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To cite this article: Leandro Zilio & Heidi Hammond (2017): A Persistent Place for Hunter-Gatherers During the Late Holocene: The Case of Burials in Pit on the Coast of Lángara Bay, Argentine Patagonia, The Journal of Island and Coastal Archaeology, DOI: [10.1080/15564894.2017.1284962](https://doi.org/10.1080/15564894.2017.1284962)

To link to this article: <http://dx.doi.org/10.1080/15564894.2017.1284962>



Published online: 16 Feb 2017.



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## **Report**

# **A Persistent Place for Hunter-Gatherers During the Late Holocene: The Case of Burials in Pit on the Coast of Lángara Bay, Argentine Patagonia**

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### ABSTRACT

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*In Argentine Patagonia, the type of archaeological burial “in pit” has been only identified on the coast of Lángara Bay. This modality is characterized by the presence of single and multiple primary burials. Studies on five human burials in pits are presented in this article. The aim is to compare the contexts of burials in pit at the site level and the spatial characteristics of their distribution in the Lángara Bay locality from a diachronic perspective. The approach focuses on mortuary practices and social relations of hunter-gatherer groups during the Late Holocene. A characterization of the burials, their chronologies, bioarchaeological determinations, stable isotope studies, and their spatial distribution are included. The results allow us to chronologically place the contexts between ca. 3000 and 2000 cal BP. A spatial pattern in the distribution of burials in the coastal landscape was identified. Finally, it is proposed that this part of the Patagonian coast was a persistent place of burials in pit.*

**Keywords** burial in pit, hunter-gatherers, Patagonia, spatial analyses, stable isotopes

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Received 13 July 2016; accepted 2 January 2017.

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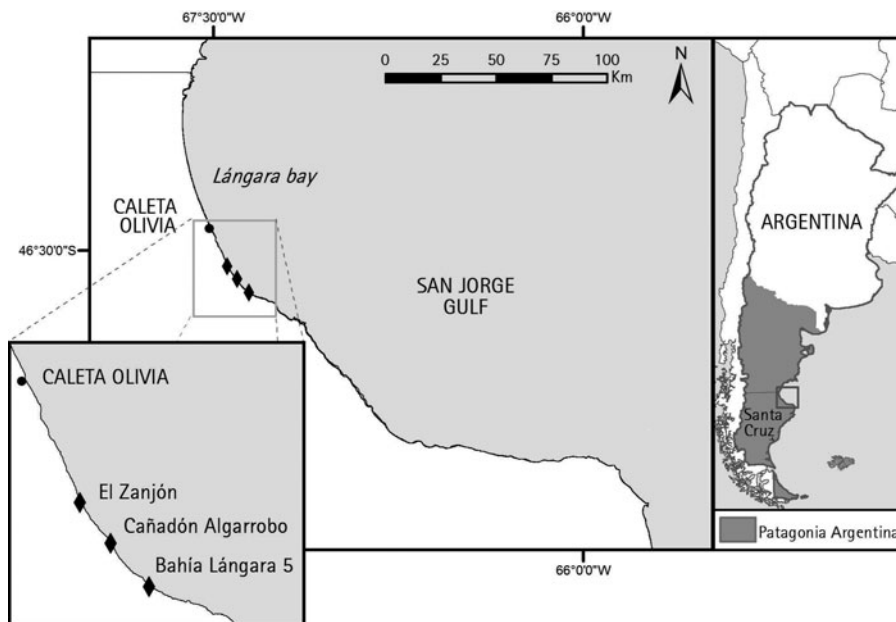
Color versions of one or more of the figures in the article can be found online at <http://www.tandfonline.com/uica>.

## INTRODUCTION

Different mortuary practices, such as burials in dunes, caves, and *chenques*, were identified on the Northern coast of Santa Cruz Province (Argentine Patagonia) during the Late Holocene (Castro and Moreno 2000; Zilio 2013, 2015; Zilio et al. 2014). Moreover, a particular type of burial, defined as “in pit”, was registered in a 20 km long stretch of coastline along Lángara Bay. This locality is situated in the centre of San Jorge Gulf on the Northern coast of Santa Cruz (Figure 1). In this coastal landscape, five mortuary contexts were identified close to the current shoreline and buried at depths of between 0.5 and almost 2 m (Figure 1). From the study of these contexts, burial in pit was defined (Zilio 2015). This modality is characterized by the presence of individuals buried in deep graves, without elements that allow the burials to be visible on the surface. So far this is the only coastal sector of Patagonia where this modality of burial has been identified.

