



Project  
**MUSE**<sup>®</sup>

*Today's Research. Tomorrow's Inspiration.*

# Between the Forest and the Sea: Hunter-Gatherer Occupations in the Subantarctic Forests in Tierra del Fuego, Argentina

María Estela Mansur and Raquel Piqué

*Abstract.* Tierra del Fuego is one of the southernmost insular territories of the planet. Hunter-gatherer populations inhabited it from the end of the last glaciation up to the beginning of the twentieth century. Different archaeological sites give testimony of strategies adopted by hunter-gatherers in the occupation of the insular territory. Nevertheless, most of the investigations concentrate on the northern and central steppes and on the southern coasts. The goal of our research is to study the characteristics of human occupation in the central forests. Fieldwork has led to the discovery of archaeological sites in different environments, in a variety of locations, and displaying wide functional variability. Besides campsites we have also discovered and studied a ceremonial site. The results summarized here confirm that the subantarctic forest constituted an abundant environment; a privileged landscape rich in different kinds of resources, and intensely exploited by the native populations.

## Introduction

Tierra del Fuego is one of the southernmost insular territories of the planet. Located in the southern extreme of South America, between 54°–55° S and 67°–68° W, it is formed by a main island, the Isla Grande (shared between Chile and Argentina) and a series of smaller islands extending south up to Cape Horn. The entire surface area of the archipelago is 71,500 km<sup>2</sup>. The Isla Grande (around 45,000 km<sup>2</sup>, henceforth “the island”) is separated from the continent by the Magellan Strait and surrounded by the Atlantic Ocean to the east, the Pacific Ocean to the southwest, and Beagle Channel to the south. Its environmental characteristics are strongly conditioned by the presence of the Andes Cordillera, formed by a series of sub-parallel chains

oriented roughly East-West. To the south, the Andes sink into Beagle Channel, forming an irregular coast with alternating bays and cliffs; to the north, the slopes descend gradually to terraced plains, modeled by different glacial events (Fig. 1).

The climate is windy and very cold. Humid winds arriving from Antarctica cause abundant precipitation on the southern slope of the Andes, and continue on to dry out the northern plains, where precipitation rarely exceeds 340 mm. In the central part of the island the climate is more continental, with relatively pronounced seasonal differences. In the warmest month (January) the average is around 10° C, whereas in the coldest winter month (July) it falls to around –4° C. There is frost from the beginning of autumn to the end of

---

*María Estela Mansur, Researcher, Centro Austral de Investigaciones Científicas (CADIC)  
Bernardo Houssay 200, 9410 Ushuaia, Argentina*

*Raquel Piqué, Professor, Departament de Prehistòria, Facultat de Lletres  
Universitat Autònoma de Barcelona. 08198 Bellaterra, Spain*

ARCTIC ANTHROPOLOGY, Vol. 46, Nos. 1–2, pp. 144–157, 2009 ISSN 0066-6939

© 2009 by the Board of Regents of the University of Wisconsin System

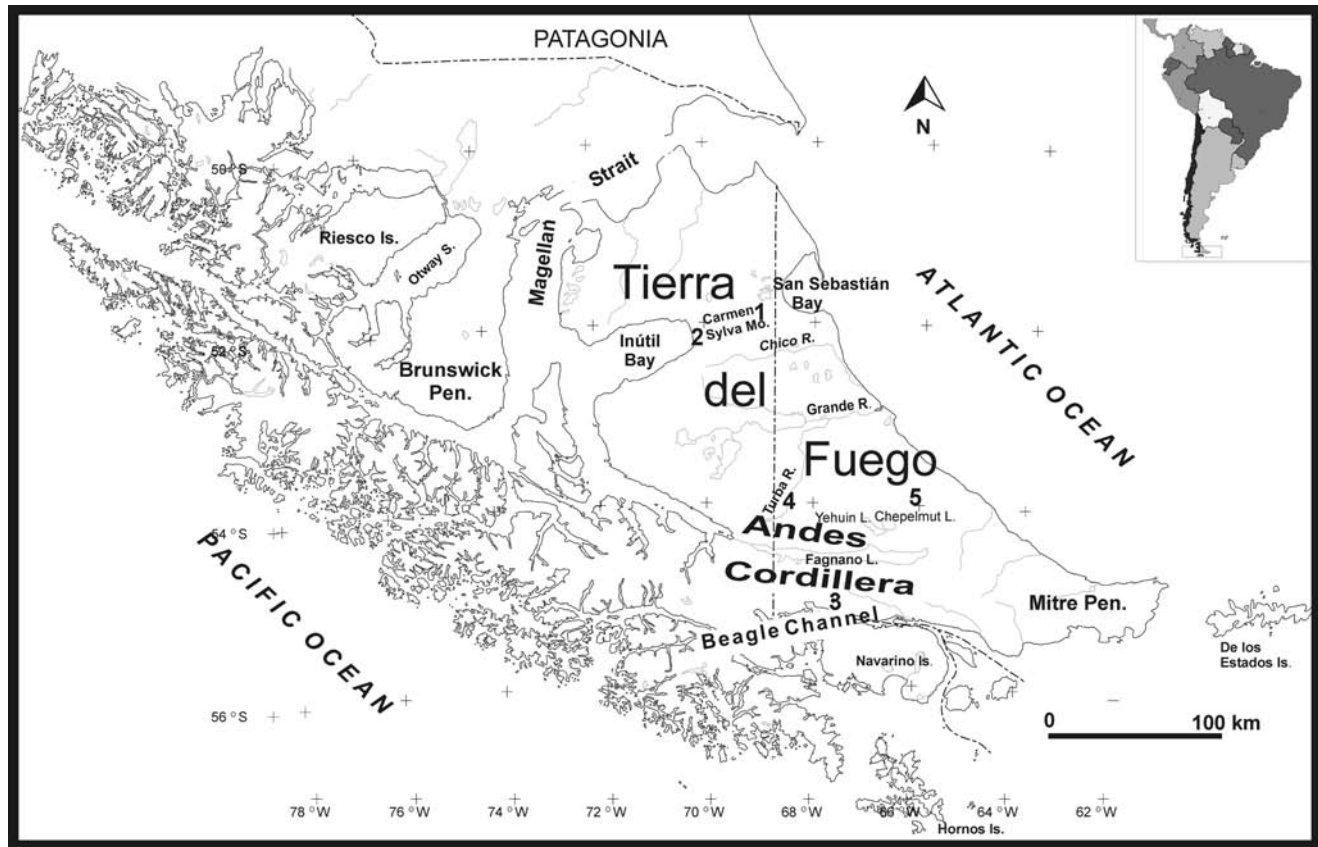


Figure 1. The territory of Tierra del Fuego. Numbers indicate archaeological sites: 1, Tres Arroyos; 2, Marazzi; 3, Túnel; 4, Marina; 5, Ewan locality.

spring; the ground can freeze to a depth of 0.80 m. In the mountains (500 mm) snowfall can occur at any time of the year and precipitation is abundant, but decreases over the northern foothills (300 mm), where the stronger winds contribute to considerable wind-chill. The winds are permanent throughout the year, although becoming more persistent and intense during spring and summer.

The subantarctic forest covers the mountainous zone of the island, but vegetation types change from south to north according to climatic conditions and soil characteristics; perennial mixed forests of the southern coast change into deciduous forest on the northern cordilleran slopes, followed by an ecotonal zone with wooded hillsides, and finally herbaceous plains on the northern steppe.

