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El poblamiento inicial de las Llanuras Sudamericanas: una mirada sobre los pobladores del Pleistoceno Tardío y Holoceno Temprano en Uruguay

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Auteur correspondant:	Rafael Suárez, Ph.D. Universidad de la Republica, Facultad de Humanidades y Ciencias de la Educación, Depto. Arqueología URUGUAY
Premier auteur:	Rafael Suárez, Ph.D.
Ordre des auteurs:	Rafael Suárez, Ph.D.
	Jenny Volarich
	Julia Melián
Résumé:	Este artículo revisa más de 20 años de investigación sobre las ocupaciones del Pleistoceno Tardío y Holoceno Temprano en los llanos uruguayos. El objetivo de esta síntesis es brindar un panorama general de la información disponible relacionada con el poblamiento humano temprano de Uruguay. Aquí nos enfocamos en los principales temas discutidos en las últimas dos décadas: caracterización y cronología de sitios tempranos, respuesta humana al cambio climático, diversidad cultural, patrones de ocupación, movilidad y tecnología. Los esfuerzos sistemáticos y continuos realizados han proporcionado nuevos datos y nuevas perspectivas sobre las primeras ocupaciones humanas de la región. Hemos definido un paisaje complejo arqueológico y la estrategia de investigación en curso se basa en los tres tipos principales de sitios que lo componen: campamentos residenciales, cuevas y abrigos rocosos, y fuentes de materias primas. Esto nos ha permitido ampliar y mejorar nuestra comprensión del registro. Las nuevas investigaciones y los datos que aportan estos yacimientos nos han llevado a proponer un modelo de poblamiento para la región y la época. Se ha evidenciado una diversidad cultural a través de estudios profundos de sitios arqueológicos estratificados, secuencia cultural, una base de datos cronológica sólida y tecnología lítica. Finalmente, avanzamos en la caracterización de los objetos de prestigio social entre los cazadores-recolectores que ocuparon las llanuras durante el final del Pleistoceno en el sureste de Sudamérica. una sólida base de datos cronológica y tecnología lítica. Finalmente, avanzamos en la caracterización de los objetos de prestigio social entre los cazadores-recolectores que ocuparon las llanuras durante el final del Pleistoceno en el sureste de Sudamérica. una sólida base de datos cronológica y tecnología lítica. Finalmente, avanzamos en la caracterización de los objetos de prestigio social entre los cazadores-recolectores que ocuparon las llanuras durante el final del Pleistoceno en el sureste de Sudamérica.

Title

The initial peopling of South American Plains: an overview on Late Pleistocene and Early Holocene settlers in Uruguay

Titre

Le peuplement initial des plaines d'Amérique du Sud: aperçu des colons du Pléistocène supérieur et de l'Holocène inférieur en Uruguay

Abstract

This paper reviews more than 20 years of research about the Late Pleistocene and Early Holocene occupations of the Uruguayan plains. The aim of this synthesis is to provide an overview of the available information related to early human peopling of Uruguay. Here we focus on the main issues discussed over the last two decades: early sites characterization and chronology, human response to climate change, cultural diversity, occupations patterns, mobility and technology. The systematic and continuous efforts made have provided new data and new perspectives regarding the earliest human occupations of the region. We have defined an archaeological complex landscape and ongoing research strategy is based on the three main types of site that compose it: residential camps, cave and rockshelters, and raw material sources. This has allowed us to expand and improve our understanding of the record. The new research and data provided by these sites have led us to propose a settlement model for the region and the period. A cultural diversity has been evidenced through in-depth studies of stratified archaeological sites, cultural sequence, a solid chronological database and lithic technology. Finally, we advance in the characterization of objects of social prestige among hunter-gatherers who occupied the plains during the end of the Pleistocene in Southeastern South America.

Résumé

Cet article passe en revue plus de 20 ans de recherches sur l'occupation des plaines uruguayennes au Pléistocène supérieur et à l'Holocène inférieur. L'objectif de cette synthèse est de fournir une vue d'ensemble des informations disponibles relatives au peuplement humain précoce de l'Uruguay. Nous nous concentrons ici sur les principales questions abordées au cours des deux dernières décennies : caractérisation et chronologie des sites anciens, réponse

humaine au changement climatique, diversité culturelle, modèles d'occupation, mobilité et technologie. Les efforts systématiques et continus déployés ont fourni de nouvelles données et de nouvelles perspectives concernant les premières occupations humaines de la région. Nous avons défini un paysage archéologique complexe et la stratégie de recherche en cours est basée sur les trois principaux types de sites qui le composent : les camps résidentiels, les grottes et les abris sous roche, et les sources de matières premières. Cela nous a permis d'élargir et d'améliorer notre compréhension des archives. Les nouvelles recherches et données fournies par ces sites nous ont amenés à proposer un modèle de peuplement pour la région et la période. Une diversité culturelle a été mise en évidence grâce à des études approfondies des sites archéologiques stratifiés, des séquences culturelles, une solide base de données chronologiques et la technologie lithique. Enfin, nous avançons dans la caractérisation des objets de prestige social chez les chasseurs-cueilleurs qui occupaient les plaines à la fin du Pléistocène dans le sud-est de l'Amérique du Sud.

key words

Peopling of South America; technological change; Cultural diversity; Paleoamerican points; Social prestige; Uruguayan plains

mots clés

Peuplement of South America; Changement humain; Diversité culturelle; Points paléo-américains; Prestige social; Plaines de l'Uruguay

1. Introduction

The Uruguayan plains present optimal conditions for investigating the early settlement of southeastern South America. It gathers an important cultural diversity, lithic resources of excellent quality, caves and rockshelters, open-air stratigraphic archaeological sites and pleistocene faunal remains (Martínez et al., 2015, Suárez, 2018; Ubilla et al., 2004).

The systematic efforts made by our research team allowed us to generate an archaeological, stratigraphic, chronological, technological, faunal and cultural database that led us to position the ancient occupations of Uruguay in the context of the settlement of South America (Suárez, 2011a, 2015a, 2015b, 2017, 2019a; 2019b; Suárez et al., 2018).

Here we present the main results of an ongoing research that has been carried out for more than twenty years on the cultural diversity, chronological database, lithic technology, settlement pattern and socio-symbolic aspects of the early human population of southeastern South America.

Human groups during the exploration and colonization of Southeastern South America used different types of sites for various activities located in different landscapes. Initially, our research focused on open-air stratigraphic sites located in lowland plains, river and stream mouth environments in northern Uruguay. Later, we advanced in the research of sites with lithic resources used as sources of supply of highly silicified rocks (silicified sandstone, silicified limestone, opal, jasper, rhyolite, etc.) with which they manufactured their artifacts. Subsequent research continued in caves and rockshelters to integrate these sites into the context of the initial occupation of Uruguay. The integration of these sites allows a comprehensive interpretation of the early archaeological record of Uruguay, advancing in a complex settlement pattern used by human groups during the initial settlement of the region.

In this paper we present different types of sites located in diverse environments in what we define as a Paleoamerican Social Landscape used during the late Pleistocene and early Holocene. We make here a brief introduction and characterization of the main study sites, with special emphasis on the archaeological and chronological evidence of each of them and their roles within the pattern of occupation of space.

The data recovered from the mentioned sites has evidenced an important cultural diversity for the final Pleistocene and initial Holocene. We resume here the cultural and technological variability recognized and discuss some aspects linked to the mobility and use of space.

