

# Landscape and human settlement dynamics in insular environments. An archaeological approach

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## Abstract

Archaeological researches in island territories of the subarctic and subantarctic regions, at opposite ends of the planet, have largely developed independently. Therefore independent interpretive frames have also been developed to explore the dynamics of human settlement in the past, especially with regard to hunter-gatherer societies.

In the northern hemisphere, the archaeological studies are part of the research tradition of Paleolithic / Mesolithic Europe, initially developed with a largely terrestrial focus. Although in recent years new emphasis has been placed on research in coastal areas - including the subarctic area, the theoretical frameworks remain similar to those employed in the study of hunter-gatherers of the inland areas of continental Europe.

On the other side, the archaeology of Tierra del Fuego has developed close to ethnoarchaeological research, as native populations lived there until the end of XIXth century. It has emphasized the analysis of social processes, confronting archaeological data with ethnographic and ethnohistorical records.

We believe that models on aboriginal strategies build from this ethno-archaeological perspective constitute an excellent starting point to discuss some aspects of Scottish mesolithic archaeology. Recently we have adopted a comparative

approach; our starting point is focused in the differences in scales of analysis (environment, home ranges, etc.). In this paper we highlight some of the comparable features and offer a new perspective on the archaeological record and mobility of hunter-gatherer sites in Scotland using the ethnohistorical records from Tierra del Fuego.

**Keywords:** Scotland, Tierra del Fuego, Mesolithic, Selk'Nam, ethnoarchaeology.

## Introduction

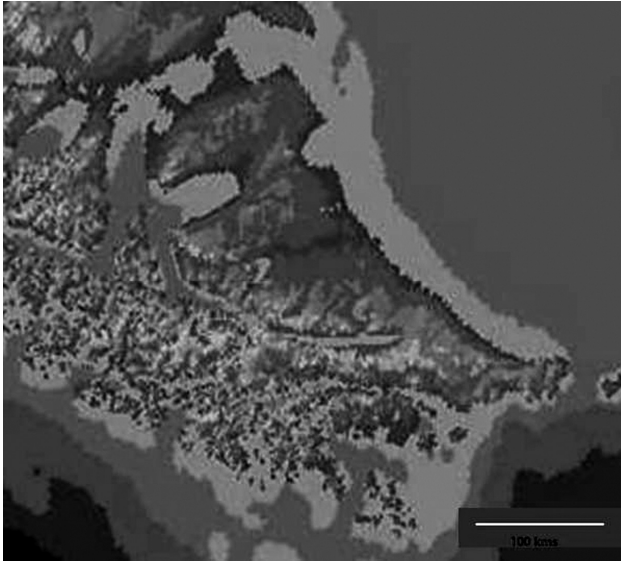
The history of archaeological researches in island territories of the subarctic and subantarctic regions, at opposite ends of the planet, shows that they have largely developed independently. Therefore independent interpretive frames have also been proposed to explore the dynamics of human settlement in the past, in particular with regard to hunter-gatherer societies. As for northern hemisphere, the archaeological studies are part of the research tradition of Paleolithic / Mesolithic Europe, initially developed with a largely terrestrial focus. In recent years new emphasis has been placed on research in coastal areas including in the subarctic area. Yet theoretical frameworks remain similar to those employed in the study of hunter-gatherers of the inland areas of temperate Europe.

In Tierra del Fuego, on the other hand, archaeology has developed close to ethnoarchaeological research, as native populations lived there until the early twentieth century. Archaeological research has then emphasized the analysis of social processes, confronting archaeological data with ethnographic and ethnohistorical records. Previous joint projects between our institutions have focused for some time on developing the theoretical and methodological areas of our discipline (Estevez & Vila coord 1995). The features of this territory, which is located in

a sub-Antarctic area, and the persistence of aboriginal societies until the beginnings of last century (Mansur, Pique & Vila 2007), facilitate analysis of a range of issues relevant to the establishment of human communities (remoteness, mobility, etc.) Here we discuss a new line of comparative research which aims to explore the results of archaeological and ethnoarchaeological investigations in subantarctic areas of Tierra del Fuego with the evidence for human occupation of Scotland during the Mesolithic. In the first instance we have identified an important difference in the scales of analysis (environment, home ranges, etc. We recently discussed this issue in relation to long distance mobility (Hardy *et al.* 2010). In this paper, we focus primarily in the territories and mobility of indigenous people of Tierra del Fuego, and, based on this we highlight the need to propose a new framework for the interpretation of Mesolithic settlement in Scotland.