Due to its position far away from ancient commercial routes, Tierra del Fuego was distant from usual navigation circuits until the discovery of the Magellan Strait in the beginning of the sixteenth century. Since then, many sailors and travellers visited its coasts, coming into contact with the native population. However, the effective colonization of the island by Europeans took place as late as the final two decades of the nineteenth cen-

tury. Because of this history of contact, the ethnohistorical documentation concerning these populations is abundant and rich, from the first encounters with explorers, sailors, and naturalists, to the arrival of colonizers. Nevertheless, the best documents are those produced by the missionary and ethnographer M. Gusinde (1937) and anthropologist Anne Chapman (1982, 1986), even though an intense process of social disorganisation had already occurred by that time (Borrero 1991; Chapman 1982, 1986, 1989; Mansur 2006; Martinic 2003).

When the first European settlers established themselves in Tierra del Fuego, the island was inhabited by hunter-gatherer societies that had developed two different strategies for resource exploitation. One was specialized in littoral and marine resources, whereas the other relied principally on the exploitation of the hinterland but with complementary use of the Atlantic littoral.

The former, in fact, comprised two main groups: the Yámana, who lived on the southern coasts, including Beagle Channel and the islands and islets stretching towards the south, and the Kawesqar, who occupied the islands and coasts of

the western sector of the Magellan Strait. In order to exploit maritime resources they had developed an elaborate technology including harpoons, canoes, and other navigation and sea-hunting equipment. Subsistence was based on hunting the two most common types of pinnipeds (*Arctocephalus australis* and *Otaria flavescens*), but they complemented their diet by collecting mussels and other shellfish, catching fish and birds, collecting eggs, mushrooms, and berries, and occasionally hunting guanaco (*Lama guanicoe*) or exploiting accidentally beached whales. Families formed relatively independent units that periodically moved, sailing by canoe along the coasts. This strategy was highly dependent on the exploitation of forest resources, as most of the technology required the availability of wood for the manufacture of canoes, long harpoon shafts, etc. Archaeological investigations have revealed that this strategy already existed along the Beagle Channel coasts at least 6,000 years ago (Orquera and Piana 1999a, 1999b; Piana and Orquera, this volume).

The second strategy corresponds to two groups who occupied most of the territory of the island: the Selknam and the Haush. They had developed generalized strategies combining terrestrial mammal and bird hunting, collection of a wide variety of terrestrial and littoral resources, fishing, etc. The central and northern regions were the territory of the Selknam, while the Haush occupied the easternmost part of the island. The latter seem to have decreased in number very rapidly, a process that could be connected with the indiscriminate exploitation of seals carried out by seal hunter ships from the end of the eighteenth century onwards, as well as the brutal encounters between natives and sealers. A rapid process of assimilation between the Selknam and the Haush took place by the end of the nineteenth century, coinciding with the European occupation of the island. When M. Gusinde visited the area, between 1919 and 1923, the Selknam and the Haush lived side by side in the center of the island and the majority of the Haush informants spoke both Selknam and Haush languages (Chapman 1986).

Until recently, most of the archaeological investigations in the vast region that later became the Selknam territory had been concentrated on the northern steppes, and little attention had been paid to the central forest. It is in part because of this that the image we have today of the inhabitants of the central and northern parts of the island is closer to that of steppe hunter-gatherers than an image of a society having occupied and exploited different environments, including the forest landscape.

The goal of our research was to study the characteristics of human occupation in the region of the subantarctic forest, which in Tierra

del Fuego extends over approximately 12,422 km<sup>2</sup>. Fieldwork conducted during the last decade has led to the discovery and study of archaeological sites placed in different environments. The sites are characterized by the diversity of locations detected, as well as by their variability from the functional point of view. Besides campsites interpreted as domestic units, we discovered and studied a ceremonial site of the Selknam, dated by dendrochronology to 1905.

These investigations were conducted within the scope of an archaeological research project, *Proyecto Arqueológico Corazón de la Isla*, CADIC-CONICET. The main goals of the project were to evaluate the characteristics of the archaeological record and to reconstruct the dynamics of human occupation of the hinterland territories of Tierra del Fuego, especially those in the region of the subantarctic forests (Mansur 2003, 2006; Mansur, Martinioni, and Lasa 2000). In our initial model, we proposed that in order to fruitfully exploit a region with such characteristics, a hunter-gatherer society should implement strategies fulfilling certain minimal requirements. Groups should be small, highly mobile, with light equipment enabling them to make frequent moves between campsites. This mobility would allow them to exploit resources from different environments at seasons when they are available (e.g., guanaco herds remaining throughout winter in zones sheltered by the forest, bird flocks at lakes and swamps during summer, etc.) At the same time, this strategy would avoid the exhaustion of resources, since the group could move before over-exploitation occurred. It was expected that the visibility of such groups in the archaeological record would be very low because of the poor preservation conditions in wooded environments, where soils are relatively thin and disturbed by numerous factors. Moreover, small groups of hunters that were highly mobile and lightly equipped may have had a very low impact on the landscape and left little imperishable material.

However, the ethnographic information on the Selknam mentioned aggregation events, such as ceremonial celebrations, in which various groups gathered and camped together during a certain time. We expected the archaeological record from these specific events to be different from that of single campsites. Consequently, within the scope of this research a specific joint project was initiated in 2003; its principal goal is to study different aspects of the archaeology of ceremonial sites (*Society and Ritual: The Utilization of Forest Environments as Ritual Spaces among the Selknam, Tierra del Fuego* CADIC-Autonomic Barcelona University).

This paper summarizes some of the results obtained by these investigations. They confirm

that the subantarctic forests of the center of the island constituted an abundant landscape, rich in different kinds of resources, and was intensively exploited by the native populations.

### The Selknam Society According to Ethnographic Information

According to Gusinde's reports (1937), the Selknam were divided into two groups corresponding to the principal landscapes of their region. The northern Selknam occupied the steppe zone in the north and east parts of the island (Párik), up to the Río Grande (Hurr), while the southern Selknam inhabited the wooded hillsides, meadows and wide valleys of the central region up to the northern slopes of the Cordillera (Hérsk). They lived in groups formed by a few related families, in delimited territories that they called *haruwen*. By the time of Gusinde's visits there were 39 *haruwen* belonging to the different lineages.

One of the principal events in Selknam life was the initiation ceremony for adolescent males, the Hain. On these occasions, people from different territories joined and camped together for several months. According to Gusinde, who was present at a Hain celebrated near Fagnano Lake, a special place was chosen for the celebration, usually a clearing in the woods where participants built a big hut reserved for adult and young men. The domestic huts were built inside the forest (close to its edge), at approximately 200 m from the ceremonial hut. During the Hain different rituals took place, intended to reinforce the established social order, principally masculine domination (Chapman 1986).

The Selknam did not stay for long at each campsite, but rather moved very frequently. Descriptions of the huts vary, according to the sources, between two types: conical huts, built with logs and covered with branches and furs, and windbreaks formed by a series of branches nailed onto the floor and to which furs were fixed. Even though these structures have sometimes been regarded as seasonal variations (winter and summer camps), it is probable that they are related to different environments, in this case forest and steppe.

All the ethnographic sources indicate that guanaco hunting formed the basis of Selknam subsistence. They also captured rodents and birds; fished in the lakes, lagoons, and rivers; and collected different plant products, such as fungi, roots, and berries, as well as shellfish along the coasts of the Atlantic Ocean and Magellan Strait (e.g., Beauvoir 1915; Bridges 1951; Chapman 1986, 1989; Gusinde 1937). Selknam permanent nomadism conditioned the characteristics of their everyday equipment, which was complex and varied,

but above all, fulfilling certain basic requirements: it was light, easily portable, and perfectly adapted to the exploitation of the available resources.