Finally, we discuss the proposed behavioral-archaeological model for the early settlement of the region based on the last 20 years of research.

2. Background and sites

Our investigation focuses on the visualization of a paleoamerican landscape composed of three different types of sites: residential camps, caves and rockshelters, and raw material sources sites.

2.1. Residential camps

Among the residential camps, two important archaeological open-air sites stand out: Pay Paso 1 and Tigre site, also known as K87 site (Figure 1). Pay Paso 1 is a multicomponent open-air site that forms part of the Pay Paso locality, a locality of multiple interest composed of 9 sites with archaeological, paleontological and paleobotanical valuable information. Pay Paso is located along the Cuareim River, on the triple border formed by Uruguay, Brazil and Argentina. 50 km away from Pay Paso 1 on southwestern direction, it is the Tigre site. Tigre site is also a multicomponent open-air site such as Pay Paso 1, but located on the left bank of the middle Uruguay River.

2.1.1. Pay Paso 1

Pay Paso 1 site was excavated in the 1980´ where an age of ca. 11,300 yr. cal BP was obtained (Austral, 1982, 1995) (Figure 2). From 2000 until 2006, new excavations and surveys were carried out in the proximity of the site, which allowed a global definition of the locality (Suárez, 2011a). The archaeological sites that make up this locality are Pay Paso 0, 1, 3 and 8. Pay Paso 2 and 4 are paleontological sites where Pleistocene fauna is recorded in situ in the sedimentary profile and lithic artifacts on the surface. Finally, Pay Paso 5, 6 and 7 are surface archaeological sites. The excavations carried out during this period covered a total area of 114 m2. This extensive intervention provided archaeological, stratigraphical, paleoecological, sedimentary, chronological, and faunal data. Data collected allowed the generation of a solid chronological sequence that facilitated the reconstruction of the successive human occupations of the site to the final Pleistocene and early Holocene. Together with this, the 124 formal tools and 1,390 debitage pieces recovered in stratigraphic context made it possible the configuration of a model of human occupation of the site based on three different early components: component 1, between 12,802 and 12,470 cal yr BP; component 2, between 12,008 and 11,485 cal yr BP; and

component 3, with ages between 11,081 and 11,024 cal yr BP (Table 1). Component 1 corresponds to the end of Pleistocene while component 2 and 3 are related to the Pleistocene-Holocene transition.

Component 1 starts on the base of the sedimentary profile at a depth of 5.7 m. Within this component, 47 formal artifacts were found. The lithic assemblage recovered include blades and retouched blades, side and end scrapers, several cores among which is included a blade extraction core, standardized unifacial tools, choppers and a spurred graver. Besides, this component presented a total of 320 flakes and flakes fragments of translucent agate, chalcedony and silicified sandstone. Among these flakes, the presence of overshot flakes stands out. Component 1 is also notable for a number of important faunal remains, including remains of Pleistocene fauna (*Equus* sp.) and present-day fauna (*Myocastor coipus, Rhea americana* (eggshell) and *Leporinus* sp.).

On the other hand, component 2 has no faunal remains, but has a rich record of lithic material that includes 38 formal artifacts and 152 pieces of debitage. Two projectile points, two thin bifaces, unifacial tools, terminal and lateral scrapers, cores, choppers and other tools were recovered from this component.

Finally, component 3 presents faunal and lithic remains. Among the faunal remains were recognized modern and extinct taxes such as *Equus* sp. and *Glyptodon* sp. The lithic assemblage is composed of a total of 38 formal tools and 917 debitage pieces. The formal artifacts include projectile points, biface tools, end and side scrapers, cores and choppers. A detailed description of the material recovered from the three components mentioned can be consulted on Suárez (2011a).

2.1.2. Tigre site

Tigre site was first excavated in the 1970s due to the construction of the Salto Grande Dam, which at that moment implicated a risk for the conservation of the site. The archaeological efforts then carried out at the site were framed within the Salto Grande Archaeological Rescue Mission (Laming-Emperaire and Guidon, 1980; MEC, 1989a, 1989b). More than 40 years later, in 2012, our team resumed the research on the site with new excavations that were carried out that year, the next one, and more recently, during 2019 (Figure 3).

Recent excavations at the site occupied a total of 32 m2 and provided valuable archaeological, stratigraphic and chronological information. These data allowed to better understand the origin and development of the multiple components that make up the site from the Late Pleistocene to the Late Holocene. Archaeological remains recovered include a total of 491 ceramic fragments and lithic materials such as pieces of debitage (1219 in total) and formal artifacts. The twenty AMS radiocarbon dates (14C) obtained in the successive excavated sedimentary deposits associated with the archaeological material facilitated the chronological and cultural definition of the multiple occupations of the site.

The upper stratigraphic sequence of the site (stratigraphic unit 4 -SU4) includes hunter-gatherer occupations with pottery dated to the end of the Holocene, around 1178 cal BP. This unit featured lithic and ceramic materials. All the ceramic recovered from the site corresponds to it. A total of 491 pottery fragments were recorded, some of them with organic matter adhered.

In the lower portion of the stratigraphic sequence (stratigraphic units 3, 2 and 1 SU3, SU2, SU1) there is a succession of at least four human occupations beginning at 13,256 cal BP and ending in 9469 cal BP. Stratigraphic unit 1 presents a discrete pre-Fishtail occupation. Stratigraphic U2 in particular, presents a significant vertical development with high archaeological resolution, with Fishtail, Tigre, and Pay Paso components. SU2 was the richest archeological level 1060 pieces of debitage and a total of 31 formal artifacts were recovered from this unit: 5 projectile points, 11 bifaces, 12 unifaces and 3 hammerstones. SU3 was mainly sterile, except toward the base where some flakes and biface pieces appeared.

2.2. Caves and rockshelters

The first records of cave sites with archaeological remains in Uruguay date back to the end of the 19th century (Figueira, 1892). It was not until more than 100 years later that some efforts began to be made in relation to archaeology of caves (Aguirrezabal, 2021; Cabrera, 1995; Suárez et al., 2011). However, and although in nearby regions such as the Pampa and Patagonia (Argentina), Chile and southern Brazil extensive efforts have been made to investigate this type of sites, in Uruguay they have not been deep and systematically investigated yet.

In 2009, started a research program oriented to broaden our knowledge and understanding of the use of caves and rockshelters by the people in the past. This work allowed the definition of a cultural landscape composed until now of 11 identified caves, 31 rockshelters, 22 silcrete and silicified sandstone outcrops-quarries, one ochre resource and 6 cairns. Archaeological tests

pits were carried out at 4 of these caves: De la Tuna, de los Cuervos, La Deseada and Queguay cave. Other 2 rockshelter were also excavated: Tamanduá and 4 amigos rockshelter. A total of 15,5 m2 have been excavated (7,5 in caves and 8 in the rockshelters) (Figure 4). These excavations have yielded evidence of early human occupations dated ~ 10,000 cal BP (Suárez et al. 2011) and from more recent periods that remain unpublished. Part of the main data obtained during these archaeological efforts will be published soon.