## **Geographical background**

Tierra del Fuego is a large archipelago at the southern tip of the American continent, between 54° - 55° S and 67° - 68° W (Fig. I). It is formed by a big island called Isla Grande (48.100 km<sup>2</sup>) and thousands of smaller islands off its west and south coastlines, up to Cape Horn. The entire area of the archipelago is 73.753 km<sup>2</sup>. This almost parallels the area of Scotland, formed by about 800 islands: 78.772 km<sup>2</sup>. The latitudes of Ushuaia in Tierra del Fuego and Portree in the Isle of Skye are almost exactly the same, though the climate in Tierra del Fuego and the marine environment is somewhat harsher.



**Fig. 1.** Tierra del Fuego.

In Tierra del Fuego, 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 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, modelled by different glacial events (Fig. 2).

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  $10^{\circ}$  C, whereas in the coldest winter month (July) it falls to around  $-4^{\circ}$  C. There is frost from the beginning of autumn to the end of spring; the ground can freeze to a depth of 0.80 m. Precipitation is abundant in the mountains (500 mm), where snowfalls can occur at any time of the year, and decreases over the northern foothills (300 mm), where the stronger winds contribute to considerable wind-chill. The winds are permanent throughout the year. more persistent and intense during spring and summer.



**Fig. 2.** Landscape of Tierra del Fuego a- Beagle channel coast  
b- northern inland plateau (Source: M. E. Mansur)

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 (Fig 3), followed by an ecotonal zone with wooded hillsides, and finally herbaceous plains on the northern steppe.



**Fig. 3.** Guanacos in a clearing of the forest in the ecotonal sector.  
(Source: M. E. Mansur)

## **Tierra del Fuego**

### **Ethnohistoric, ethnographic and archaeological record**

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 have visited its coasts and come 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 century. Because of this history of contacts there is an abundant and rich ethnohistorical documentation concerning these populations, from the first encounters with explorers, sailors, and naturalists, to the arrival of colonizers. Nevertheless, the best documents are those produced by missionary and ethnographer M. Gusinde (1937) and anthropologist Anne Chapman (1986, 2008), even though an intense process of social disorganisation had already occurred by that time (Borrero 1991; Chapman 1986, 2008; Mansur 2006; Martinic 2002).

Along with written information about the population in these recent times, there is an important record of systematic archaeological research results. They concern principally the southern coastal section (Orquera y Piana 1999 a, b) and the northern part of the Isla Grande (Borrero 1991, Massone 2002, Massone et al 1993).

This implies that our present day knowledge about population of Tierra del Fuego is the result of a permanent confrontation and integration of information proceeding from all these sources, and from historical, ethnohistorical, ethnoarchaeological and archaeological approaches (Mansur 2006, Mansur and Piqué 2009).

Up to the early 20<sup>th</sup> Century, Tierra del Fuego was inhabited by hunter gatherer populations with a material culture and archaeology that has parallels to the Mesolithic of the far north west of Europe (Fig. 4). Archaeological and ethnographic research have revealed that fuegian populations had developed two different strategies in relation to exploitation of natural resources: sea-nomads adapted to sea litoral resources and inland terrestrial hunter-gatherers. The sea-nomads 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 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 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; 2009).

The second strategy, of inland terrestrial hunter-gatherers, corresponds to two groups who occupied most of the territory of the island: the Selk'nam 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 Selk'nam, 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 with the brutal encounters between natives and sealers. A rapid process of assimilation between the Selk'nam 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 Selk'nam and the Haush lived side by side in the center of the island and the majority of the Haush informants spoke both Selk'nam and Haush languages (Chapman 1986).