Thus, the Selknam rejected heavy or voluminous technologies and instead specialized in, for example, the manufacture of skin vessels and bags, nets and baskets made of plant materials, and other such objects. They had a wide variety of hunting weapons, including bows and arrows, slings, lassos, traps, and fishing lines. Apart from food, the guanaco provided important raw materials: the skins were used to make clothing, containers and bags, the covers of windbreaks, etc; the bones used to make flaking tools and other bone tools; sinews and tendons for making thongs and ornaments such as necklaces and bracelets, which sometimes also included shells or bird bones. All of these work processes required raw plant materials that were also used for firewood, to build houses and other structures, make handles, shafts, etc.—a fact that has gone largely unnoticed.

As pointed out by Borrero (1991), the Selknam have frequently been cited in the anthropological literature, and above all for two main reasons. First, they never adopted the horse, unlike what happened with the Tehuelche of continental Patagonia and with the native populations of the North American Plains. In consequence, scholars thought that the Selknam were a good example of a hunter-gatherer society. Second, people interpreted them in terms of strict territoriality in the use of space. Different lineages or factions that separated from the main group had rights to determined extensions of land. Ethnographic studies revealed that all the inhabitable parts of the island were occupied and that there were no lands, nor watercourses, without owners. Chapman (1986), however, showed the existence of a continuous process of fission and fusion of territories, and that the territorial boundaries could be dissolved under certain circumstances, in particular when food was abundant, such as when a beached whale became available.

### The Selknam Region According to Archaeological Research

Archaeological investigations on the island reveal that the peopling of Tierra del Fuego took place at the end of the last glaciation, about 11,500 years ago, at a time when the physical configuration and environmental conditions of the Magellan Strait region were very different from what they are today. Between approximately 12,000 and 10,000 B.P., when the sea level was about 60 m below its present level, the Magellan Strait was a glacial valley, occupied by lakes and shallow drainage channels. At that time, the island was a part of

continental Patagonia, connected by land bridges formed from glacial moraines (Clapperton 1992; McCulloch et al. 1997; Rabassa et al. 2000).

Investigations carried out in southern Patagonia confirm the presence by that time of hunter-gatherer groups in several caves and shelters (see Miotti and Salemme 2004). Thus, it is possible to imagine the progressive advance towards the south of fauna and people across the glacial valley. The oldest site dated so far in Tierra del Fuego is Tres Arroyos, a cave to the north of the Carmen Sylva Mountains, occupied from at least 10,500 B.P. (Massone 1987, 1996, 2004). Excavations revealed fireplaces associated with lithic tools and abundant faunal remains, some of them partially burnt, in the oldest levels. They suggest a campsite for people who hunted guanacos as well as other continental fauna. Tres Arroyos is the only site in Tierra del Fuego where there are remains of some extinct species, such as the American horse (*Hippidium sp.*), the Pleistocene sloth (*Mylodon sp.*), a type of large fox (*Canis Dusicyon avus*), as well as fragments of marine shellfish and bird bones. This fauna, as well as palynological studies in the zone of Inútil Bay, suggest an environment of open steppe (Heusser 1994).

The second oldest occupation in Tierra del Fuego was discovered in Marazzi, a shelter at the foot of a huge unusual boulder in Inútil Bay, with levels dating to around 9600 B.P. The site was excavated by a French mission in 1967 and 1969; they discovered abundant lithic artifacts, including scrapers, débitage flakes and bolas, and remains of fauna, although extinct species were not identified (Laming-Emperaire, LaVellée, and Humbert 1972; Morello, Contreras, and San Román 1999).

The final separation of the main island from the continent took place around 8,000–10,000 B.P., with the rise of sea level and formation of the Magellan Strait. It is not yet known whether evidence of the island's first immigrants found in Tres Arroyos and Marazzi represent isolated exploratory events or if the occupation continued over the following millennia. The beginning of systematic archaeological investigations in northern Tierra del Fuego is relatively recent, and sites dating from the immediately subsequent period have not yet been discovered. Nevertheless, different archaeological occupations, dating from ca. 6000 to 4000 B.P., seem to confirm the last hypothesis. One of them is from the Marazzi site itself, where intermediate levels date from ca. 5500 B.P. (Morello Repetto 2000; Morello, Contreras, and San Román 1999). Most of the archaeozoological record is from bones of guanaco, but there are also remains of shellfish, some marine mammals, and a type of deer, the *huemul*, a species associated with forested terrain. Another occupation is from the Túnel I site, on the Beagle Channel coast, where

a lower layer corresponding to hunter-gatherers not specially adapted to the seacoast was dated to around 7000 B.P. (Orquera and Piana 1999a). Near the Atlantic coast, in the northern part of the island, recent research has revealed other sites, sometimes with shell midden layers, dated to around 5000 to 6000 B.P. This is the case of Cerro Bandurrias, on the southwestern coast of San Sebastián Bay (Favier Dubois and Borrero 2005), and the Río Chico 1 and La Arcillosa 2 sites, in the region of the Chico River (Salemme, Bujalesky, and Santiago 2007; Santiago, Oría, and Salemme 2007). Finally, in the same area of Bahía Inútil, the Myren 2 site has been dated around 4000 B.P. (Prieto et al. 2007).

There is little information about the occupation of the north of the island between 5000 to 4000 B.P. and the end of Middle Holocene. For the last epoch, research conducted along the coast of the Magellan Strait (Massone 2004, Massone and Morello 2007) and near the northern and central sectors of the Atlantic coast (Borrero 1979, 1989–90, 1991; Borrero and Lanata 1988; Borrero and Barberena [eds.] 2004; Lanata 1996) indicates a diversity of sites, including surface sites and shell midden levels. Many of these sites date from the last millennium and could correspond to campsites of the historical Selknam. The archaeological sites of this period are located in a variety of topographic and environmental situations. The archaeozoological record includes guanaco bones, but also birds and rodents, as well as fish, seals, remains of beached whales, and shellfish. In spite of a general homogeneity, there are differences between sites that could be attributed to different activities, such as workshops for the manufacture of lithic tools, sites for the exploitation of marine fauna, etc. (Borrero 1991). On the coast, the most recent sites reveal the gradual adoption of European raw materials, such as glass used for projectile points, scrapers, etc., and iron, which replaced stone in the manufacture of knives and gouges.

For the central region of the island, the only archaeological investigations are those conducted by Borrero in the eastern extreme of Lake Fagnano (Borrero 1986). In the southwestern part of the island, an exploration carried out in the area between Inútil Bay and the northern coast of the Admiralty Sound-Azopardo River-Fagnano Lake system, revealed sites on both the coast and in the hinterland (Ocampo and Rivas 1996).

## Archaeological Landscapes in the Subantarctic Forest

Within the scope of our projects on the hinterland territories of the island, one of our main concerns was to recognize the different landscapes of the subantarctic forest region. Landscapes in the

central part of the island are conditioned by the Fuegian Andes, which are formed by a series of sub parallel chains and sunken valleys oriented roughly East-West. The system formed by the western part of the Magellan Strait, Admiralty Sound, Azopardo river's valley, and Fagnano Lake occupies the principal depression of a fault line that continues eastward, passing north of Isla de los Estados. Glacial events affected the territory at different times; consequently, the present-day landscape is the result of glacial, periglacial, and subsequent fluvial activity. Marine tertiary formations eroded by glaciers developed in the foothills of the northern slope of the Cordillera; they are covered by fluvio-glacial deposits and moraine belts, indicating the extent of the glacial lobes from Fagnano Lake and the zone of the Cordillera in general.

