

# ARCHAEOLOGY OF FUEGIAN ISLANDS: ENVIRONMENTAL CHANGES ALONG THE HOLOCENE, HUMAN SETTLEMENT AND CULTURAL INTERACTION (PATAGONIA, CHILE)



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### INTRODUCTION

The fueguian archipelago is an intricate territory located in the southernmost region of South America; probably one of the last regions peopled by human groups in prehistoric times. Defined as the lands south of the Strait of Magellan, they were discovered in 1520 by Hernando de Magallanes first expedition to circumnavigate the globe.

The ethnohistoric and ethnographic records show this was the overlapping network area of at least three mayor groups: Selk'nam or Ona, terrestrial hunter-gatherers that had no navigation system; and maritime hunters also known as the canoe people, namely Alacalufes or Kawésqar from the central and western shorelines and Yaganes or Yamana, located in the extreme southern portion of the fueguian archipelago (Figure 1).

The modern environment is characterized by a W-E gradient in precipitation and temperature, which goes from peat and evergreen forests in the Pacific Ocean to Magellanic forests (deciduous species) and then the Patagonic Steppe dominated by grasslands and shrubs in the east (Pisano, 1977, 1981) – Figures 2, 3 & 4.

This research focuses on the archaeology of 3 mayor fueguian islands: Tierra del Fuego, Dawson and Navarino.

#### PALAEOENVIRONMENT

The paleoenvironmental framework during the late-glacial and early Holocene is marked by rapid climate change. Different high resolution glacial and vegetation records suggests glaciers readvanced in two occasions, after the Last Glacial Maximum (c. 21,000-19,000 14C yrs BP) and, as global climate warmed during the late-glacial/Holocene transition, before the last retreat after 10,300 14C yrs BP. These advances produced land-bridge connections in the northern coast of Tierra del Fuego, generating windows of opportunity for early people to migrate from Patagonia to Tierra del Fuego (McCulloch & Morello, 2009), but the archaeological record is no older than c. 10,500 14C yrs BP. After c. 10,31514C yrs, early Holocene climatic warming led to the rapid retreat of the Patagonian ice fields. However, global sea level continued to be approximately -20 to -60 m during this period resulting in the emergence of a land-bridge across what today constitutes the Magellan strait. This situation persisted until the start of the mid-Holocene marine incursion, at c. 8,300-7,500 14C yrs BP, with a peak c. 6,000 14C yrs BP (McCulloch, Bentley, Tipping, & Clapperton, 2005; McCulloch & Morello, 2009; Porter, Stuiver, & Heusser, 1984) – Figure 5. Palaeoecological evidence suggests that the late-glacial environment was predominantly open steppe and that climate was significantly colder and drier than present. After c. 10,000 14C yrs BP, open southern beech woodland expanded into the region following the eastern flanks of the Darwin cordillera (Markgraf, 1993; McCulloch & Davies, 2001) concomitant with a severe arid phase (c.10,300 to 8,200 14C yrs BP) during which high charcoal influx suggests an increased frequency of fires. The region-wide nature of the arid phase and the increase in fire frequency suggests a climatic cause but the role of early people moving into the region cannot be excluded. As the westerlies returned to their present position (McCulloch & Morello 2009) a more humid regime is recorded in pollen evidence from c. 8,200 BP, conditions which are also reflected in the co-eval formation of space-trangressive buried organic horizons along the western coast of Tierra del Fuego (Figure 9, Table 1). The pollen records from Dawson Island (McCulloch & Davies, 2001) suggest that open southern beech woodland had reached the northern part by c. 9,000 14C yrs BP and expanded eastwards to Onamonte, Tierra del Fuego, by c. 5,130 14C yrs BP (Heusser, 1993). This implies a shift toward more humid conditions and an eastward increase in precipitation. By mid- to late-Holocene the increase in precipitation led to the development of the more closed southern beech forest observed at present on the mountainous margins of the Darwin Cordillera (Figure 4).

### HUMAN PEOPLING

The oldest archaeological evidence of human peopling is from the Pleistocene-Holocene transition and located on Tierra del Fuego (Figure 10). At Tres Arroyos Cave, camp site remains include lithic instruments, bones of extinct and modern fauna and hearth features dating c. 10,500 14C yrs BP (Massone, 2004). At this time, Tierra del Fuego and Navarino islands were connected with one another and the mainland, while Dawson Island was partially covered by the final retreat stages of the last Glaciation. All the central portion of the Strait of Magellan was dominated by large proglacial lakes. After c. 8,400 14C yrs BP sea water flooded this area. Beagle Channel opened around this time, or a little earlier (Bujalesky, 2011; McCulloch et al., 2005).