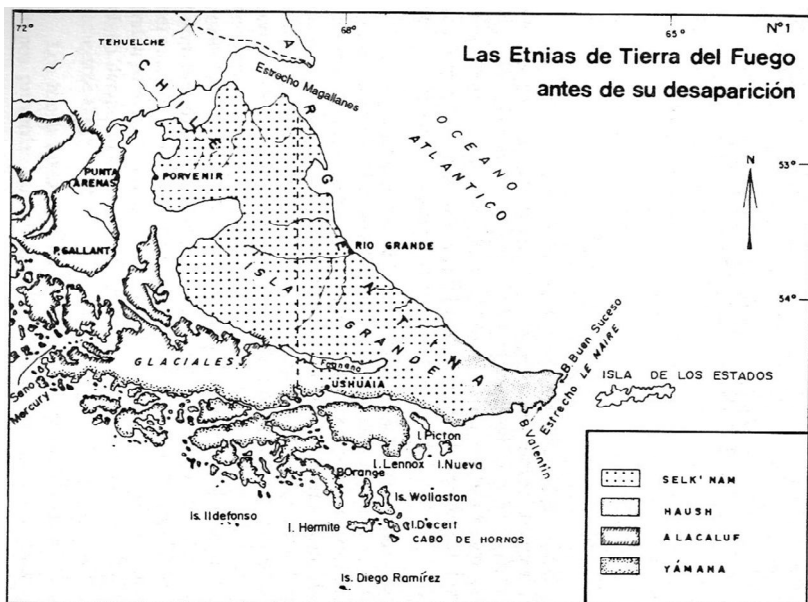


Fig. 4. Native societies of Tierra del Fuego, according to Chapman 1986.

As far as we know today, thanks to archaeological research, these two different strategies had long tradition. Archaeological sites in the northern part of the island reveal occupation by nomadic hunter-gatherers that depended on the existing land resources, as old as 10,000 years ago (Massone 2002). In fact, Tierra del Fuego was populated by hunter gatherers who arrived from the North, through the connection between the Isla Grande and continental Patagonia that existed in the area of the Strait of Magellan, at the end of the last ice age. By that time, the Isla Grande was in fact a peninsula of southern Patagonia. Slowly, they

extended themselves through almost all the territory of the Isla Grande. A second wave of population was that of the inhabitants of the South end of Tierra del Fuego, the “sea nomads”, who arrived by sea, sailing from island to island, from Western Patagonia, as early as 7,000 years ago (Piana 2010).

## The Selk’nam territories

This investigation is the result of a series of research projects developed in the central part of the Island, in the environment of sub Antarctic forest. This area was a kind of refuge for Selk’nam hunter gatherers who, for historical reasons, were the group who stayed longer without the influence of the colonizers (until twentieth century, see Parmigiani et al. 2010). Because of this reason, there is a detailed and good quality ethnographic record about this population, produced by Dr. A. Chapman, who reported most of the informants who lived in the eastern Fagnano sector since the 1960s.

One of the subjects recorded was territoriality and mobility. According to almost all the written sources, the *Selk’nam* were divided into two groups, north and south. Their territories corresponded to the principal differences in landscape of their region: the northern *Selk’nam* occupied the steppe zone in the north and east of the island (*Párik*), while the southern *Selk’nam* inhabited the wooded hillsides, meadows and wide valleys of the central region (*Hérske*) up to the northern slopes of the Cordillera.

According to Gusinde, the *Selk’nam* lived in groups formed by a few related families, in defined territories called *haruven*. At the time of Gusinde's visits, thirty-nine *haruven* had been identified, all belonging to different lineages. Chapman (1986), however, working in the late 1960's, recorded 82 *haruven*. Among these, forty-four had territories that were coastal, while thirty-eight were based exclusively in the hinterland. According to Chapman, groups of 40-120 related people occupied each *haruven*. Membership of

the family regulated access to the resources of each territory. Sons inherited the rights to hunt from their fathers; other hunters from other families or different territories needed permission to obtain food or raw materials here.

According to this model of territorial use, all the inhabitable parts of the island were occupied; there were no lands, nor watercourses, that did not have owners. Nevertheless, Chapman (1986) showed that there was a continuous process of fission and fusion of territories, and that the territorial boundaries could be dissolved in a range of circumstances, in particular when food was abundant, such as when there was a beached whale.