According to Coronato, Salemme, and Rabassa (1999), the southern beech (*Nothofagus* sp.) forest was scarcely represented before 13,000 B.P., when the association *Nothofagus-Empetrum-Gunnera-Gramineae-Cyperaceae* dominated the environments of Tierra del Fuego. In the Fuegian Andes, following the retreat of the ice, the alpine environment developed valley lakes by 10,000 B.P. Palynological studies indicate that the forest expanded to the north after the Early and Middle Holocene (Coronato 1995; Heusser 1994; Heusser and Rabassa 1995; Markgraf 1993).

Present day landscape elements are structured in three main units: a) mountain landscape, including both the wooded slopes of the Cordillera and lower tree-covered hills that extend to the north; b) lake landscape, with depressions occupied by lakes and lagoons (e.g., Fagnano, Yehuin, Chepelmut, Yakush); and finally, c) fluvial valleys (of glacial origin) and alluvial plains with pasture and bogs (Fig. 2).

Compared to the northern steppes, a wide diversity and abundance of resources characterizes

the mountainous region in the center of the island. The woodland offers protection and shelter, and an abundance of wood, an essential resource that is absent from the northern steppe. The principal trees are beeches from the genus *Nothofagus*. As one passes from south to north, the mixed woodland of evergreen beech ("guindo" or "coihue," *N. betuloides*) and high deciduous beech ("lenga," *N. pumilio*) gives way to forest of high deciduous beech or of low deciduous beech ("ñire," *N. antarctica*). In some areas the ñire forest is well developed, with trees exceeding 15 m heights. Among shrubs, one of the commonest is the box-leaved barberry ("calafate", *Berberis buxifolia*), which grows in the lower highlands, in clearings, and on the edges of the forest, and in wet areas of the steppe bordering rivers and springs. On sites exposed to the wind, it forms a shrub layer with fashine ([mata negra], *Chilotrachium diffusum*). Another important shrub is the diddle-dee [murtilla] *Empetrum rubrum*, which grows in wet lowlands and in the forest borders. Both calafate and murtilla have edible berries available during the summer. The forest environment is rich in a wide variety of edible fungi. The edges of the forest have pastures that attract guanaco herds; other mammals are the fuegian fox (*Dusicyon culpaeus*) and a rodent, the tuco-tuco (*Ctenomys magellanicus*). The environments of lakes and lagoons attract a large variety of birds, from early spring to late autumn.

Another important resource is lithic raw material. The materials most commonly found in archaeological sites belong to a single geological unit dating from the Late Jurassic, the Le Maire Formation (Borrello 1969). This formation is widely distributed in Tierra del Fuego; it is formed by a variety of rock types, such as rhyolite, tuff, lutite, and radiolarian chert. With the formation of the Andes Cordillera, parts of the Le Maire formation were



Figure 2. Landscapes in the Subantarctic forest region: a, Fagnano Lake and Andes cordillera; b guanacos in a forest clearing.

exposed to erosion and fragments of these rocks were carried by glaciers or transported by rivers and deposited in younger strata of diverse successive units. Pebbles and blocks derived from erosion of the Le Maire outcrops are available today in the region, along the margins of rivers and lakes (Mansur, Martinioni, and Lasa 2000).

The different environments of the mountainous region are connected by a series of valleys running East-West, which are in turn intersected by perpendicular valleys. This landscape structure creates corridors that facilitate communication between the highlands and the foothills and also enable access westward to Magellan Strait and eastward to the Atlantic coast. Consequently, the availability of various resources at different seasons (there are places that can be occupied and provide refuge for fauna even in winter), combined with the existence of wide valleys that facilitate circulation between different environments, make this zone an extremely favorable territory for hunter-gatherer groups.

Site formation processes relate to the characteristics of sediments and environments which condition the preservation of archaeological materials. Soils are formed by lime sediments in the alluvial plains, and by a glacial till or solifluxion of till material on the slopes. In the forest, we have recognized different horizons: a surface level of organic mantle formed by biomass produced by the trees, a middle-developed A-horizon rich in organic matter, and a compact B-horizon that can be more or less deep. Important alteration processes take place, produced by aeolian erosion, freezing and thawing of soils, animal trampling, root action, and rodent warrens, which all may disorganize the original structure of sites, dispersing or destroying archaeological remains. Humid and acidic conditions of forest soils are especially harmful for organic materials, including bone, but they also affect lithic surfaces.

## The Archaeological Sites

The surveys carried out during the past years were intended to search for traces of archaeological sites in different environments of the area. They included different zones: the surroundings of lakes and lagoons between Fagnano and Yehuín/Chepelmut lakes, the sources and middle courses of the Turba and Fuego rivers, the middle course of the Claro and Rodríguez rivers, the northern basin of the Gemelas and Hantuk lakes, the Ewan river, as well as the southern coast of Lake Fagnano. Fieldwork confirmed that the area had been occupied in the past, since many surface and stratified sites were discovered. The sites are located in different settings, some in wooded foothills, others near lakes and lagoons, still others along the sides

of wide valleys, as well as in the forest, near the forest edge, or in forest clearings.

According to their size and surface characteristics, the sites were classified in three groups: isolated finds, small campsites, and extensive sites. Isolated finds are those of archaeological materials lying on the surface and unrelated to eroded archaeological layers. Small campsites are those where few archaeological materials were found, in or around a fireplace, in concentrations that may correspond to single habitation units (huts or windbreaks) for temporary occupations. A good example of a small site is Marina 1, which we discuss in the next section. Finally, there are extensive sites where concentrations of materials overlap and cover a large surface, and where fireplaces are spatially separated. These sites could also represent reoccupation events at the same environment through a certain time frame (such as in the case of seasonal reoccupations) as well as possible sites of group aggregation events (such as in the case of the above-mentioned Hain ceremony). An example of these more extensive sites is Ewan 2 (see below).

## Isolated Findings

Isolated archaeological materials were discovered in many places. In one case a bola, made on volcanic rock, was found in a high valley in the mountainous region, and in many other cases projectile points have been found near the shores of the lakes Fagnano, Hantuk, and Escondido. In all cases, they suggest the use of these environments for hunting (Mansur, Martinioni, and Lasa 2000).

## Temporary Campsites: the Marina 1 Site

An example of a temporary campsite is Marina 1, a site located at the edge of the wide valley of the Turba River, one of the main tributaries to the southern basin of the Grande River. The site was bisected by a small watercourse and consequently there was a risk of relatively fast destruction. The stratigraphy recorded in the brook's profile includes seven natural layers, but only the basal part of the upper layer (of average 0.45 m thickness) presented archaeological materials. Excavation at the site covered a surface of 6 m<sup>2</sup>. We recorded faunal remains, lithic tools, and débitage (flakes, fragments, etc.) associated with two fireplaces with abundant charcoal fragments. Radiocarbon dating confirms a date of about 1800 B.P.

Faunal remains (n=185) are very fragmented and their surfaces show intense traces of alteration due to humidity and soil conditions. There are eight molar fragments, an incisor, and a sesamoid



of guanaco, and fragments of long bones. The rest (n=168) are unidentifiable fragments.

Lithic artifacts (n=1,151) include mostly very small débitage (flakes and debris smaller than 0.5 cm). There are some small artifacts (sizes between 0.5 and 2 cm) and a few flakes and fragments larger than 2 cm. Retouched tools include only three projectile points, four endscrapers, two sidescrapers, two retouched flakes, and three fragments of retouched tools. One of the projectile points has a fracture, probably produced by impact, another one shows a fracture produced during manufacture, and the last one is a small distal fragment. Microwear analysis was carried out in order to study the conservation and functionality of lithic artifacts. It provided evidence of activities related to animal and plant resource processing. Among the former, three scrapers and a tool fragment showed traces of use on hide with a scraping motion; a flake with a retouched cutting edge was used for butchering. As for plant materials, unretouched cutting edges were used to work wood. Actions on bone were not registered. Raw materials used to manufacture tools are mostly rhyolites belonging to the Le Maire formation. As this material is not present in the site's surroundings, we can assume that it was brought to the location, probably from neighboring redeposited geological formations, where it is available in the form of pebbles.

