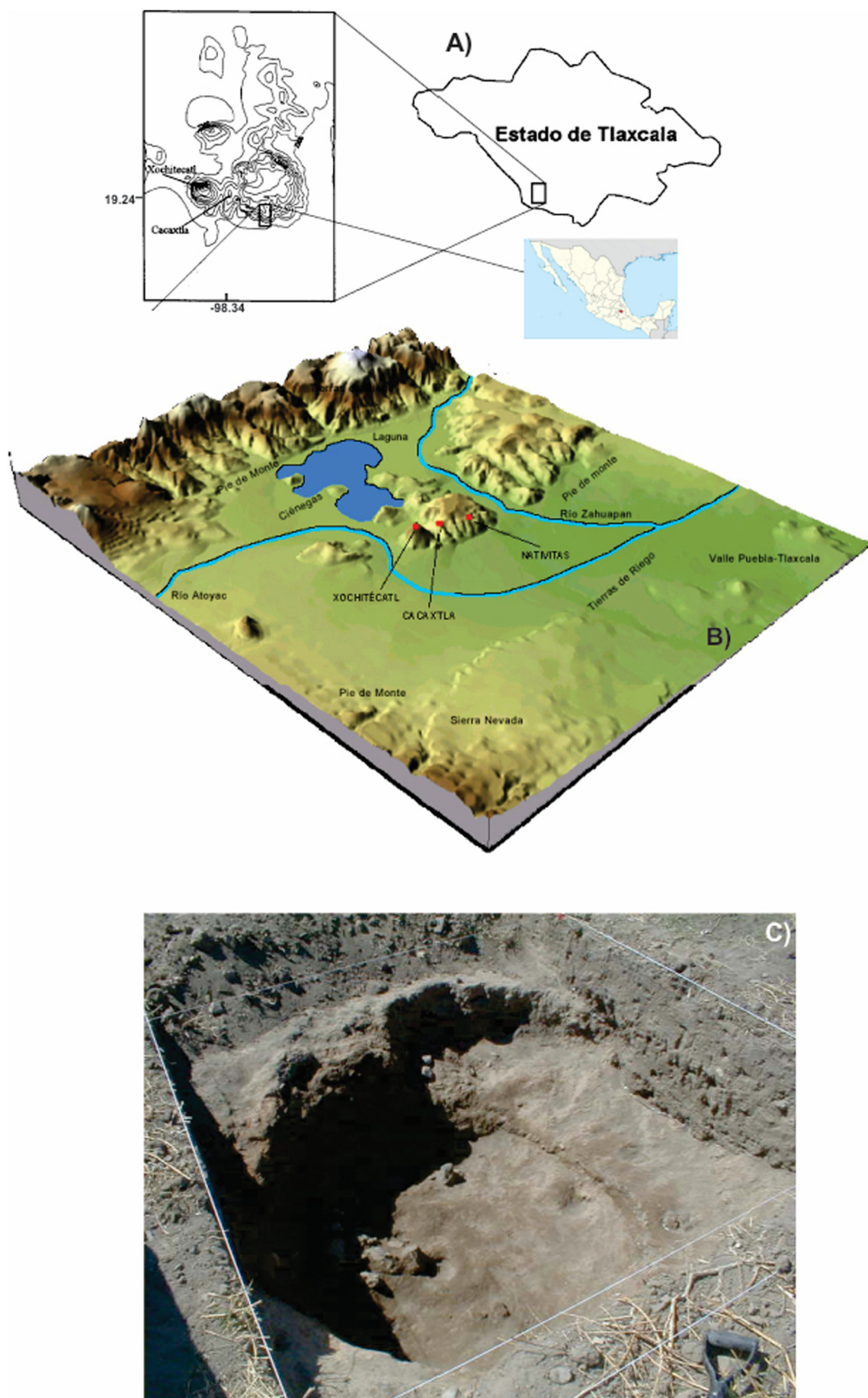
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