The aim of this report is to compare the contexts of burials in pit at the site level and the spatial characteristics of their distribution in Lángara Bay from a diachronic perspective. The approach focuses on mortuary practices and social relations of hunter-gatherer groups during the Late Holocene. In order to achieve this, diverse analyses were carried out: recording of burial features; the form of disposition of the individuals; bioarchaeological determinations of sex and age; spatial analyses; radiocarbon dating; and carbon and nitrogen isotopes studies. This approach involves working at multiple scales, such as the individual level, the burial, the site, and the archaeological locality.

Knowledge of mortuary contexts is important for reconstructing the diverse aspects of past lifeways, therefore, burial places should be analyzed as part of a social whole. The selection of spaces occupied during life and those for the dead was not the result of random choices, but instead, they were part of an articulated sys-



**Figure 1.** Location of burials in pit on Lángara bay.

tem (Zilio 2015). The landscapes where such archaeological records are located are conformed from the actions of people at different spatial and temporal scales, with distinct degrees of integration and coordination, and also by the action of different natural processes operating in a variety of spatial scales (Wandsnider 1998).

## MATERIALS AND METHODS

The bone assemblages studied are deposited at the “Man and their Environment Museum” (MEM) of Caleta Olivia city on Santa Cruz Province. The materials analyzed correspond to human skeletal remains found in five burials on the coast of Lángara Bay. Only one was excavated using archaeological techniques. The remaining were recovered by local people so they lack contextual data. The geographical location (GPS coordinates) of each burial is also available.

Analyses included the anatomical determinations and the quantification of bone elements represented in every burial. The number of identified remains (NR [= number of identified specimens or NISP]), the minimum number of elements (MNE), and the minimum number of individuals (MNI) were estimated (Lyman 1994).

Sex estimation of osteological material was based on the analysis of morphological features of the skull and pelvis, and the age of death was obtained from studies of the morphology of the pubic symphysis, of the auricular surface of the ilium, and from the analysis of the state of obliteration of the cranial sutures (Buiskstra and Ubelaker 1994; White and Folkens 2005).

Radiocarbon dates were processed at the Radiocarbon Laboratory (CIG-LATYR). Recalculation of conventional radiocarbon age obtained with tables from the value of carbon isotope fractionation of bone samples ( $\delta^{13}\text{C} = -20\text{‰}$ ) was performed. For this purpose, the  $\delta^{13}\text{C}$  value measured on the collagen extracted from samples from the same individuals dated was provided to the Radiocarbon Laboratory, which carried out the recalculation. The ages were calibrated in OxCal 4.2 using the SHCal13

curve with two standard deviations (Hogg et al. 2013) and were graphed with the probability sum command in OxCal (Ramsey 2009). All ages discussed are in calibrated years before present (cal BP).

Stable isotope analyses of  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$ , based on the processing of the organic fraction (collagen) in skeletal remains, were performed. Four samples were processed at the Natural History Museum of San Rafael (code MSR) and were measured at the University of Wyoming Stable Isotope Facility. The remaining sample was processed and measured at the Institute of Geochronology and Isotope Geology (code AIE). The C/N ratio was taken into account in order to evaluate the possibility of diagenetic alteration of isotopic composition.

## THE STUDY AREA AND BURIALS IN PIT

The coastal strip of Lángara Bay presents cliffs and wide beaches of coastal boulders, affected by sea erosion and surface runoff (Codignotto 1987). The climate is temperate with average temperatures ranging between 12 and 20°C throughout the year with well-marked seasonal differences, and annual rainfall does not exceed 300 mm (Oliva et al. 2001). Currently, the locality is characterized by the presence of high shrub steppes and thickets. Colonies of birds (*Phalacrocorax* sp., *Larus* sp., *Spheniscus magellanicus*, among others), pinnipeds (F. Otariidae: *Arctocephalus australis* and *Otaria flavescens*), and molluscs (mainly *Nacella magellanica*, *Mytilus edulis*, and *Aulacomya atra*) are dominant among marine fauna, and guanaco (*Lama guanicoe*) in terrestrial fauna.

### El Zanjón Site (Burials 1, 2, and 3)

The site is located adjacent to the modern coast on an uplifted Pleistocene marine terrace and beside the mouth of a small canyon (called *cañadón* in Patagonia) named Cañadón El Zanjón (Figure 1). Three burials were recorded at the El Zanjón archaeological site. An intra-site spatial analysis allowed us to establish that the space

between the three burials does not exceed 10 m.