2.3. Raw materials sources

Besides residential camps and caves or rockshelter, we have identified another type of site that formed an important part of the broad space occupied by the people in the past: the raw material sources (Figure 5). Raw materials sources have an important role in the study of the past because they have showed to be a key to understand the technological organization and mobility patterns of hunter-gatherers (Binford, 1980; Shott, 1986; Nelson, 1991; Amick, 1996; Borrero and Franco, 1997; Flegenheimer et al., 2003; Sellet, 2004, 2013; Suárez, 2011b; Miotti and Terranova, 2015; Borrero, 2015).

In northern Uruguay, an area called Región Arqueológica Catalanes Nacientes Arapey was defined (RACNA) (Suárez 2010, 2011b) (Figure 1). The RACNA is a 100 km long and 40 km wide corridor of extensive silicified lithic. This area of approximately 3,000 km2 included a total of 123 recognized archaeological sites. It has several and extensive outcrops of silicified sandstone, agate, jasper outcrops of silicified sandstone, agate, jasper and quartz associated with quarry-workshops and other archaeological sites (Suárez, 2001, 2010, 2011a, 2011b).

Along with the RACNA, the Calizas del Queguay of Paysandú are an important raw material source for the earliest hunter-gatherers (Figure 1). The Calizas del Queguay are essentially carbonate rock deposits which resulted from energetic calcretization-silcretization processes (Martínez et al., 2015). This group of rocks has a discussed character as an independent lithostratigraphic unit (Bossi, 1966; Bossi et al., 1975; Sprechmann et al., 1981; Preciozzi et al., 1985; Veroslavsky and Martínez, 1996; Martínez et al., 1997). Here we consider the Calizas del Queguay in a broad sense as belonging to the Queguay and Mercedes formations (Alonso-Zarza et al., 2011). These rocks are widely distributed in the center-south and west of the territory, however, there is a higher density of outcrops in the margins of the middle and lower course of the Queguay river (Martínez et al. 2015). This area located in the department of

Paysandú is important because it is the northern limit of the silicified limestone outcrops and therefore the most proximate zone to the residentials camps of the north.

The incorporation of the RACNA and the Calizas del Queguay northern zone to the scenario of study has allowed consider and discuss some aspects linked to mobility and use of raw materials. We present some of these results later in this publication.

3. Cultural diversity

The abrupt and drastic climatic, faunal, ecological and environmental changes that occurred from the Postglacial to the beginning of the Holocene had a direct impact on the social, cultural and technological development in the region.

Research carried out in recent years allows us to recognize the cultural and technological variability initiated during the Postglacial period in the territory of Uruguay and possibly southern Brazil (Suárez, 2003, 2011a, 2015a, 2017, 2018; Dias, 2004; Bueno et al., 2013; Lourdeau et al., 2014). The regional cultural sequence shows continuous human occupation in the Uruguayan plains since the late Pleistocene, during the Pleistocene-Holocene transition and early Holocene (Suárez, 2017; Suárez et al. 2018).

Paleoamerican groups that occupied the region from the Postglacial to early Holocene (Pre Fishtail, Fishtail, Tigre and Pay Paso) underwent processes of social and cultural reorganization (Suárez, 2017, 2018; Suárez et al., 2018), and these processes could be associated with abrupt environmental, faunal and vegetational changes (extinction and colonization of new species) that occurred in short periods of time. Current data suggest human populations that exhibited stylistic variability in their artifacts, as well as social, cultural, and technological reorganizations that took place during the Pleistocene-Holocene and early Holocene transition (Dillehay et al. 2017; Prates et al. 2020; Suárez 2014).

This sociocultural and technological diversity is evidenced from the analysis of the different morphologies of early points as a diagnostic element of material culture (Suárez, 2015a, 2015b, 2015c).

3.1. Pre Fishtail peoples

The initial occupation of the region, which according to current data occurred shortly after 14,000 cal BP must have been carried out very gradually by small dispersed groups, which

would explain the low level of visibility of these early occupations in the archaeological record (Borrero, 1999, 2015; Suárez, 2014, 2017).

For this period in Uruguay, two sites are known (Urupez 2 and Tigre, Fig. 1A) with five radiocarbon dates of 14,000 - 13,300 cal BP (12,000 - 11,315 14C BP) (Suárez, 2014, 2017; Suárez et al. 2018, Meneghin, 2015). This evidence coincides with that recorded for the Pampean region (Politis et al., 2014, 2016), as well as from extra-regional sites (Dillehay et al., 2008) and point to a dispersed occupation between 14,600-14,000 cal BP in the southern part of the continent. No diagnostic artifacts for this early period of occupation are known to date for Uruguay and the Pampas (Politis et al.,2014, 2016; Suárez, 2014, 2017; Suárez et al. 2018).

3.2. Fishtail peoples

The hunter-gatherer that used Fishtail points occupied vast territories of the Southern Cone including Uruguay, Pampa, Patagonia, southern Brazil, southern, central and northern Chile, from the Atlantic slope to the Pacific slope. They inhabited the region between 12,900-12,200 years ago, marking the beginning of a "Paleoamerican cultural tradition" of bifacial stemmed projectile points. For this period the archaeological record becomes more robust, locating a large number of sites with Fishtail points in environments of high concentration of resources, such as the middle Negro River and the middle Uruguay River during the late Pleistocene. It is possible that these characteristics may have acted as an important attraction factor promoting aggregation and social interaction processes for hunter-gatherers.

The main characteristics of these points are pronounced or rounded shoulders, a concave base and a stem wider than long with concave sides expanded towards the base.

3.3. Tigre peoples

According to palynological studies conducted at different sites in northwestern Uruguay (Suárez, 2017) the dry and cool climate with predominance of grasslands was replaced by more humid and temperate conditions around 12,000 - 11,300 years ago with the expansion of the gallery forest in the middle Uruguay River and Cuareim River. During this period, different morphology points appear in the region, corresponding to a technological and cultural reorganization resulting from a change in the climate which became warmer and more humid, and the expansion of the gallery forest along the banks of the Uruguay River basin.

Among their main techno-morphological characteristics are the wide stem with straight or slightly convex sides, notched, short or long triangular blade, attenuated convex or convex base, thinned by retouching with complete bifacial thinning (Suárez, 2011a). These points constitute temporal markers for a Paleoamerican cultural group that occupied the region in the period between 12,000 and 11,300 years ago. For these reasons, added to the need to refer to them precisely, they are named after the site where they were first recovered in stratigraphy (Suárez, 2011a, 2015a, 2017; Suárez et al. 2018), at site K87, Arroyo del Tigre in the mid-1970s. Based on chronological, archaeological and stratigraphic evidence from sites Pay Paso 1, Laguna de Canosa and Tigre, they were defined as Paleoamerican point type by Suárez (2011a, 2015a, 2015b, 2015c, 2017, 2018; Suárez et al. 2017). These points are part of the Tigre techno-complex toolkit, which includes also asymmetrical medium-sized oval bifaces (crescent/half moon shape), large preforms, cutting tools made on blades and bladelets, and a variety of side scrapers (Suárez, 2015a, 2015c, 2017).

In addition to those recovered in the region (northern Uruguay, southern Brazil, and eastern Argentina) there have been recorded similar morphology and design points in northern Chile in the Puna region - Salar Punta Negra and Quebrada Maní 12 (Lynch 1986; Grosjean et al., 2005; Santoro et al., 2011; Latorre et al. 2013). The presence of these points in the Andean region approximately 1300 km away from those recovered in Uruguay, in a very different environment, opens the possibility of a cultural or technological relationship between the human groups that inhabited both regions.