Prior to the mid Holocene the non-coastal archaeological record of Tierra del Fuego consists exclusively of an occupation dated to 9,590 ± 200 14C yrs BP at the Marazzi 1 site (Laming-Emperaire, Lavallée, & Humbert, 1972). Although the latter is recorded as disperse charcoal fragments in a pit with little control over cultural remains association. Recently dates of 8,840 ± 50 14C yrs BP on a buried paleosoil soil horizon corresponding to the lower levels described by Laming-Emperaire et al. 1972 at Marazzi 1 site, coupled with a 4,550 ± 40 14C yrs BP date on bone associated to fauna remains sampled from the same layer (Arroyo-Kalin, 2009; Arroyo-Kalin & Morello, 2010; Morello et al., 2009), call the early human occupation to disregarding. A few millennia after the fueguian seascape formation, c. 6,500 14C yrs BP, the region was peopled by highly specialized marine groups, which occupied islands, fjords and channels thanks to their exceptional navigation technology. They are known as the early canoe groups and their cultural assemblage has been identified as the Englefield Tradition (Legoupil & Fontugne, 1997; San Román, 2013, 2014). Over the northern shore of Beagle channel at Tierra del Fuego Island and further south in Navarino island, several archaeological sites have important evidence of these groups.

A gap in the archaeological record has been recorded from 10,500 to 7,800 14C yrs BP. Thus, a local extinction or out-migration hypothesis of early late-glacial groups is still possible. Then, the arrival of maritime groups, distinct from Fuego-Patagonian terrestrial hunter-gatherers, would account for the Middle Holocene colonization of Fueguian islands, such as Tierra del Fuego and Navarino (Borrero, 1996; Borrero & McEwan, 1997; Morello, Borrero, et al., 2012; L. A. Orquera, Legoupil, & Piana, 2011). After the Tres Arroyo Cave archaeological occupations, there is human evidence in Beagle Channel at sites Imiwaia and Túnel-1 (Figure 10). The archaeological assemblages at these sites are identified as characteristic of terrestrial hunter-gatherers camping locations. Imiwaia and Túnel-1 are dated to 7,840 and 6,680-6,980 14C yrs BP, respectively (L. Orquera & Piana, 1999; L. A. Orquera et al., 2011). Thus, findings of early marine nomads or canoe people dated to or around 6,500 14C yrs BP are specially relevant (Legoupil and Fontugne 1997; Orquera et al. 2011; San Román 2013; Morello et al. 2012a, among others), as they acted as "water bridges" (Fiore, 2006) for all the Fueguian and Patagonian archipelagos.



gure 13. Lithic artefacts: a) spheroid las from Marazzi 1. Middle Holocen vels: b) ovoid bola from the same site evel: c) denticulate scrapers from Myren 2: d) spheroid bolas also from <u>Ayren 2; e) ethnographic arrow, glass</u> projectile point, Ona type and Tres rroyos 1 Ona type projectile point ilex rock); f ) two small endscrapers om Tres Arroyos 1, Late Holocene vels; g) sidescrapers from Marazzi 1

The environmental information above has been complemented by geoarchaeological studies focused on paleosoils from Tierra del Fuego Island. Several have been radiocarbon dated and some tend to show contemporaneous soil formation for larger areas (Figu-

Chronological information for paleosoils show wide and frequent distribution of organic buried horizons between c. 8,500 and 3,000 14C yrs BP, many on the western shore of Tierra del Fuego (Figure 9, Table 1). On the other hand, the formation and preservation potential of these paleosoils depend on the erosive dynamics of the landscape. In this direction, we have observed that the north-eastern part of Tierra del Fuego paleosoils show more resilience to erosive processes than those in Cabo Vírgenes (Barberena & Borrero, 2010) and San Sebastián Bay (Favier Dubois, 2003, 2007). From Puerto Yartou in the Southern end till Cabo Monmouth at the North, several buried paleo-surfaces have been recorded with vast extension and dating the Early Holocene. Both extension and chronology are rare in the Atlantic zone data. This large timing of the west Tierra del Fuego paleosol sequence complicates there use as chronostratigraphic markers and the possibility of relating them with other proxies like palinological reconstructions (hors tephra layers). On the other hand, there potential for finding contemporaneous archaeological remains has yet to be

systematically explored.