In 2007 El Zanjón 1 burial (EZ1) was excavated by a local villager. The burial structure consists of a pit sealed by a layer of coastal boulders and the human bones were placed approximately 1 m deep. A few days after identification, the structure was ransacked by a local fisherman, and part of the skeletal remains was handed over to the MEM.

In 2010 the archaeological rescue of burial 2 from El Zanjón (EZ2) was carried out (Figure 1; Zubimendi et al. 2011). Due to the extraction of natural aggregates for construction in the marine terrace with the use of a mechanical shovel, erosion began acting on an exposed surface, and the burial was uncovered. Later, a local villager partially ransacked the burial and then gave notice to archaeologists. The archaeological rescue excavations allowed us to recognize the limits of a pit, which had a diameter of just over 1 m and was approximately between 1.6 and 1.9 m deep. We were also able to confirm that it was a single primary burial. The sedimentary column that was over the human skeletal remains was excavated by the person who ransacked the site. Immediately above the body, an accumulation of coastal boulders of about 30 cm in diameter was identified. These boulders were part of the burial structure, they are locally available and selected by size. Along with this individual, two rock balls (known as *boleadoras*) of andesite with a fine furrow were deposited as grave goods (Figure 2; Zubimendi et al. 2011).

The discovery of burial 3 of El Zanjón (EZ3) was made because the context was crossed by a trail generated by motocross and quads. These vehicles exposed the human remains, which were later ransacked. Consequently, only a few skeletal remains were rescued from the site by archaeologists. In 2014 the site was visited by one of us, who observed that the human remains had a depth of approximately 1 m. A reconstruction of the discovery context allows us to infer that the individual or individuals present at the burial would have been deposited in a pit. It was not possible to take the dimensions of the pit because the

structure was much altered by a trail. The burial was covered with coastal boulders and sediments (gravel and sand).

### Cañadón Algarrobo

In 2010 Cañadón Algarrobo burial (CA), located at the mouth of the namesake small canyon, was discovered (Figure 1). The burial was found by a machinist who performs movements of natural aggregates for construction. Subsequently, the local police collected the human bones. Movements of natural aggregates with a mechanical shovel completely altered the original context, so it was not possible to determine how the body had been deposited. However, from a visit at the site of the find, it is inferred that the remains were deposited at a depth greater than 50 cm.

### Bahía Lángara 5

In 1996 Bahía Lángara 5 burial (BL5), located at the mouth of a small canyon called Cañadón León (Figure 1), was excavated by a local villager and the human skeletal remains were taken to the MEM. During a site visit, a pit of about 50 cm deep as well as coastal boulders that had formed part of the burial structure were identified (Griboaud, personal communication).

## RESULTS

### Bioanthropological Determinations

In Table 1, the MNE for each skeletal part from burials in pit is presented. The skeletal sample analyzed from the five burials consists of a MNI of 7 and the total MNE is 404. The only burial with more than one individual represented corresponds to EZ1 (MNI = 3). In this last, a total of 91 bone elements could not be assigned to any of the three individuals identified (Table 1). In all cases the skeletons of individuals are incomplete and bone elements are fragmented in high frequencies (Table 2).

In individual 1 from EZ1 the sex was estimated from the morphology of the





**Figure 2.** Location of rock balls at EZ2 burial.

pelvis and skull, and for individual 2 from analysis of the skull. Both correspond to male individuals. The skulls of individuals 1 and 2 were incomplete, so an examination of the cranial sutures closure could not be performed. A fragment of the pubic symphysis, the third molar, the iliac crest, and the epiphysis of the fused clavicle (skeletal elements of late fusion) were preserved in individual 1. From these indicators it is inferred that the individual was a young adult at the time of death. Meanwhile, in individual 2 the only diagnostic element

that was preserved for estimating the age of death was the pubic symphysis, from which it was determined that the individual was a young male.

Individual 3 from EZ1 is represented by fragments of two tibias, a fibula, a scapula, and a coxal (Tables 1 and 2). The epiphysis of the fibula and tibia were completely fused, suggesting they correspond to an adult individual.