At the early stages of researchs and with the first data about these techno-cultural complexes, it has been suggested that Tigre points circulated in northern Uruguay, southern Brazil, and eastern Argentina (Suárez, 2017). Recent investigation advances with more detailed knowledge of the Paleoamerican period record indicates the possibility of extra-regional circulation of these artifacts and human groups expanded to other regions of the South Cone connecting Pacific and Atlantic regions (Suárez et al., 2018). Further research is needed to advance in the interpretation whether these Tigre points represent regional or extra-regional adaptations.

3.4. Pay Paso peoples

Linked to a period in which climatic conditions became progressively milder in the early Holocene, in the archaelogical record the Tigre points are replaced by smaller ones with short stem and concave base (Suárez, 2003, 2015a, 2015b, 2015c). These were defined as Pay Paso

points by Suárez (2003) and dated from a chronological base of 10 radiocarbon ages between 11,080-10,300 years (Suárez, 2011a, 2015a, 2015b, 2015c, 2017, 2019b). They present a reduction of the stem in relation to the Fishtail and Tigre, which may be related probably to the new hunting prey of these hunters by the early Holocene. As well as Fishtail and Tigre points, many show intensive maintenance and rejuvenation (Suárez, 2015a).

It has been recorded Pay Paso points in the region of the middle Uruguay, Cuareim, Negro and Tacuarembó rivers. They have also been identified in southern Brazil, in the states of Rio Grande do Sul and Santa Catarina (Mentz Ribeiro et al., 1995; Corteletti, 2008, 2013), at distances of up to 800 km from the Pay Paso site. There is no record of Pay Paso points further south than the mouth of the Uruguay River, in the Pampean region (Argentina), both in stratigraphic and surface contexts

Current evidence suggests that the Pay Paso groups did not occupy as large areas as did the Fishtail or TNSP groups, constituting instead a local or regional adaptation linked to the Uruguay River Basin, The southern limit of the territory used by the Pay Paso groups at the mouth of the Uruguay River, supports the idea that these techno-complex represents a regional adaptation and reorganization in response to climatic, vegetation and faunal changes during the early Holocene (Suárez, 2019b).

3.5. Other people's

Triangular non-stemmed points (TNSP) are recorded mainly in widespread regions below 21° south latitude, but are present in other areas, such as Peru and northeastern Brazil, spanning a period of 12,650 - 8050 (Suárez and Melián, 2021).

These points have a triangular-shaped blade, slightly convex or straight sides and a slightly concave to slightly convex base with or without fluting.

In Uruguay they were recovered in different regions: middle region of the Uruguay River, Río Negro, Santa Lucía River basin, Laguna Negra and Aº Miguelete at Montevideo department. In 2021 the first systematic study of this point design for Uruguay was published (Suárez and Melián, 2021), which includes the survey of the 24 recognized specimens and the morphometric analysis of 12 of them.

The Paleoamerican groups that occupied the region from the Postglacial to early Holocene (Pre Fishtail, Fishtail, Tigre and Pay Paso) underwent social and cultural reorganization processes (Suárez, 2017), which would be associated with environmental, faunal and vegetational changes (extinction and colonization of new species), in a more complex early settlement process than previously suggested (Suárez 2019b).

4. Raw material and mobility

Efforts have been made in order to study the use and preferences of different raw materials and how it links with the mobility patterns of the groups (Suárez 2010, 2011a, 2011b, 2015a; Barceló, 2020).

In order to determine the frequency and percentages of different raw materials used during early occupations, a sample of 1390 debitage fragments and 124 lithic artifacts recovered from the early components of Pay Paso 1 (ca 11.000-8.500 years BP) was studied (Suárez, 2010, 2011a). Among the rocks identified, two groups of siliceous rocks stood out. Silicified sandstone was the site's most frequent raw material, representing 84,5% in the case of debitage fragments and 74,2% for the artifacts. Agate translucent was the second group of rock most represented: 10,7% of the debitage fragments were identified as agate translucent as well as 14,5% of the artifacts. The rest of the debitage fragments and artifacts were identified as silicified limestone, opal, jasper, chalcedony, silicified wood, basalt, and quartz (4,8% for debitage fragments and 11,3% in artifacts).

In the case of Tigre site, the predominant rock used was also the silicified sandstone. A total of 1060 debitage fragments of SU2 (ca 11.000-8.400 years BP) were analyzed in the same way as in Pay Paso 1 (Suárez et al., 2017). The mainly identified rock for this sample was silicified sandstone. It represented 40,4% of the sample studied and it was followed by other cryptocrystalline rocks such as agate, chalcedony, jasper, opal, silicified wood, and silicified limestone (39.7% in total). The remaining debris fragments were classified as quartz, basalt, quartzite, and others (19.8%).

In addition to the context data from the sites, an important raw material indicator are the rocks in which the lithic projectile points are made themselves. Whether they come from the surface or not, the points which present an early design as the presented before, are a very valuable source of information to discuss technical and social aspects of the early groups (Suárez, 2011a, 2017, 2018, 2019; Suárez y Cardillo, 2019; Suárez y Melián, 2021). In this line, a recent and

important effort has been made to update the data known and rethink the mobility patterns of the early groups who occupied the region (Barceló, 2020).

A sample of 232 projectile points was analyzed to explore the representativeness and diversified use of lithic resources among the different designs: 100 Fishtail points, 84 Tigre points and 48 Pay Paso points (Barceló, 2020). The results showed that the most represented resources within these early lithic projectile points are silcretes or silicified limestones with 38.8 % (N = 90), followed by silicified sandstones with 23.3 % (N = 54). Other raw materials identified were opal, silicified wood and jasper (7% in each case, N = 17, N = 17 and N = 16 respectively). When studied individually, the results showed that for both the Tigre and Pay Paso projectile points, the most frequently used lithic resource is silicified sandstone (36.9% Tigre and 39.6% Pay Paso, N = 31 and N = 19). However, this was not the case for Fishtail projectile points. The most frequently identified raw material among the points surveyed with this design was silicified limestone (54.0%, N = 54). This preference for silicified limestone was also recognized for the case of the TNSP group. The 83.3% (N = 10) of the sample known and analyzed for Uruguay of this type was manufactured in that rock (Suárez y Melián, 2021).

The preference for a type of rock such as silicified limestone in two different designs of points (Fishtail and TNSP) has already been pointed out as an interesting aspect to study, since this preference cannot be explained by the overabundance of the resource (Suárez and Melián, 2021). Other rocks with excellent to very good quality abound in the region and could be used instead, however, the preference for silicified limestone in both cases is clear.

The significant representation of translucent agate in the lithic record of the residential camps in northern Uruguay indicates a mobility distance of about 150-170 km between the residential sites in the middle Uruguay River region and the RACNA resources (Suárez, 2011b). In this region, people would provide with translucent agate geodes big enough to manufacture pieces of over 100 mm length, such as the ones recovered from the middle Uruguay River and Cuareim River. This way, as suggested by Suárez (2010, 2011a, 2011b, 2018), early groups of hunter-gatherers would have traveled long distances to obtain their lithic resources, generating a mobility corridor among the residential sites located on the banks of the Uruguay and Cuareim rivers and the quarries located in the Catalanes area.