Figure 15 (above). Green and black obsidia C) Cerro León 1; D) Laguna Vergara; E) Río from archaeological sites in Tierra del Fuego Cullen 2. F) rodado de toba recolectado en os paleocordones de Ea. Florentina.

Figure 11 (right). General view of archaeolo gical site Coabo Monmouth 20 (paleo-lake te rrance) and guanacos beside the coast.

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rea and steppe veget tion of the northern part of Tierra del Fuego Figure 10 (below) Map with archaeologica

sites organized by chroology (modified from Morello et al., 2012a; Legouil et al., 2011; Orquera et al., 2011; Ocampo 8 Rivas 2000).

Recent research in Tierra del Fuego and Dawson islands (Legoupil, Christensen, & Morello, 2011; Morello, 1999; Morello, Borrero, et al., 2012; Morello, Torres, et al., 2012) suggest a colonization pulse that spread widely between 5,000 and 3,000 14C yrs BP (Figures 10 & 11). This colonization period is frequently related to technological innovation traits as big lanceolate projectile points, Levallois débitage and exceptional cases of long distance raw material circulation extending from archipelago to mainland and viceversa

The density and diversity of archaeological records shifted upward in the last 2.000 years of our era. This density has been interpreted as a demographic expansion, but one that never reached spatial saturation (Borrero, 1989-90). This demographic expansion is also observed in the archaeological record of Navarino Island and Beagle Channel. However, the colonization process in these localities occurred a thousand years earlier during the Middle Holocene, although it is still related to early marine nomad sites (Ocampo & Rivas, 2000; L. A. Orquera et al., 2011).

Tabular erect modification

Myren-1 (n° 30477) Rio San Martin (n° 9607



iddle Holocene levels; h) bifacial arte facts from Marazzi 1, Middle Holocene (Morello et al., 2012a)

The peopling of Tierra del Fuego shapes a discontinuous archaeological record during the Holocene. The lack of information for the early Holocene can at least in part be related to an arid phase which would have influenced the archaeological record in different ways: drier conditions may have made areas of the island more inhospitable to human inhabitation; increased opportunities for erosion and deflation may have affected preservation of archaeological remains; and –as suggested by the more ubiquitous presence of paleosoil- a subsequent landscapes evolution may have decreased the visibility of early Holocene surfaces (Arroyo-Kalin & Morello 2010). It is also possible that rapid shifts to more humid conditions may have helped increase opportunities for ite formation and concentration of remains in specific points in the landscapes. A similar statement can be advanced for the strong archaeological pulse of coastal occupations recorded in the Middle Holocene, in which a shift to more humid conditions in the palaeoenvironmental record coincides with sea transgression shaping of the landscape during the second part of the Holocene. This suggests that, during the Middle Holocene, guanaco hunters were frequently accessing the Atlantic and northwest coast of the Main Island, probably for short but repeated residential stays. As a whole a general adaptation strategy for this period can be observed, with terrestrial fauna exploitation (mainly guanaco hunting) being supplemented by the use of marine resources, with no specialized technology for the acquisition of the latter until the appearance of harpoons and fishing weights during the last two mi-Ilennia for Tierra del Fuego Island (Borrero, 1986; Torres, 2009). No evidence is available to suggest that residential mobility was guided by the intensity of exploitation and seasonal availability of coastal resources. During the last 2,000 years a complementary use of marine resources and other ecological zones accompanies evidence for more occupations in all available environments of the island. This proliferation in the archaeological record has been interpreted as a demographic increase (Borrero, 1989-90) and related with models of high mobility and interaction in the use of some specific localities (Borrero, 1986). We have discussed some of the main perceptible inflections in the colonization process of Tierra del Fuego and their correlation to paleoenvironmental information. The study of the terrestrial colonization process of Tierra del Fuego provides additional dimensions to the Divergent Evolution model developed for the peopling of Tierra del Fuego and Patagonia (Borrero 1989-90). Although the Tierra del Fuego case can be regarded as a continuation of the general peopling process of Patagonia from c. 11,000 14C yrs BP, natural barriers forming around c. 8,400 14C yrs BP are effective agents of independent and discontinuous development, that is, of divergent evolution processes. They may have contributed to vicariance (Borrero, 1991) and resulted in divergent evolutionary processes between c. 8,000-5,000 14C yrs BP. However, this biogeographic barrier may have been partially transformed into a "water bridge" (sensu Fiore 2006) by the mid Holocene arrival of maritime groups distinct from Fuego-Patagonian terrestrial hunter gatherers. This would have opened the central Magellan strait to diverse inter-group contacts that resulted in raw material circulation (obsidian, Miraflores rock, guanaco bones) and an intangible flow of ideas and artifact morphology (linguistic and typologic industry relations). At least two interaction periods are observed, an initial stronger pulse between ca 5,000-3,000 14C yrs BP and another towards the last 1,000 14C yrs BP (see cranium deformation distribution, Figure 16). Although we lack empirical evidence, the exchange or circulation of people between the north and south of Magellan strait cannot be overruled. The mediator role of canoe groups in these interactions remains to be fully assessed, but clearly there are sociocultural processes that can invalid biogeographic barrier isolation effects (Morello et al., 2012).