Although ethnographic sources indicate that *Selk'nam* subsistence was based on guanaco hunting, it is known that a diverse range of resources were utilised. These included rodents and birds, they also fished in the lakes, lagoons and rivers. They collected different plant products for food, fuel and raw material, such roots, berries or fungi. They also exploited marine resources. Shellfish were collected along the coasts of the Atlantic Ocean and the Magellan Straits. Marine mammals such as seals were hunted on the coast with bow and arrow. In addition, they were opportunistic; for example, when a whale was beached by a high tide. A beached whale was an opportunity for people from different territories to gather together and sometimes led to the celebration of the *Hain* ceremony (e.g. Beauvoir, 1915; Bridges, 1951; Chapman, 1986, 2008; Gusinde, 1937). A high degree of division of labour was characteristic among the *Selk'nam*; hunting and fishing were men's responsibility while shellfish, fungi and plant gathering were the responsibility of woman.

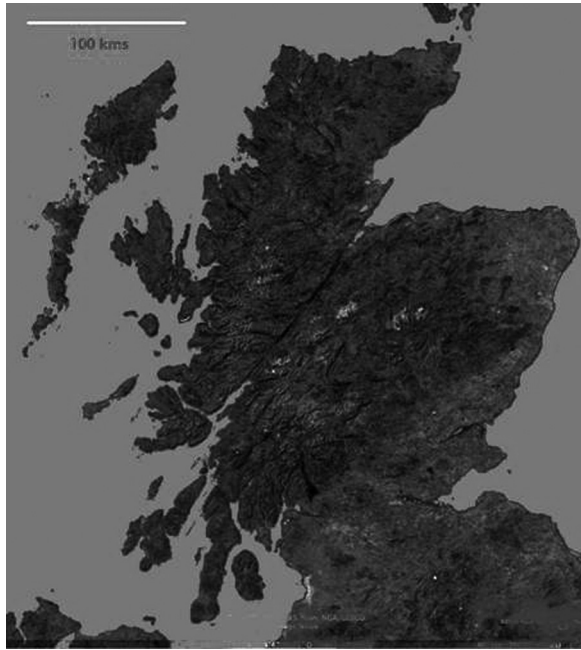
Mobility was very high in the *haruwen*, they normally stayed less than one week in the same place. The main reason for this high mobility was the need to search of food and other resources available at different places and at different seasons. According to Chapman (1986), the migration of guanaco determined their movement inside their territories. Thus in winter, from May to

November, people used to live on the shore or, in inland territories, they would move into the valleys and steppes as the climate was milder here. In summer however, they would move into the forest and low lying hills, which were the guanaco's preferred grazing places. Some resources such as eggs and berries were available only during spring, whereas other resources were available all year round; these included rodents, seals and shellfish (mussels, limpets, conches, razor clams and ordinary clams). Because of a greater abundance of food during late spring, summer and autumn, people tended to gather during these times whereas during winter they tended to split into smaller groups.