From the morphology of the pelvis, the individual from EZ2 burial was determined to have been a young adult male. Although

**Table 1.** MNE values for each bone element of burials in pit.

Burial Individual	EZ1						EZ2		EZ3		CA		BL5		
	1		2		3		1		1		1		1		
	MNE		MNE		MNE		MNE		MNE		MNE		MNE		
	L	R	L	R	L	R	Ind.	L	R	L	R	L	R	L	R
Skull*	12		0		0		0	23		0		6		30	
Sternum	0		0		0		0	1		0		1		1	
Vertebrae	0		0		0		18	1		0		14		21	
Scapula	1	0	0	1	1	0	1	1	1	0	0	1	1	1	1
Rib	2	3	0	0	0	0	52	12	11	0	0	12	10	5	0
Clavicle	1	1	0	1	0	0	1	1	1	0	0	1	1	1	1
Humerus	1	0	1	1	0	0	1	1	1	0	0	1	0	1	1
Radius	1	1	1	1	0	0	0	1	1	0	0	0	0	1	1
Ulna	1	1	1	1	0	0	0	1	1	0	0	0	0	1	1
Femur	0	1	1	1	0	0	1	1	1	1	0	0	0	1	1
Tibia	1	0	1	1	1	1	1	1	1	0	0	0	0	1	0
Fibula	1	1	1	1	1	0	1	1	1	0	1	0	0	0	0
Coxal	1	1	1	1	1	0	0	0	1	0	0	0	0	1	1
Sacrum	1		0		0		1	0		0		0		0	
Patella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Carpal	0	0	0	0	0	0	0	1	0	0	0	0	0	4	3
Metacarpal	0	0	0	0	0	0	6	4	3	0	0	0	0	4	2
Tarsal	1	0	0	0	0	0	3	3	3	2	2	0	0	0	0
Metatarsal	0	0	0	0	0	0	1	3	2	2	2	0	0	0	0
Phalange**	0	0	0	0	0	0	4	11	10	0	0	0	0	3	8
Total	33		16		5		91	105		10		48		96	

Ind. (indeterminate): indicates the skeletal parts that were not possible to assign to an individual.

\*All elements, except the ear bones.

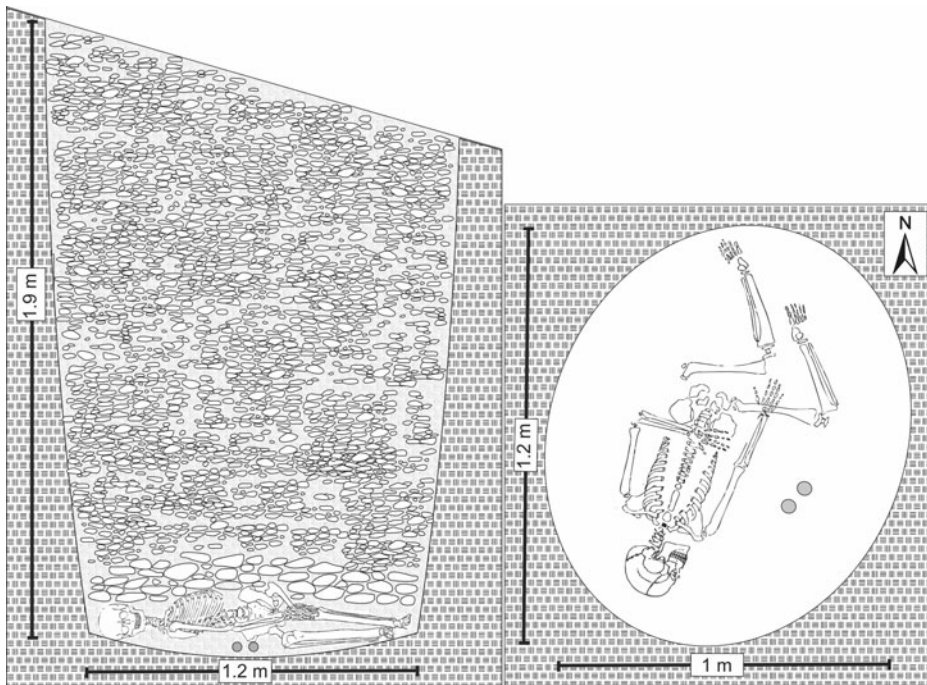
\*\*Phalanges of hands and feet.