To conclude, the site could be interpreted as a temporary campsite of a small group that moved around with its basic tool kit. Evidence of two fires were found at the campsite where various processing/consumption activities were performed, such as processing of animal and hides (at least guanaco), finishing of lithic tools, repair or maintenance of damaged instruments, as well as replacement of lithic projectile points in the arrow shafts. For these activities, they used wood from the bordering forest, water, guanaco herds, and the site was situated to provide excellent visibility to detect such resources due to its location at the edge of a wide valley (Mansur 2003; Mansur, Martinioni, and Lasa 2000).

### Extensive Sites: The Ewan Locality

The best example of an extensive site is the Ewan locality, situated in the upper basin of the Ewan River. The landscape corresponds to wooded hills with *Nothofagus* forest and clearings. In the course of the investigations it was possible to identify two sites; one in a forest clearing, where part of the structure of a big log hut is still conserved in relatively good conditions (Ewan I), and another one inside the forest, where four fireplaces were detected, corresponding to smaller structures (Ewan II). A 200 m long intermediate area separates Ewan I from Ewan II (Figs. 3, 4). This struc-

turing of the space coincides with the spatial organization described in the ethnographic sources for the celebration of the Hain, so excavation was carried out with the goal of testing this hypothesis (Mansur, Piqué, and Vila Mitla 2006).

The sites were occupied after the arrival of the Europeans on the island. Dendrochronological dating of logs from Ewan I placed the date of the hut's construction in the year of 1905 (Berihuette et al. 2007). Moreover, the only raw materials present in the site are of industrial origin (glass and metal). The excavations revealed significant differences between the two sites, concerning both number and characteristics of archaeological remains and their spatial distribution.

In the Ewan I site, there is a conical wooden structure, partially preserved, corresponding to a hut, 6 m in diameter; this facilitated the distinction between an inside and an outside section. The outside section had no signs of activity on the ground surface; excavation revealed that it was completely sterile, with no archaeological remains (neither refuse nor other activity areas). On the inside, a large fireplace (containing most of the archaeological remains) was discovered near the middle of the hut floor. The archaeological record (n=21,343) consists primarily of fragments of guanaco bones (about 70% of determinable specimens); they are highly fractured and show different degrees of thermal alteration. Shells of *Patinigera* were also found within and around the fireplace. Artifacts consist only of microflakes from retouching, made on different types of glass (n=97). Although no retouched tools were found in the site, microscopic analysis of the microflakes suggests the manufacture of both projectile points and endscrapers. A few altered iron fragments were also found. Flotation of the sediments revealed abundant charcoal and carbonized seeds. The study of the surrounding forest further showed that even though at present the hut is almost covered by the advancing forest, at the time of construction it was placed in a clearing, close to the forest edge (the front line of trees). The spatial distribution of materials and the characteristics of the sediments indicate that the entrance of the hut was oriented towards the east.

Ewan II is situated 200 m to the west of Ewan I, inside the old forest of *N. antarctica*, near the forest edge. It is an extensive site formed by at least four structures, although in this case no superstructures were preserved above ground that could indicate the location of the structures. All of the features were discovered after systematic survey by means of test squares and cores. We detected four fireplaces that were placed about 10 to 12 m apart, and aligned parallel to the edge of the forest. One of the structures was entirely excavated (Ewan II, structure 1). During excavation,

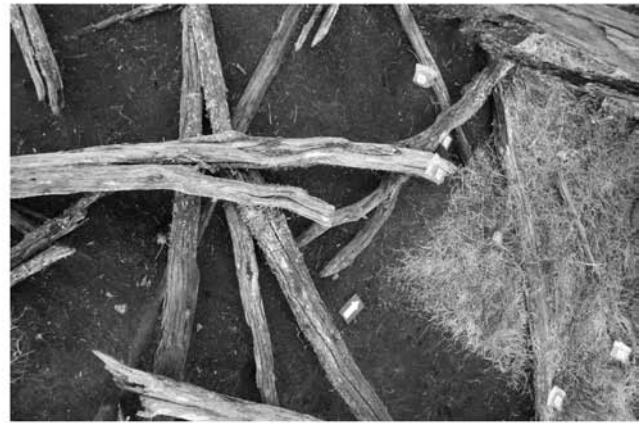


Figure 3. Ewan 1: *a*, clearing in the forest, arrow indicates location of the hut; *b-c*, the hut before and during excavation.



Figure 4. Ewan 2: *a-b*, the site before and after excavation.

it was possible to document fallen trunks, some of them partially buried. The distribution of the fallen trunks and the dispersion of the archaeological materials suggest the existence of a hut, 3–4 m in diameter, with the entrance oriented towards the east (Mansur et al. 2007). Most of the archaeological remains were found inside the hut, around a big fireplace, but there were also remains outside the structure. The archaeological remains consist principally of the same categories discovered in Ewan I, although differences were found

in the abundance and characteristics of the remains. Glass microflakes at Ewan II exceed 3,700; there are also glass flakes and fragments ( $n=34$ ), as well as retouched tools (3 endscrapers, 3 arrowheads, 4 retouched flakes, and broken retouched tools) (Fig. 5). The archaeozoological remains ( $n=8,483$ ) are also fractured and thermally altered but they show a greater taxonomic diversity than for Ewan I. Again, flotation of sediments allowed the recovery of charcoal and carbonized seeds. In sum, the excavated structure of Ewan II presents an

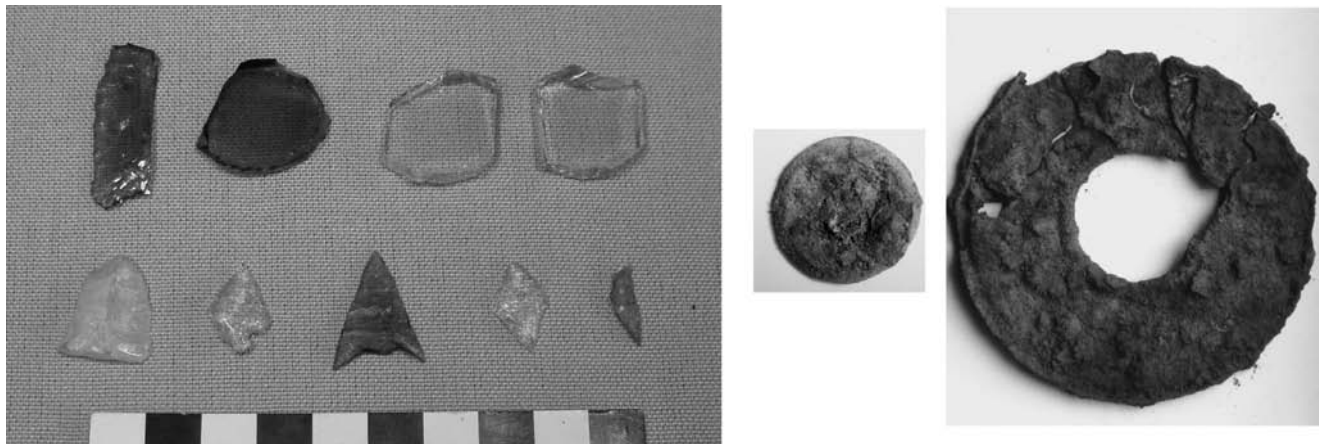


Figure 5. Archaeological materials from Ewan II: a) glass endscrapers and projectile points; b) iron remains.

assemblage of materials much more diverse than the assemblage in Ewan I, and principally related to production and consumption activities.