## **Scotland**

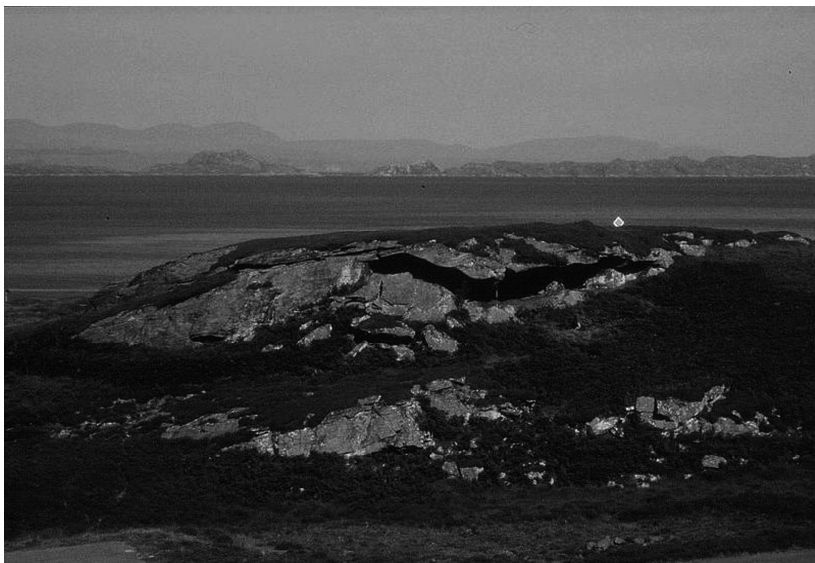
### **Archaeology of the Mesolithic.**

The evidence for the Mesolithic in Scotland is strongly focused on the west coast, where many shell middens and lithic scatter sites have been found. Though the resource base is very good and there is likely to have been a strong Mesolithic population here, it does not mean that elsewhere in Scotland was as unoccupied as the material record suggests (Fig. 5). Though there are few locations where inland sites have been found, examples such as along the River Dee in north east Scotland and the River Tweed in the south, where concentrations of sites have been found, suggest that the inland use of waterways may be more common than the current archaeological record suggests (Hardy and Wickham-Jones C. (eds). 2004)



**Fig. 5.** Scotland territory.

Both these areas have been the subject of detailed and long term survey and it is safe to assume that concentrations such as these could well exist elsewhere. Fewer sites have been found on the east than the west coast though this is more likely to be due to a combination of a lack of archaeological visibility here as well as the nature of parts of the coastline which is relatively inaccessible in many places, due to high cliffs (Figs 6 and 7).



**Fig.6:** Sand Mesolithic site in Scotland west coast. (Source: K. Hardy)



**Fig 7:** Inland landscape in northern Scotland (Source: K. Hardy)

The material record for the Mesolithic in the north-west European corner is fairly homogeneous but the quality of information is not. There is a generalised use of microlithic lithic technology, an extensive use of bone and other organic materials to construct items of raw materials. Around the Baltic and along many inland central European river systems large cemeteries and rock art are found while waterlogged sites have produced a much more extensive assemblage of organic material culture. In Scotland and much of northern England, with the notable exception of Star Carr, sites consist primarily of lithics with the occasional evidence for structures of some sort, and some shell middens which can contain a restricted number of bone tool types and some evidence for the use of personal decoration. Consequently, we have little with which to build a social perspective.

Based on ethnographic examples of different hunter gatherer societies from latitudes similar to North West Europe, we cannot really assume that we are simply missing the evidence from other areas, but neither can we accept that our record is representative of a less elaborate social structure. We have little on which to build a social perspective and the contrasts that exist among hunter-gatherer societies in these latitudes in other places in the world, suggest that the level and type of social organization in the northern European Mesolithic cannot be assumed.

## **Discussion.**

### **What can ethnoarchaeology contribute to archaeological interpretation**

Understanding the past is about using a combination of hard archaeological facts in the shape of finds, and interpreting them using deductive logic.

As we have shown, for Tierra del Fuego, there is a wide record including archaeological, historical and ethnographic evidence. All of it allows undertaking discussions about social organization and way of life of the aboriginal populations. We believe that because of insularity (and isolation, after the opening of Magellan strait) as well as the characteristics already mentioned, Tierra del Fuego could be considered as a laboratory for the study of social processes related to maritime and continental hunter-gatherer populations.

On the other hand, our interpretation of the social structure of Mesolithic groups, into family-based bands and groups, is based on anthropological information from around the world. The use of ethnoarchaeological and ethnohistoric information to try to understand geographical structure, long distance mobility and social networks of prehistoric people is no different.

Following present day criteria related to political boundaries (nation, province, department, etc.), archaeologists are led sometimes to search for the same distinctions in the past (for example, “the Patagonian paleoindian”, the “French Mesolithic”, etc.) But we know that this cuttings are arbitrary, derived from present day situations related to research policies and not to past reality. They are conceptual constructions that we have to revise before we discuss the archaeological/social landscape.

Consequently, in this confrontation of information between both territorios, Tierra del fuego and Scotland, and considering similarities, as well in size, latitude, topography, etc., we believe that it is possible to use the fuegian model in order to hypothesize about the forms of past human occupation of the present day Scottish territory.

In our comparison, if Scotland, which was a north-west peninsula of Europe during much of the Mesolithic, is turned around and placed upside down over Tierra del Fuego, the geographies of these places become remarkably similar. They are



roughly the same size and both have thousands of islands around much of their coastline. Additionally, both regions have mountainous interiors and the interior of both places is cut by a deep water channel.