**Table 2.** Fragmentation of skeletal remains from burials in pit.

Burial	MNE	NR	Complete bone elements
EZ1	1	33	41
	2	16	17
	3	5	7
EZ2	1	105	121
EZ3	1	10	10
CA	1	48	60
BL5	1	96	111

the skull is preserved, it was not possible to make any determination with this skeletal element because of its poor preservation. The body was in dorsal decubitus position, with lower extremities semi-flexed and turned to the right. A reconstruction in section and plan of EZ2 burial is illustrated in [Figure 3](#).

From the study of skeletal remains found in EZ3 burial it was determined that they correspond to an adult individual, although it was not possible to establish the sex or age. Bioanthropological analyses show evidence that the individual from CA burial is probably female. A



**Figure 3.** Reconstruction of EZ2 burial in section and plan. The gray circles correspond to the rock balls.

massive bone loss was recorded in CA, thus, sex determination was based on the features of the cranial vault. A large part of the skeletal remains of this last individual had a reddish pigment adhered to them.

Studies of the pelvis and skull fragments found in BL5 burial allowed us to suggest it corresponds to a male individual. The skeletal remains belong to a senior adult (over 50 years), according to the high degree of tooth wear and characteristics of the cranial sutures.

### Radiocarbon Data and Isotopic Determinations

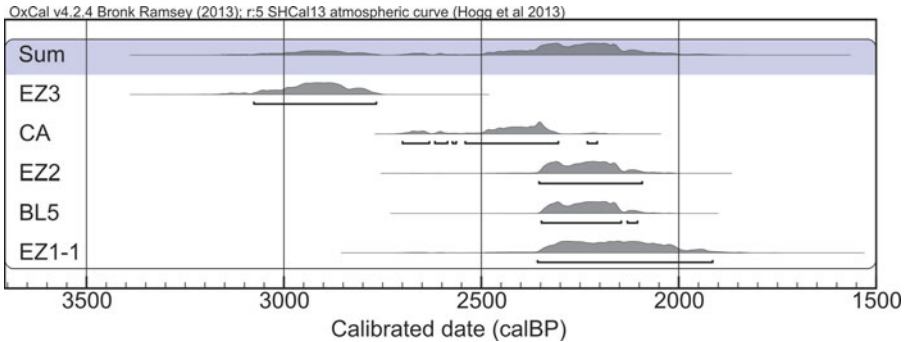
Five direct radiocarbon dates of individuals recovered from burials in pits were performed (Table 3). The calibration of radiocarbon dates and the joint combination of calibration intervals allow us to place these five individuals between 3076 and 1914 cal BP (Table 3 and Figure 4).

Five determinations of stable isotopes of the organic fraction of human skeletal remains were conducted. The obtained

**Table 3.** Radiocarbon dates of EZ1-1, EZ2, EZ3, CA, and BL5 burials.

Burial	Age <sup>14</sup> C	Age cal BP (2σ)	Code	Material dated
EZ1-1	2210 ± 100	2358–1914	LP-2443	Bone
EZ2	2280 ± 60	2354–2093	LP-2461	Bone
EZ3	2850 ± 60	3076–2766	LP-3044	Bone
CA	2400 ± 50	2700–2207	LP-2689	Bone
BL5	2270 ± 50	2348–2105	LP-2705	Bone





**Figure 4.** Distribution of calibrated dates and sum of probabilities of burials in pit.

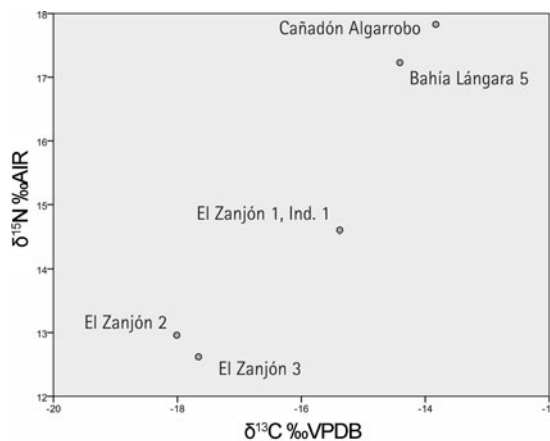
values are distributed linearly, so we can interpret that the individuals based their diets on the combination of marine and terrestrial resources (Table 4 and Figure 5). The results indicate mixed diets based on the incorporation of terrestrial and marine resources (EZ1-1, CA, and BL5), as well as predominantly terrestrial diets (EZ2 and EZ3).