Likewise, the Calizas del Queguay area would have also functioned as a supply zone for raw materials, precisely silicified limestones or silcretes in which early groups seem to have shown

special interest. In this case, the evidence suggest mobility ranges of 190-350 km South from the residential camps to the most proximal Calizas del Queguay area (Suárez, 2019).

5. Discussion

The plains of southeastern South America are a highly biodiverse ecosystem, containing an extensive and ramified river network along the banks of which subtropical gallery forests extend. Abrupt climatic changes occurred during the post-glacial period, the Pleistocene-Holocene transition and the early Holocene, that drastically modified the environmental conditions, fauna and vegetation (Iriondo, 1999; Prieto, 2000; Zarate, 2003; Ubilla et al., 2004; Behling et al., 2005; Kerber et al., 2014). These changes have a significant impact on the human groups inhabiting the region (Suárez, 2003, 2011a, 2015a, 2017; Bueno et al., 2013).

Archaeological sites in the area of the current Atlantic Ocean coastline -Urupez- and middle Uruguay River -Arroyo del Tigre (K87)- with reliable chronological resolution, allow to infer routes of entry of the first human groups and their dispersion throughout the territory.

The archaeological record indicates the existence of cultural diversity at the initial peopling of the low plains of southeast South America, showing at least three Paleoamerican groups with different stemmed projectile points. The already known Fishtail that occupied large areas of the southern cone between 12,800-12,200 cal BP years, and regional adaptations as the Tigre techno-complex -12,000 to 11,231 cal BP- and the Pay Paso techno-complex (11,081 to 10,300 cal BP) (Suárez, 2011a, 2015a, 2017).

Based on this evidence, Suárez (2017) proposes an archaeological and behavioral model of settlement for Uruguay and southern Brazil. The peopling of southeastern South America took place from the coast of the Atlantic Ocean to the plains via the rivers, with La Plata and Uruguay basins as the main routes of entry, dispersal and circulation through the Uruguay plainlands. The earliest occupation of this territory was approximately 1000 years before the Fishtail groups, dating from approximately 14.000 to 13.700 cal BP. Low level of visibility in the archaeological record indicates that the first settlements were carried out by small groups scattered over vast territories, with scarce contact or interaction between them. Different cultural groups occupied briefly and redundantly the same locations, recorded by small archaeological sites with low frequency of tools. A regional technological and social reorganization, with a Paleoamerican stemmed point tradition which includes three cultural techno-complexes -Fishtail, Tigre and Pay Paso- as human adaptations to low grassland plains

and fluvial environments between 12,800 and 10,100 cal BP. Tigre and Pay Paso cultural complexes emergence indicates a period of technological adjustments during the Pleistocene-Holocene transition that took place along with the initial regional diversification in early projectile point designs in southeastern South America. Early archaeological sites are situated in locations nearby water, like stream mouths, river o lakes, which provides a great diversity of resources, facilitating hunting and fishing strategies and raw materials for the manufacture of stone tools. Exists a residential mobility strategy and hierarchy in the use of space during the early peopling of the Southeast of South America and Uruguay. In the axis of the middle Uruguay River there are numerous archaeological sites that show the movement between three types of sites: residential camps, fishing camps and sites located in places where rivers or streams cross. At the same time, the archaeological record indicates logistical mobility strategies over significant distances to obtain non-local raw materials. An increase of the social identity of the human groups is suggested by the stylistic and techno-morphological diversity shown of the points recorded for the region.

Among the Fishtail and Tigre points recorded for Uruguay there are a few oversized, some of them exceeding 150 mm. Given that the chronology of both types of points is synchronous with the megafauna of the region, a simple interpretation might suggest that these extra-large points would correspond to hunting weapons of this Pleistocene fauna. Common sense suggests that the artifacts of hunter-gatherers are intended for activities directly associated with hunting and gathering (Sinclair, 1995).

Nevertheless, the archaeological record indicates otherwise: the two Fishtail points from Tagua Tagua II site in Chile, linked to mastodon hunting activities measured 37 and 40 mm (Núñez et al., 1994; Mendez, 2015; Suárez et al. 2018). Likewise, other findings in South America such as Fell's Cave (Bird, 1969), Cueva del Medio (Nami, 1987; Martin et al., 2019) and Paso Otero 5 (Martínez, 2001), report small to medium-sized Fishtail points associated with megafaunal remains, with sizes varying within a range of 37 to 60 mm.

These oversized points have been recorded in Uruguay, Pampa, Patagonia and south-central Brazil (Miotti, 1995; Suárez and López, 2003; Flegenheimer et al., 2013; Loponte et al., 2016; Suárez et al., 2018), but much less frequently than the small-medium ones.

Following Hayden (1998), two types of technologies can be recognized among hunter-gatherers: practical and prestige technologies. Practical technology seeks to satisfy basic needs

in an efficient and effective way, selecting the best option in a cost-effectiveness relationship within the pool of available solutions. This category includes most of the artifacts recovered in the early archaeological record of Uruguay, used to carry out different activities (Suarez, 2015c, 2017). Unifacial artifacts such as scrapers or knives were used for daily activities and quickly discarded (Suárez, 2015c). Among the bifacial artifacts, large bifaces used as cores, preforms, bifacial knives and projectile points were recovered (Suarez, 2017). In the case of the points it is possible to recognize a highly morphologically-standardized design, distinguishing the Fishtail, Tigre, and Pay Paso points (Suárez, 2015a, 2017). These points were constantly maintained, conserved, resharpened, and recycled (Politis, 1991; Suárez, 2003, 2011a, 2015a; Castiñeira et al., 2011; Flegenheimer and Weitzel, 2017; Suárez et al., 2018).

On the other hand, prestige technology according to Hayden (1998) doesn't seek to solve a practical task, but to display wealth, success, and power. These prestige objects are produced with a different logic and strategy than that used to produce a practical object (Hayden, 1998), and they employes as much surplus labor as possible to create objects that will appeal to others and attract people to the possessor of those objects due to admiration for his or her economic, aesthetic, technical, or other skills (Suárez et al., 2018)

Many authors (Gamble, 1990; Stringer and Gamble, 1993; Hayden, 1998; Gallay, 2010) have recognized some characteristics that the oversized Fishtail and Tigre points recovered in Uruguay share: they require a tremendous amount of energy, time and skills to produce an artifact like that. First of all, the need for suitable outcrops to obtain base forms over 200 to 250 mm long or more, most of the times rocks with an especial value, symbolic or aesthetic, like reddish silicified limestone. This particular rock has a regional distribution (Martínez et al., 2015), and was transported from distances as long as 500 km from Uruguay to the Pampa region (Flegenheimer et al., 2003; Suárez et al., 2018). Added to the rarity of the raw materials, it requires an extremely sophisticated knapping technique and very controlled thinning stages in all the reduction strategies, with highly specialized manufacturing skills.

At least since the Upper Paleolithic, humans produced symbolic and prestige artifacts, including large points whose bifacial technology far exceeds the requirements of a practical tool (Sinclair, 1995). Oversized Fishtail and Tigre points registered in Uruguay meet these characteristics, with the symbolic aspect of technology not restricted to the morphology but through the entire process of manufacture, and these exceptional artifacts might have served as a symbol of individual prestige for hunter-knappers (Suárez et al., 2018).