This different orientation of Scotland highlights the startlingly similar geographies of these two regions, and offers the possibility to explore Fuegian regional territories and mobility patterns in the context of Scottish, and indeed British, geography. Early results suggest that the though the weather and sea of Scotland's west coast can be treacherous, which is an argument sometimes used against high mobility, the distances involved even to the most far-off islands off the Scottish mainland, do not match those habitually navigated by the fuegian fisher-hunter-gatherer populations. Likewise the fuegian example demonstrates different possible ways of inter connectedness between islands, and also demonstrates how exclusive use of a small island, such as those found on the Scottish west coast, is not sustainable.

These distributions of population are directly related with mobility. All the inland sites in Scotland are near or adjacent to rivers: Looking at how this would actually have been possible for Scotland with its high mountains and difficult interior, faults such as the Great Glen offer the opportunity to traverse the whole country by boat, getting directly from east to west is more complicated but there are routes which require a very short distance of overland travel, for example up the Forth valley through Loch Katrine, and Loch Artlett to Loch Lomond, two small overland distances of around 1km each.

The extent of coastal and land based mobility of the Fuegian populations, when mapped onto Scotland, suggests that Scotland may have had no distinct or separate coastal and inland populations. Populations in the north, west and east are likely to have been connected through the Loch Ness fault. On the other hand, the area of relatively low lying land from the Midlands south

and east into Doggerland could have supported populations relying on inland resources.

Another important point is that of marine transport. Though we know, based for example on the movement of lithic raw materials, that people lived and moved between islands, this is tempered by the dangers inherent in marine travel here. If we examine the record for marine transport in Tierra del Fuego however, in coastal waters that are considered 'the fiercest place on all the seven seas', we observe that people habitually travelled across extended stretches of water in bark canoes. Even traveling in the Beagle Channel, which is relatively protected in the wider scale of things, can be extremely dangerous and difficult. But we know that people used all the islands, even the Isla de los Estados and the Isla Grevey and Wollaston (all at some 25 km into Cape Horn from the nearest points on the mainland), and this in spite of the winds. So how did they do it? Our answer is that they had a combination of very high resolution understanding of climatic conditions and extremely highly developed maritime skills. The only way to successfully travel in volatile open waters is to have a deep understanding of local conditions. In Tierra del Fuego we see this was not only possible but a part of everyday life. This suggests to us that we underestimate the skills people had, and that water should not be seen as a barrier, but rather as a highway, for movement and visibility.

We are just beginning this work. By looking at the overlying structure in this way, and by looking at large scale patterns of travel, we may be able to predict the most likely locations of archaeological sites, particularly in the geographically complicated north. We are also working with ethnohistorical information from Medieval Scotland. Scotland is a good place to explore use of the interior. It has a complicated geography with many high mountains and deep valleys or glens and lots of water in the form of lochs. This means that routes to travel from one place

to another is normally focused, and easy or even possible routes have not changed much really at all.

## **Conclusion**

As we previously said, understanding the past is about using a combination of hard archaeological facts in the shape of finds, and interpreting these using deductive reasoning together with empirical data that provides usually a part of the answer; stable isotope analysis is a good example of a broad brush analytical technique that provides direction but does not provide 'fact'. The use of ethnoarchaeological and ethnohistoric information to try to understand questions of geographical structure and long distance mobility and social connections of prehistoric people is no different.

We believe that, based on the ethnohistorical and ethnoarchaeological data from Tierra del Fuego, together with the results of archaeological research, it is possible to draw explanatory models about social organization of hunter gatherer societies that can be used for different instances of palaeolithic/Mesolithic Europe.

In our case study, this information is used together with the geography and ethnohistorical evidence for long distance overland travel routes in Scotland, and the evidence of high level of maritime sophistication, the extent of potential distances travelled overland and on water, and the need for a range of environmental zones etc. On this basis, the most likely scenario is that Scotland and northern England was occupied by one interrelated language group, which was probably largely coastal-based and connected. We believe that because of geographic constraints on land-based travel (High mountains), their mobility had to be based primarily on water. We cannot see how a separate inland population group, possibly a different language group, would have had space to exist, until we reach below the Pennines.

The large area of low lying land, in middle and southern England, together with Doggerland and into continental Europe would have offered ample space for separate inland groups to flourish.

## Aknowledgements

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