The median of the isotopic values of  $\delta^{13}\text{C}$  is  $-15.38 \pm 1.89\text{‰}$ . The difference between the minimum and maximum is wide (between  $-18.01\text{‰}$  and  $-13.83\text{‰}$ ). On the other hand, the  $\delta^{15}\text{N}$  recorded a median of  $14.60 \pm 2.39\text{‰}$ . The minimum and maximum values correspond to  $12.62\text{‰}$  and

$17.83\text{‰}$  respectively. The C/N ratio measured on collagen is between 3.0 and 3.4. This value is within the accepted range of samples without diagenetic alteration (2.9–3.6, De Niro 1985).

### Spatial Distribution

The spatial analysis of the five burials found in Lángara Bay (Figure 1) led to the identification of an association between the location of the burials in pit and specific landforms. Thus, these burials are located at the end of the mouths of small canyons



**Figure 5.** Collagen  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  values of individuals buried in pits.

**Table 4. Stable isotope data from EZ1-1, EZ2, EZ3, CA, and BL5 burials.**

Burial	$\delta^{13}\text{C}$ (‰)	$\delta^{15}\text{N}$ (‰)	Code	C/N	Sample
EZ1-1	-15.38	14.6	MSR270	3.2	Rib
EZ2	-18.01	12.96	MSR271	3	Rib
EZ3	-17.66	12.62	AIE35407	3.4	Calcaneus fragment
CA	-13.83	17.83	MSR298	3.3	Rib
BL5	-14.41	17.23	MSR402	3.2	Radius fragment

in the Atlantic Ocean, located at the highest levels of the slopes of the canyons and adjacent to the modern shoreline (Figure 6).

## DISCUSSION AND CONCLUSIONS

In the modality of burial in pit, individuals were buried at a depth of between 0.5 and 1.9 m, and the aperture of the pit was filled with sediment. This type of inhumation is characterized by the presence of primary burials, both single and multiple. The obtained dates allowed us to place this type of burial between ca. 3000 and 2000 cal BP (Figure 4).

Spatial analysis of the sites allows us to identify a pattern between the location of the burials in pit and their geomorphological placement. In all cases, the burials are placed at the end of the mouth of small canyons in the Atlantic Ocean, located at the highest levels of the slopes of the canyons and adjacent to the modern shoreline (Figure 6). From the recognized spatial pattern of burials in pit, it is possible to argue that human groups that performed these burials selected certain sectors of the

coastal landscape, with particular characteristics, in order to bury their dead.

It was determined that two of the individuals analyzed present isotopic signals that can be explained by a majority use of terrestrial resources (EZ2 and EZ3). In EZ2 two rock balls were found in direct association to the only buried individual (Figures 2 and 3). The association between a technology interpreted for hunting terrestrial animals, like the *guanaco*, and the terrestrial isotopic signal of the individual is highlighted.

The three remaining isotopic signals indicate a mixed diet, which suggests that individuals consumed both marine and terrestrial resources (CA, BL5, and EZ1-1). The individuals found at CA and BL5 burials have diets of high trophic level based on consumption of seafood products (Zilio et al. 2014). It is inferred that mixed diets are part of a complementary use of the resources of the hinterland and the coast. In this sense, it suggests that the land use of these individuals connected the Atlantic Coast with interior areas at variable distances.

The analyses of human skeletal remains indicate that the bones are mostly incomplete and fragmented. This is mainly



**Figure 6.** Burials in pit in Lángara Bay locality. Small canyons are highlighted in red.

related to the particularities of burial discovery, as the majority were recovered without archaeological techniques. It is possible to associate the high fragmentation of the skeletal remains to modern human action.

The presence of reddish sediment both in skeletal parts as well as in the surrounding sediment in CA burial and the absence of cut marks on the bones allow us to discard the hypothesis that this case could have been a secondary burial. It is proposed that the body could have been wrapped with some organic material (e.g., hide) in which the red pigment was introduced. Once buried, both the wrapping material as well as the human tissue degraded, which would have caused the staining of skeletal parts and the surrounding sediment.

### Lángara Bay as a *Persistent Place of Burials in Pit*

The type of burial in pit was only recorded in Argentinean Patagonia in the coastal sector of Lángara Bay (in San Jorge Gulf), within a specific period of time during the Late Holocene. In the coastal strip of San Jorge Gulf, in addition to the burials in pit, other burial types, such as *chenques* and burials in dunes, were identified (Castro and Moreno 2000; Zilio 2013, 2015; Zilio et al. 2014; Zubimendi et al. 2011). These types differ from burials in pit in their general characteristics, in the way individuals are buried, and also in their location and chronologies (Zilio 2015).