Material culture is not passive, but is used as an instrument in social strategies, consolidating and shaping social relations between individuals and groups (Sinclair, 1995), with artifacts serving as identity markers. Fishtail and Tigre points, as material culture, are an ideal means of communication, and shared designs that circulated extra-regionally may have stimulated social aggregation among groups dispersed over large territories (Dillehay et al., 2003; Robinson et al., 2009; Suárez et al., 2018). The exchange of objects, knowledge, raw materials and information that occurred in these aggregation events could have contributed to social cohesion in the initial dispersion in the region.

6. Conclusions

The continuous research carried out in the last 20 years, with the incorporation of unpublished sites expanding the base of radiocarbon dates, and the interdisciplinary work, allowed us to recognize a Paleoamerican cultural landscape, and to formulate an behavioral-archaeological model for the early settlement of the region.

The proposed model is constantly being reformulated and expanded, integrating the information provided by the archaeological, paleoclimatic, geological and biological records to explain the cultural change observed in the lithic technological innovations and the designs of the different types of artifacts, especially projectile points.

An initial human dispersal in the region took place between 14,000 and 13,100 cal BP during the late Pleistocene, when cold and dry conditions still prevailed in these environments. The chronological depth of the earliest occupation in Uruguay indicates that 1000 years before the appearance of the Fishtail groups, the Uruguayan plains were being explored by other human groups that in small flows were recognizing a territory with a great diversity of resources such as the Uruguayan plains. The dense river network was a determining factor for human advance in the region, forming a geographic network of routes and axes of significant dispersion that minimized the risks of exploring a previously unknown and uninhabited area of the continent.

Around 12,900 cal BP, when the climate was still dry and arid, with a predominant presence of large grass prairies, emerged a tradition of pedunculate points with an abundant and widespread archaeological record in the Southern Cone: the Fishtail points.

From approximately 12,000 cal BP onwards, a warmer and more humid climatic phase begins, with a marked increase in rainfall that produces a significant change in the vegetation, given

by the expansion of the gallery forest along the margins of the watercourses of the basin of the middle Uruguay River. These paleoenvironmental transformations determine the beginning of the Holocene and, in a local archaeological framework, are linked to the emergence of the Tigre cultural complex, which emerges as a response to this climatic, ecological and faunal reconfiguration.

Around 11,080 cal BP, new regional social and technological readjustments take place, with the emergence of the Pay Paso cultural complex, with smaller and increasingly triangular points, with peduncles that also decrease in size in relation to the Tigre and Fishtail points, but increase their penetration power, probably linked to a change in the prey that these groups hunted.

The Paleoamerican cultural landscape, from the end of the Pleistocene and beginning of the Holocene, was organized around the central geographical axis of the middle Uruguay River, with early sites located in strategic locations linked to circular patterns of seasonal residential mobility. The hierarchy in the use of space emphasizes a strategy of residential and logistic mobility that configures a network of movements between different sites: residential, quarries for the supply of lithic resources, rock shelters and caves located in areas of high concentration of lithic raw material. Four interrelated criteria are identified in the choice of residential sites: proximity to water resources, vital for human development; the existence of flood plains with extensive grasslands and pastures and the presence of extinct and present-day herbivorous mammals; proximity to fishing sites with important fish fauna resources; and availability of raw material for knapping.

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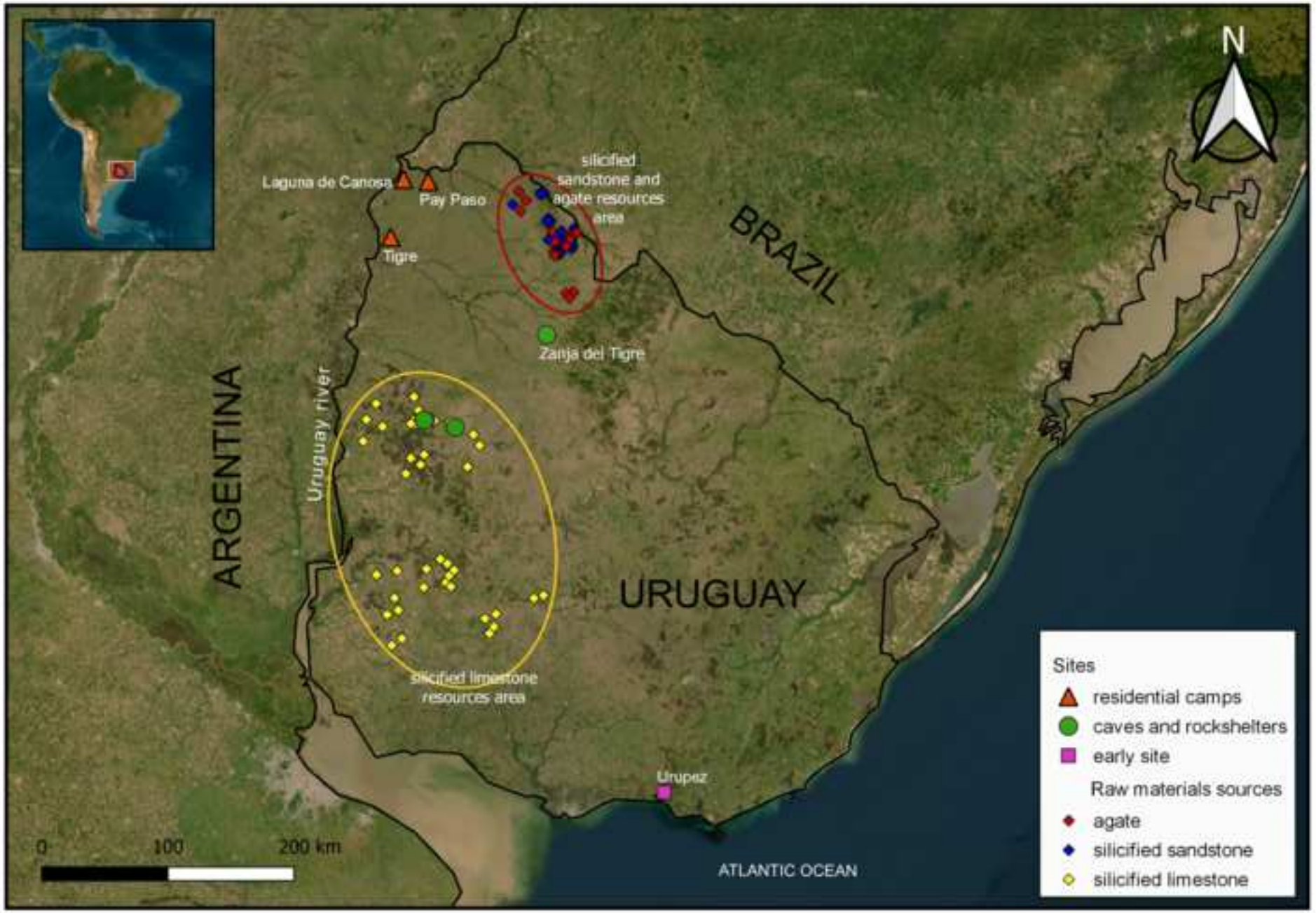