### The Utilization of Forest Resources

Without doubt, one of the main contributions of the Ewan sites is the significant information obtained about the use of forest resources. The traditional image of the Selknam, derived from the ethnohistorical record, states that they based their economy on hunting, while other activities such as plant gathering were only incidentally mentioned. Traditional archaeology has strengthened this perspective. Only a few archaeological studies have been focused on plant use, probably because of the poor preservation of plant remains, but also due to the assumption that plants were not important from an economic point of view. However, the good preservation of the hut structure in Ewan I, and the systematic flotation for archaeobotanical remains in both Ewan I and Ewan II, together with the ethnographic data, allow us to confirm that plants collected in the forest were fundamental for the whole subsistence strategy, and thus the traditional perspective on the economy of the Selknam must be re-evaluated.

### The Forest Resources as Firewood

The study of charcoal remains from Ewan I and Ewan II allowed the determination of the species and some morphological characteristics of pieces selected for firewood. Charcoal analysis revealed that *N. antarctica* was the dominant species used. As it is also the dominant species in the forest, we can assume that the selection of firewood was opportunistic and local, a strategy that was also documented in the late Beagle Channel sites (Piqué 1999). Large fragments with slightly curved growth rings indicate the use of big pieces for firewood in

both huts. In Ewan II, some partially burnt pieces of firewood were preserved in the fireplace. These also correspond to trunks and large branches, some of them showing signs of having been cut with metal axes. These data suggest that the collection of firewood could have been selective with regard to the morphology and characteristics of the wood (Berrhuete et al. 2009).

These results agree with some of the ethnographic descriptions of firewood management among the Selknam. Fire was used for a great diversity of purposes, such as food processing, transformation of some raw materials, etc., but above all it was essential for life in the cold and humid climate of Tierra del Fuego. Although ethnographic literature contains few references to the species used as firewood, there are detailed descriptions of some aspects of firewood gathering and fire management. Gusinde (1937) mentions that the entire group participated in firewood gathering, although each member had a different responsibility: the boys and girls collected small branches, the women pulled branches out of the trees, and the men cut down branches and uprooted trunks with ropes. They generally looked for dry wood, but avoided wood in the process of decay. Once gathered, the wood was transported by the women, who used carrying straps to hold it in bundles. As to the morphology of the firewood, Gusinde indicates that they used large trunks, which were progressively pushed into the fire as they were burnt. The texts also mention the use of torches made with *Empetrum* branches, in activities like night bird capture.

### Plant Foods

Analysis of vegetable micro-remains revealed the existence of abundant carbonized seeds in both sites. At Ewan I, the analyzed material (n=2,952) revealed two species (the diddle-dee, *Empetrum rubrum*, and a bedstraw, *Galium aparine*), ten gen-

era (*Empetrum*, *Galium*, *Bromus*, *Festuca*, *Lolium*, *Carex*, *Cerastium*, *Poa/Phleum*, *Chenopodium/Atriplex*, *Polygonum*) and nine families (Empetraceae, Rubiaceae, Poaceae, Cyperaceae, Polygonaceae, Plantaginaceae, Chenopodiaceae, Caryophyllaceae, Umbelliferae). At Ewan II the analyzed remains (n=527) confirmed four species (*E. rubrum*, *G. aparine*, *Lolium perenne*, *Polygonum aviculare*), ten genera (*Empetrum*, *Galium*, *Bromus*, *Festuca*, *Lolium*, *Carex*, *Cerastium*, *Malva*, *Chenopodium/Atriplex*, *Polygonum*) and thirteen families (Empetraceae, Rubiaceae, Poaceae, Cyperaceae, Polygonaceae, Plantaginaceae, Chenopodiaceae, Caryophyllaceae, Umbelliferae, Malvaceae, Leguminosae, Labiatae, Plantaginaceae) (Berihuete et al. 2007).

The dominant species in Ewan I is the diddle-dee (“murtilla”, *E. rubrum*), and in Ewan II bedstraw (*G. aparine*) predominates. The other taxa are poorly represented in both sites. However, in spite of the taxonomic difference between Ewan I and Ewan II, there is a similar pattern as to the taxa distribution and concentration: the highest frequency and diversity of remains occurs at the perimeter of the fireplaces, but with small marginal concentrations at the periphery.

These results suggest that plants were intentionally brought to the settlement, even though we cannot always know for what purpose. Some of them are suitable for food use, which has been documented in the ethnographic sources, but we have also identified seeds of species used in basketwork, and others for which no specific use has been mentioned. In the ethnographic literature there are few references to the plants used for food, but the ethnobotanical studies made by Martínez Crovetto (1968) suggest that the Selknam had a broad knowledge of plants. Martínez Crovetto (1968) mentions more than twenty plants collected for subsistence purposes; the parts used include berries, leaves, stems, roots, seeds, or even the sap. Some of them were directly consumed without any preparation, while others needed cooking or other processing to make them suitable for consumption. The most representative example is that of the seeds of a cruciferae, *Descurainia canescens*, which were husked once dry, then ground between two smooth stones and kneaded with grease, in order to make a sort of chocolate-colored bread that was eaten at any time and was considered a sweet.

## Wood for Construction

An interesting characteristic of the Ewan sites is the conservation of logs of *N. antarctica*, which were used to build the framework of the huts. The hut at Ewan I was a conical structure of trunks lying over each other in the vertex of the structure. Some logs are still standing, while others were un-

covered in the course of the excavation in a more or less radial pattern. Their degree of conservation varies; logs that are still standing show an outside face less well preserved than the face oriented toward the inside of the structure. The top-end, in particular, often has the bark preserved, while the bottom end shows severe decay. The logs are characterized by their size and morphology. Diameters can attain more than 0.30 m and length 5 m and sometimes more. Many of them ended up in forks that facilitated the construction of the structural framework for the hut. Most of them are rectangular, little-knotted sticks, from which branches have been pulled or cut. The size of these logs allowed the building of a hut of 6 m in diameter and 3.17 m in interior height, bigger than most known ethnographic or present-day examples.

In Ewan II, Structure 1, no superstructures were preserved above ground. All the surface of the site was covered by fallen branches that did not seem to follow a clear pattern. Nevertheless, when cleaning the site's surface at the beginning of the excavation, it was clear that some of these branches belonged to a structure that had entirely collapsed. Some of the logs belonging to the former structure could be identified at once because they showed anthropogenic cut marks in one or both ends, or ended in a fork, or had roots at the bases of the trunk; others were identified after excavation. The positions of their bases delimited an irregular perimeter around the fireplace and its bordering zones; this area was coincident with the distribution of microflakes, fauna, and other archaeological remains.

According to the ethnographic data, the Selknam uprooted and pulled out small trees that were used with almost no modification to build huts and windbreaks. The morphology of the logs from Ewan II provides an idea about how they were obtained and suggests the selection of certain attributes. Diameters and lengths of these logs are variable, but in all cases, they are smaller than those from Ewan I. Among the best preserved the length is around 3.5 m, while at Ewan I most of the logs surpass 4 m. These differences in sizes affect the diameter and height of the hut and can be interpreted as an indicator of a smaller size standard in log selection for the domestic unit. In the case of Ewan II, where the logs were shorter, the structure should necessarily be smaller than that of Ewan I (Berihuete et al. 2007).

## Forest Raw Materials and Technology

Different European museums have important ethnographic collections from Tierra del Fuego, which include artifacts made with raw plant materials. Unfortunately, these collections do not always mention the exact provenance of materials and therefore in some cases it is difficult to deter-

mine whether they belong to the Selknam population. The process of identification of materials took into consideration information from the ethnographic literature (Piqué 2006).