The five radiocarbon dates of contexts in pits represent the earliest ages recorded for burials located on the coastal strip of the San Jorge Gulf. Notwithstanding there are only five registered burials, they share regularities on the construction characteristics of the pits, in their chronologies, and their location on the landscape. Based on these similarities, we propose the existence of a shared knowledge among groups who carried out such mortuary practices through multiple generations. Radiocarbon evidence indicates that three of the cali-

brated dates overlap (EZ2, BL5, and EZ1-1), allowing us to suggest the possible contemporaneity between the individuals buried. On the other hand, dating of the CA and EZ3 burials indicate earlier ages, and their calibration ranges are separated temporally (Figure 4). This information evidences persistence in the construction and location of burials in pit over time.

The use, generation after generation, of the same spaces for the construction of the burials in pit in Lángara Bay would reflect the need for consolidation of the society and the creation of community memory expressed in the construction of a burial place (Kuijt 2008). This fact is also supported by the recurring features in the construction of the pits and the creation of loci with specific characteristics on the location of the burials on the landscape.

Recurrence in the construction of burials in pit on this part of the coast during the period between ca. 3000 and 2000 cal BP would not strictly correspond to the existence of a formal burial area or a cemetery. A cemetery is a formal and spatially delimited area whose use is aimed exclusively for the burial of the dead with a high degree of spatial contiguity between graves (Pardoe 1988). Littleton (2002) and Littleton and Allen (2007) have criticized the definition of cemetery given by Pardoe (1988). The application of the criteria considered in the definition of the formal areas of burial leads to an image in which the larger sites (with many burials) are classified as cemeteries and smaller sites (few burials) as non-cemeteries (Strauss 2012). Littleton (2002) shows that in many small sites considered non-cemeteries, funeral activities according to a well-defined formalism were made and that although small, these areas were intentionally aimed for the burial of the dead. Following Littleton (2002), we propose that, for the coastal sector of Lángara Bay where burials in pit are located, this last conceptualization could apply.

The characteristics in common and continuity in time of burials in pit allow us to define the coastal sector of Lángara Bay as a persistent place during the

Late Holocene (Littleton and Allen 2007; Schlanger 1992). For Littleton and Allen (2007), it is possible to interpret burials in hunter-gatherer groups through the *persistent places* concept. This term was applied by Schlanger (1992) to refer to cultural traits that structure the use and reuse of the landscape. This author suggests three ways from which persistent places are created: 1) through recognition of landscape qualities that makes it particularly suitable to carry out certain activities or practices; 2) through the presence of remains or structures that attracts reuse and reoccupation and will structure future activities; and 3) through processes of occupation and reoccupation over time (Schlanger 1992). The coastal sector of Lángara Bay where the burials in pit are located correspond to a persistent place in two ways. First, the burials are placed in points of the landscape with particular characteristics, such as at the mouth of small canyons located in the highest levels of the slopes of the canyons and adjacent to the modern shoreline. Second, the persistence of this type of burial over several centuries was recognized.

It is unknown whether there was an element that could have served as a marker of burials in pit on the surface, such as wooden or rock structures. However, despite the apparent lack of visibility of pits on surface, their features, location, and knowledge of the existence of this modality of burial would have been transmitted from generation to generation. An example of this is the El Zanjón site, where the distance between the pits is a few meters, despite an age difference of 400 years between the burials (Figure 4).

Stable isotope values indicate that individuals have differences in the proportion of marine and terrestrial resources consumed. In this regard, the interpretation of the home ranges of use of space varies between predominantly terrestrial diets and marine diets of high trophic level. This is a point which we believe reinforces the idea of the presence of a *persistent place* for burials in pit on the coast of Lángara Bay, Argentine Patagonia.

## ACKNOWLEDGEMENTS

*We thank César Gribaudo from Museo Educativo Patagónico ([www.patagoniaedglobal.com.ar](http://www.patagoniaedglobal.com.ar)), Florencia Mari of Radiocarbon Laboratory (CIG-LATYR), and Alicia Castro for her comments on the manuscript. We thank the two peer reviewers and academic editor for their input in helping to improve the manuscript.*

## FUNDING

Our research was funded by the National University of La Plata (UNLP) and the National Council of Scientific and Technical Research (CONICET).

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