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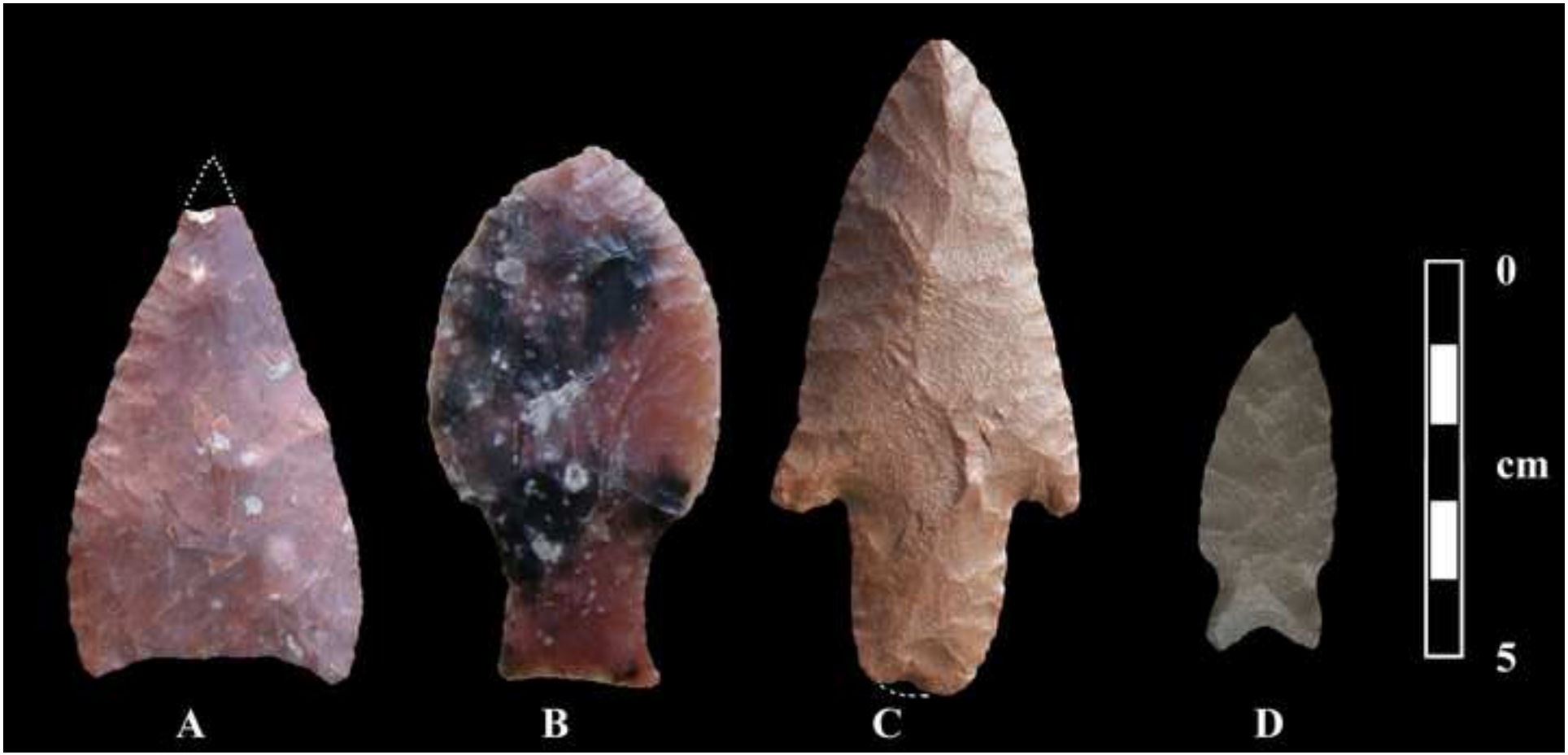

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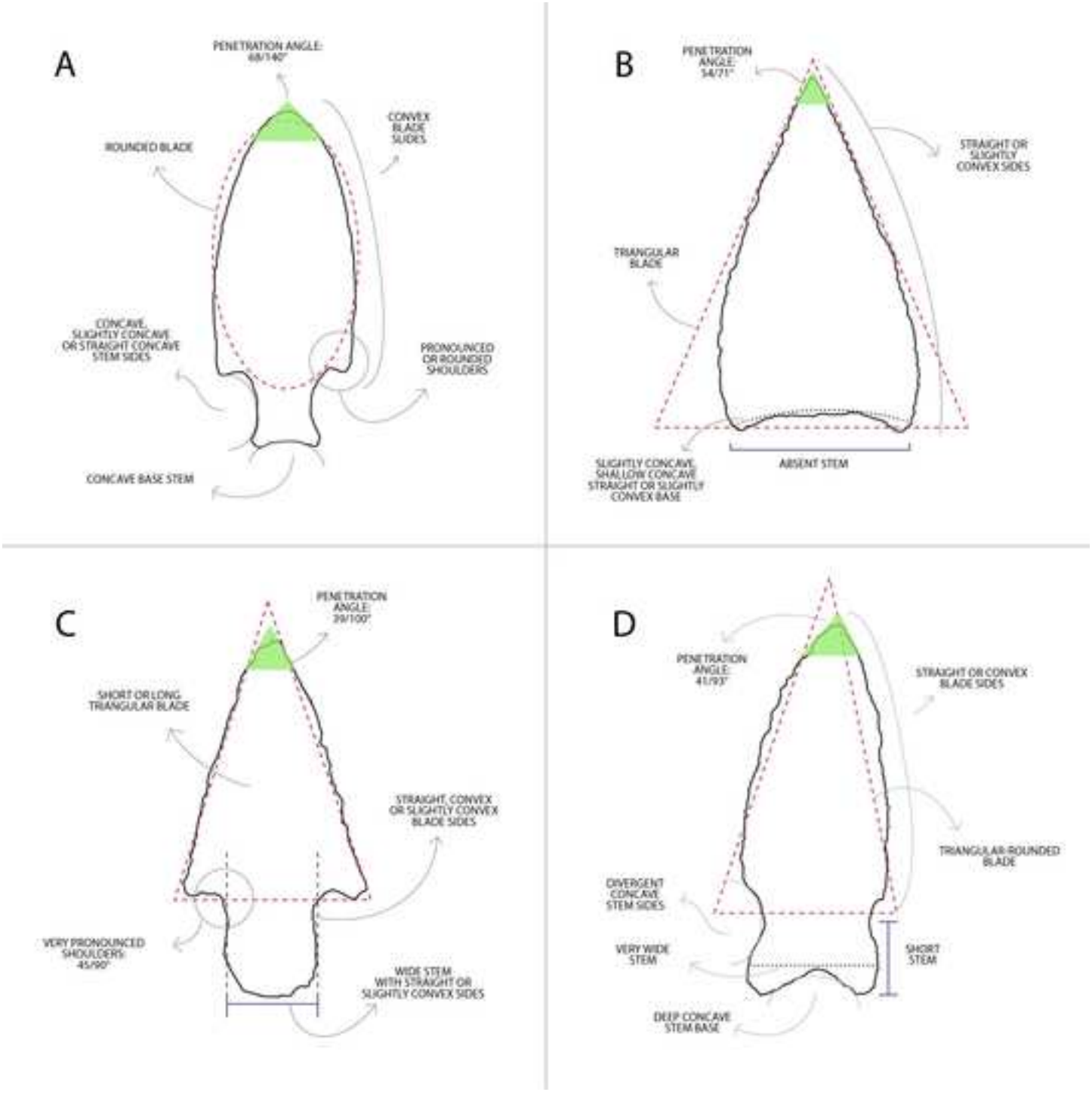

Table 1. Ages obtained in the Tigre, Pay Paso 1 and Zanja del Tigre 1 sites.