Wood is present in artifacts related to food procurement, containers, structures, and lodging. Among tools, wood was used for bows and arrow shafts, as well as for handles for most of the tools. With minor modification, wood was used to make cudgels, digging sticks, logs for huts and windbreakers, etc. It also played an important role in the processing of other raw materials: in skin work, for example, wooden frameworks were used to stretch furs, straps, etc. The production process of wooden artifacts started in the forest, where the most suitable species and individuals for each type of artifact were chosen according to their physical, morphological, or mechanical properties. *Nothofagus* was the most versatile resource. *N. betuloides* and *N. antarctica* seem to have been preferred, especially for the manufacture of bows and javelin hafts. For arrow shafts they usually chose branches of shrubs such as the holly-leaved barberry (*Berberis illicifolia*) or the fashine (*Chilotrimum difussum*), whose wood is light and at the same time flexible and resistant. The selection of wood was not limited to species, but also to the most suitable part of the tree for each purpose. In the case of bows, for example, they selected the wood growing below the cortex, where fibers are more flexible. According to ethnographic information, woodworking was an essentially masculine activity (Gusinde 1937; Lothrop 1928). Selknam men were skilled wood carvers and they even made the wooden tools that were used by women.

Apart from wood, the Selknam used many other vegetable resources. *Chilotrimum difussum* was used as tinder, and a rush, *Marsippospermum grandiflorum*, was used for basketry. For personal hygiene they used grasses or lichen, which were also used for padding in shoes. In winter, they attached a bundle of branches under the shoes to walk on the snow. Ornaments were made with plant materials, such as bracelets of braided rush. Charcoal provided the black colorant for body paintings.

Although in the Ewan sites no wooden artifacts were preserved, glass projectile points and scrapers confirm that at least bows, arrow shafts, and handles for scrapers had to be made. Micro-wear analysis of glass tools is ongoing, in order to determine traces of use and hafting of the tools.

## Conclusion

One of the goals of our research was to evaluate the role played by the subantarctic forest in the occupation of the central part of the island. Fieldwork developed in this area has revealed different types of sites, located in diverse topographic and environmental settings. The distribution of sites in

environments in which resources are available in a particular season of the year supports the hypothesis proposed regarding seasonal exploitation. The Ewan locality is an example of seasonal occupation; the trees used to build the hut were cut down in the beginning of spring, and fruits and seeds discovered in the sites were gathered in spring and summer. Unfortunately, in other archaeological sites information about seasonality is scarce. The results obtained up to now confirm that the subantarctic forests constituted an environment of abundance, rich in different kinds of resources, that was intensely exploited by the Selknam population. Apart from shelter for people and fauna, the forest has a variety of plant resources that were used for many different purposes. Sophisticated techniques were used for their procurement and processing, denoting the ample knowledge people had of the plant world. Many of the plants used are only present in the region of the subantarctic forest. The principal forest resource is wood, a precious raw material that was used for manufacturing artifacts that were basic for food procurement, especially hunting equipment such as bows and arrows. From this point of view, it is possible to suggest that wooden implements must have circulated among groups living in territories of the steppe region, who did not have direct access to this raw material. To conclude, the results obtained in the study of the strategies implemented by hunter-gatherer societies from the central part of Tierra del Fuego, working from an integrative perspective of archaeology and the ethnographic sources, confirm the essential role the subantarctic forest played in their lives.

*Acknowledgments.* Fieldwork was financed by CONICET (PIP 0179/98), the Ministry of Culture of Spain (2003–2005), and the Generalitat de Catalunya (2007), and was supported by CADIC, UAB, and CSIC. Our gratitude to the families Goodall and Daniels, to the Museo Yámana in Ushuaia, and especially to B. O'Byrne, for continued encouragement and support; to Natalie P. de Goodall, for information and documentation; to M. Chifflet; and to all the students who participated in the project.

## References Cited

- Beauvoir, J. M.  
1915 Los Shelknam. Indígenas de la Tierra del Fuego.  
[1998] Buenos Aires: Talleres gráficos de la Compañía General de Fósforos. (ed. facsimilar, Ushuaia: Zagier & Urruty, 1998).
- Berihuete, M., L. Caruso, M. E. Mansur, G. Massaccesi, C. Mensua, and R. Piqué  
2009 El aprovechamiento de los recursos vegetales entre los Selknam de Tierra del Fuego (Argentina). Una aproximación etnoarqueológica. *In*

- La alimentación en la América precolombina y colonial: una aproximación interdisciplinar. A. Capparelli, A. Chevalier, and R. Piqué, eds. Pp. 21–41. Madrid: CSIC, Treballs d'Etnoarqueologia, 7.
- Berihuete, M., L. Caruso, M. E. Mansur, G. Massaccesi, C. Mensua, V. Parmigiani, and R. Piqué  
2007 Estudios arqueobotánicos en Tierra del Fuego: El caso de la localidad Ewan. *In XVI Congreso Nacional de Arqueología Argentina*. Número especial, Pacarina. I:91–97.
- Borrello, A. V.  
1969 Los geosinclinales de la Argentina. *Anales XIV*, Buenos Aires: Dirección Nacional de Geología y Minería.
- Borrero, L. A.  
1979 Excavación en el Alero Cabeza de León (Tierra del Fuego). *Relaciones* 13:255–71.  
1986 La economía prehistórica de los habitantes del norte de la Isla Grande de Tierra del Fuego. Tesis de Doctorado, Facultad de Filosofía y Letras, Universidad de Buenos Aires.  
1989– Evolución cultural divergente en la Patagonia  
90 Austral. *Anales del Instituto de la Patagonia* 19:133–140.  
1991 Los Selk'nam (Onas). Su Evolución Cultural. Buenos Aires: Búsqueda-Yuchán.
- Borrero, L. A. and J. L. Lanata  
1988 Estrategias adaptativas representadas en los sitios de Estancia María Luisa y Cabo San Pablo. *In Precirculados del IX Congreso Nac. Arqueol. Instituto de Ciencias Antropológicas. Facultad de Filosofía y Letras*. Pp. 166–174. Buenos Aires: Universidad de Buenos Aires.
- Borrero, L. A. and R. Barberena (eds.)  
2004 Arqueología del norte de la Isla Grande de Tierra del Fuego. Concepción del Uruguay: Ediciones Búsqueda, Yuchán.
- Bridges, L.  
1951 *Uttermost Part of the Earth*. London: Hodder and Stoughton.
- Clapperton, C. M.  
1992 La última glaciación y deglaciación en el Estrecho de Magallanes: implicaciones para el poblamiento de Tierra del Fuego. *Anales Inst. de la Patagonia* 21:113–128.
- Coronato, A.  
1995 The Last Pleistocene Glaciation in Tributary Valleys of the Beagle Channel. *Quaternary of South America and Antarctic Peninsula* 9:153–172.
- Coronato, A., M. Salemme, and J. Rabassa  
1999 Paleoenvironmental Conditions during the Early Peopling of Southernmost South America (Late Glacial—Early Holocene, 14–8 ka B.P.). *Quaternary International*, 53/54:77–92.
- Chapman, A.  
1982 *Drama and Power in a Hunting Society: The Selk'nam of Tierra del Fuego*. Cambridge University Press.  
1986 *Los Selk'nam. La vida de los Onas*. Buenos Aires: Emecé Editores.  
1989 *El fin de un mundo: los Selk'nam*. Buenos Aires: Vázquez Mazzini Editores.
- Favier Dubois, C. and L. A. Borrero  
2005 Playas de acreción: cronología y procesos de formación del registro arqueológico en la costa central de la bahía de San Sebastián, Tierra del Fuego. *Magallania* 33(2):83–98.
- Gusinde, M.  
1937 *Die Feuerland Indianer*. T.I: Die Selk'Nam. [1982] Mödlig-Wien. (Translation: Los indios de Tierra del Fuego. I: Los Selk'nam. 2 vols. Buenos Aires: Centro Argentino de Etnología Americana).
- Heusser, C. J.  
1994 Quaternary Paleoeecology of Fuego-Patagonia. *Revista IG Sao Paulo*. 15(1/2):7–26.
- Heusser, C. J. and J. O. Rabassa  
1995 Late Holocene Forest-Steppe Interaction at Cabo San Pablo, Isla Grande de Tierra del Fuego, Argentina. *Quaternary of South America and Antarctic Peninsula*. 9:179–188.
- Laming-Emperaire A., D. Lavallée, and R. Humbert  
1972 Le site de Marazzi en Terre de Feu. *Objets et Mondes* 12:225–244.
- Lanata, J. L.  
1996 La diversidad instrumental en el norte de Península Mitre, Tierra del Fuego. *Arqueología* 6:159–197.
- Lothrop, S. K.  
1928 *The Indians of Tierra del Fuego*. Museum of the American Indian (Heye Foundation), Contribution 10. New York.
- Mansur, M. E.  
2003 El Corazón de la Isla. Arqueología de la zona central de Tierra del Fuego. *In Mundos Fueguinos. Doce Miradas. Sobre Selknam, Yaganes y Kawesqar*. Odone C. and P. Mason, eds. Pp. 148–166. Santiago de Chile: Taller Experimental Cuerpos Pintados.  
2006 Los Unos y los Otros. El uso de fuentes etnográficas y etnohistóricas en la interpretación arqueológica." *In Etnoarqueología de la Prehistoria: més enllà de l'Analogia*. Madrid: CSIC, Treballs d'Etnoarqueologia 6:316–336.
- Mansur, M. E., D. Martinioni, and A. Lasa  
2000 La gestión de los recursos líticos en el sitio Marina 1 (Zona central de Tierra del Fuego, Argentina). *In Desde el País de los Gigantes. Perspectivas arqueológicas en Patagonia*. Tomo I, Pp. 57–72. Río Gallegos: Univ. Nacional de la Patagonia Austral.

- Mansur, M. E., A. Maximiliano, O. Vicente, and R. Piqué  
2007 Arqueología de Rituales en Sociedades Cazadoras-Recolectoras. Una aproximación desde el Análisis del Espacio Socialmente Producido. *In* Arqueología de Fuego-Patagonia. F. Morello, M. Martinic, A. Prieto, and G. Bahamonde, eds. Pp. 741–754. Punta Arenas: Fundación CEQUA.
- Mansur, M. E., R. Piqué, and A. Vila Mitja  
2006 Étude du rituel chez les chasseurs-cueilleurs. Apport de l'ethnoarchéologie des sociétés de la Terre de Feu. *In* Chasseurs-cueilleurs. Comment vivaient nos ancêtres du Paléolithique supérieur. S. de Beaune, ed. Pp. 143–150. Paris: Editions du CNRS.
- Markgraf, V.  
1993 Paleoenvironments and Paleoclimates in Tierra del Fuego and Southernmost Patagonia, South America. *Palaeogeography, Palaeoclimatology, Palaeoecology* 102:53–68.
- Martínez Crovetto, R.  
1968 Nombres de plantas y su utilidad, según los Indios Onas de Tierra del Fuego. *Estudios Etnobotánicos* 4(3):1–20.
- Martinic, M.  
2003 Breve reseña de la historia de los Selknam desde fines del siglo XIV al presente. *In* Mundos Fueguinos. C. Odone and P. Mason, eds. Pp. 231–260. Santiago de Chile: Taller Experimental Cuerpos Pintados.
- Massone, M.  
1987 Los cazadores paleoindios de Tres Arroyos (Tierra del Fuego). *Anales del Instituto de la Patagonia* 17:47–60.  
1996 Hombre temprano y paleoambiente en la región de Magallanes: evaluación crítica y perspectivas. *Anales del Instituto de la Patagonia* 24:81–97.  
2004 Los cazadores después del hielo. Centro de Investigaciones Diego Barros Arana, Col. Antropología. Santiago.
- Massone, M. and F. Morello  
2007 Los cetáceos en el mundo Selk'nam: una evaluación arqueológica. *In* Arqueología de Fuego-Patagonia. F. Morello, M. Martinic, A. Prieto, and G. Bahamonde, eds. Pp. 709–722. Punta Arenas: Fundación CEQUA.
- McCulloch R. D., C. M. Clapperton, J. Rabassa, and A. P. Curren  
1997 The Natural Setting. *In* Patagonia. C. McEwan, L. Borrero, and A. Prieto, eds. Pp. 12–31. London: The British Museum Press.
- Miotti L. L. and Salemme M. C.  
2004 Poblamiento, movilidad y territorios entre las sociedades cazadoras-recolectoras de Patagonia. *Complutum* 15:177–206.
- Morello Repetto, F.  
2000 30 años después, una primera aproximación a la Colección Marazzi (Museo Regional, Punta Arenas). *In* Desde el país de los gigantes, Perspectivas Arqueológicas en Patagonia. Tomo II, Pp. 481–498. Río Gallegos: Universidad Nacional de la Patagonia Austral.
- Morello F., L. Contreras, and M. San Román  
1999 La localidad de Marazzi y el sitio arqueológico Marazzi 1, una reevaluación. *Anales del Instituto de la Patagonia* 27:183–197.
- Ocampo C. and P. Rivas  
1996 Caracterización arqueológica preliminar del suroeste de la Tierra del Fuego. *Anales del Instituto de la Patagonia* 24:125–151.
- Orquera L. A. and E. L. Piana  
1999a Arqueología de la región del canal Beagle (Tierra del Fuego, República Argentina). Buenos Aires: Publicaciones de la Sociedad Argentina de Antropología.  
1999b La vida material y social de los Yámana. Buenos Aires: EUDEBA.
- Piqué R.  
1999 Producción y uso del combustible vegetal: Una evaluación arqueológica. *Treballs d'Etnoarqueologia* 3. Madrid: CSIC.  
2006 L'uso del legno nelle società fuegine: manufatti dalle collezioni del Museo Pigorini. *In* Finis Tèrrea. A. Salerno and A. Tagliacozzo, eds. Pp. 182–192. Roma: Museo Nazionale Preistorico Etnografico "Luigi Pigorini".
- Prieto, A., E. Calás, F. Morello, and J. Torres  
2007 El sitio arqueológico Myren 2, Tierra del Fuego, Chile. *Magallania* 35(2):89–103.
- Rabassa, J., A. Coronado, G. Bujalesky, M. Salemme, C. Roig, A. Meglioli, C. Heusser, S. Gordillo, F. Roig, A. Borromei, and M. Quatrocchio  
2000 Quaternary of Tierra del Fuego, Southernmost South America: An Updated Review. *Quaternary International*. 68–71:217–240.
- Salemme M., G. Bujalesky, and F. Santiago  
2007 La Arcillosa 2: La ocupación humana durante el Holoceno Medio en el Río Chico, Tierra del Fuego, Argentina. *In* Arqueología de Fuego-Patagonia. F. Morello, M. Martinic, A. Prieto, and G. Bahamonde, eds. Pp. 723–740. Punta Arenas: Edic. CEQUA.
- Santiago F., J. Oría, and M. Salemme  
2007 Nuevo contexto arqueológico del Holoceno Medio. Río Chico 1. Tierra del Fuego, Argentina. *Actas del XVI Congreso Nacional de Arqueología Argentina. Número especial, Pacarina III*:439–445.