Site	Laboratory Number	Radiocarbon dating (14C BP)	2s Calibrated age (cal BP)	Stratigraphic Unit	Reference
Tigre	UCIAMS 145430	11,355 ± 30a	13,256-13,078	SU1 interface with SU2	Suárez, Piñeiro and Barceló 2017
Tigre	UCIAMS 145429	11,320 ± 30a	13,213-13,062	SU1 interface with SU2	Suárez, Piñeiro and Barceló 2017
Tigre	UCIAMS 145428	11,315 ± 30a	13,208-13,060	SU1 interface with SU2	Suárez, Piñeiro and Barceló 2017
Tigre	UCIAMS 125383	10,955 ± 50	12,917-12,700	SU2 (base)	Suárez, Piñeiro and Barceló 2017
Tigre	UCIAMS 125384	10,930 ± 20	12,802-12,705	SU2 (base)	Suárez, Piñeiro and Barceló 2017
Tigre	UCIAMS 125381	10,905 ± 20	12,782-12,697	SU2 (base)	Suárez, Piñeiro and Barceló 2017
Tigre	UCIAMS 125379	10,595 ± 25	12,640-12,431	SU2 (base)	Suárez, Piñeiro and Barceló 2017
Tigre	UCIAMS 125393	10,580 ± 50	12,658-12,320	SU2 (base)	Suárez, Piñeiro and Barceló 2017
Tigre	UCIAMS 145434	10,510 ± 45	12,556-12,077	SU2 (base)	Suárez, Piñeiro and Barceló 2017
Tigre	UCIAMS 125380	10,425 ± 20	12,407-12,057	SU2 (base)	Suárez, Piñeiro and Barceló 2017
Tigre	UCIAMS 145433	10,410 ± 60	12,426-11,986	SU2 (base)	Suárez, Piñeiro and Barceló 2017
Tigre	UCIAMS 145432	10,400 ± 300	12,744-11,220	SU2 (base)	Suárez, Piñeiro and Barceló 2017

Tigre	UCIAMS 145431	10,075 ± 30	11,747-11,336	SU2 (middle)	Suárez, Piñeiro and Barceló 2017
Tigre	UCIAMS 145435	9,710 ± 130	11,313-10,592	SU2 (middle)	Suárez, Piñeiro and Barceló 2017
Tigre	UCIAMS 125385	9,615 ± 20	11,089-10,749	SU2 (middle)	Suárez, Piñeiro and Barceló 2017
Tigre	UCIAMS 145437	8,690 ± 150	10,176-9334	SU2 (upper)	Suárez, Piñeiro and Barceló 2017
Tigre	UCIAMS 125382	8,425 ± 15	9479-9307	SU2 (upper)	Suárez, Piñeiro and Barceló 2017
Tigre	UCIAMS 145436	8,405 ± 25	9469-9298	SU2 (upper)	Suárez, Piñeiro and Barceló 2017
Tigre	LEMA 511	1,210 ± 40	1178-971	SU4	Suárez, Piñeiro and Barceló 2017
Tigre	UCIAMS 125397	685 ± 15b	656-560	SU4	Suárez, Piñeiro and Barceló 2017
Pay Paso 1	UCIAMS 21631	10,930 ± 20	12,802-12,705	U2a	Suárez 2011a
Pay Paso 1	UCIAMS 27738	10,910 ± 30	12,797-12,698	U2a	Suárez 2011a
Pay Paso 1	UCIAMS 27744	10,895 ± 30	12,786-12,693	U2a	Suárez 2011a
Pay Paso 1	UCIAMS 27745	10,880 ± 25	12,759-12,692	U2a	Suárez 2011a
Pay Paso 1	UCIAMS 21637	10,680 ± 20	12,674-12,558	U2a	Suárez 2011a
Pay Paso 1	UCIAMS 21636	10,630 ± 25	12,655-12,440	U2a	Suárez 2011a
Pay Paso 1	UCIAMS 27746	10,595 ± 30	12,642-12,430	U2a	Suárez 2011a
Pay Paso 1	UCIAMS 21644	10,580 ± 20	12,618-12,429	U2a	Suárez 2011a

Pay Paso 1	UCIAMS 21645	10,555 ± 20	12,552-12,426	U2a	Suárez 2011a
Pay Paso 1	UCIAMS 27747	10,540 ± 35	12,629-12,174	U2a	Suárez 2011a
Pay Paso 1	UCIAMS 21643	10,520 ± 20	12,551-12,177	U2a	Suárez 2011a
Pay Paso 1	UCIAMS 27740	10,500 ± 25	12,548-12,114	U2a	Suárez 2011a
Pay Paso 1	UCIAMS 28692	10,465 ± 30	12,429-12,058	U2b	Suárez 2011a
Pay Paso 1	UCIAMS 28682	10,450 ± 25	12,422-12,064	U2b	Suárez 2011a
Pay Paso 1	UCIAMS 27741	10,390 ± 30	12,400-12,001	U2b	Suárez 2011a
Pay Paso 1	RT 5257	10,320 ± 70	12,401-1767	U2b	Suárez 2011a
Pay Paso 1	UCIAMS 21639	10,285 ± 25	12,051-11,821	U2b	Suárez 2011a
Pay Paso 1	RT 5256	10,225 ± 70	12,251-11,406	U2b	Suárez 2011a
Pay Paso 1	UCIAMS 21632	10,205 ± 35	12,008-11,629	U2c	Suárez 2011a
Pay Paso 1	UCIAMS 21634	10,180 ± 20	11,974-11,623	U2c	Suárez 2011a
Pay Paso 1	UCIAMS 21633	10,115 ± 25	11,795-11,399	U2c	Suárez 2011a
Pay Paso 1	UCIAMS 21641	9,585 ± 25	11,081-10,711	U2d	Suárez 2011a
Pay Paso 1	UCIAMS 21642	9,555 ± 25	11,070-10,685	U2d	Suárez 2011a
Pay Paso 1	UCIAMS 21647	9,550 ± 20	11,069-10,679	U2d	Suárez 2011a
Pay Paso 1	UCIAMS 21635	9,545 ± 20	11,068-10,666	U2d	Suárez 2011a

Pay Paso 1	UCIAMS 21646	9,545 ± 20	11,068-10,666	U2d	Suárez 2011a
Pay Paso 1	UCIAMS 21640	9,525 ± 20	11,064-10,595	U2d	Suárez 2011a
Pay Paso 1	UCIAMS 21638	9,525 ± 20	11,064-10,595	U2d	Suárez 2011a
Pay Paso 1	Uru-248	9,280 ± 200	11,124-9901	U2e	Suárez 2011a
Pay Paso 1	Beta-156973	9,120 ± 40	10,373-10,176	U2e	Suárez 2011a
Pay Paso 1	Uru-246	8,570 ± 150	10,119-9093	U2e	Suárez 2011a
Zanja del Tigre 1	UGAMS 7459	8770 ± 30			Suárez, Leigh and Trindade 2011
Zanja del Tigre 1	UGAMS 7460	8750 ± 30			Suárez, Leigh and Trindade 2011

Notes: Calibration performed with Calib 7.0. SHcal13.14c (two sigma rates). Hogg et al., 2013. All dates were obtained by AMS 14C method, except for Uru-246 and Uru-248, which were obtained by the standard method.