> Figure 12 (below). Distribution of nonlocal raw materiales in Patagonia and Fueguian archipelago: obsidian (green and black), Miraflores rock and guanaco remains.





igure 5b (left-below) iew of modern and Middle Hold ene marine incursion terrace near Porvenir, Tierra del Fuego

rello 2009).

gure 5a (left-above)

6,000 yrs BP.

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Lago Blanco 1; 28) Las Vueltas 1 and Laguna Grande; 29) Aviles 1, 3 and Amalia 4; 30) Puesto Pescador 1; 31) Rio Caleta 4; and various sites 32) Navarino Island: 33) Beagle Channel: 34) Dawson Island.

#### Estancia Cameron (Figure 6)

This pollen record suggests a similar pattern to that from Puerto Arturo of early Holocene relat ry conditions. Between c. 9,500 and 7,500 14C yrs BP there is a dominance of Poaceae and Aca suggesting an open, almost steep environment. There is also the low but continued presence of narcoal suggesting periodic fires. However, there is the persistence of water at the site indica ted by the presence of algae (Pediastrum). It is unclear if the Cyperaceae was forming a fen-like community around pools of standing water or if it was part of the steppe vegetation occupying the more humid ground. Nothofagus forest forms approximately 10-20% of the total land pollen sum. This is earlier than the expansion of Nothofagus woodland onto Isla Dawson to the west at c 8,500 14C yrs BP (McCulloch & Davies, 2001) and may represent a north-eastward migration of t woodland from Woodland refugia in the south-western corner of Tierra del Fuego and / or a grea ter push from southwesterly precipitation moving through the Cordillera Darwin and reaching th southern shore of Bahía Inútil. After c. 7,500 14C yrs BP there is an apparent increase in aridit with the expansion of grasses and higher proportions of charcoal suggesting an increase in fire frequency. The timing of this phase appears to be asynchronous with other records from Fuego atagonia and so this interpretation should be treated with caution until further 14C dating cont has been obtained for this record From c. 4,500 14C yrs BP to present the shift from Poaceae to Empetrum heathland suggests ar increased in relative moisture levels. This is most evident in the change to relatively unhumified peat with very low pollen concentrations suggesting rapid accumulation. Two tephra layers within the pollen core from Estancia Cameron have been identified during the pollen analytical process These tephra layers have been geochemically identified by electron microprobe analysis to be f Nount Burney and from Volcan Hudson.



#### **NEW PERSPECTIVES**

Most archaeological sites from the main island of Tierra del Fuego have been considered as remains of terrestrial-land hunter-gatherers that use or integrate marine resources on a complementary basis. On the other hand, prevailing interpretations for Navarino and Dawson islands focus on the presence of specialized maritime societies (Legoupil, Bearez, Lefèvre, San Román, & Torres, 2011; Legoupil, Christensen, et al., 2011; Massone et al., 2007; Massone et al., 2003; Morello, Contreras, & San Román, 1999). For Navarino Island, in particular, human colonization has generally been interpreted as homogenous, stable and continuous throughout the Middle and Late Holocene (Orquera et al., 2011).

The circulation of nonlocal raw materials testifies to regional social connections and interactions. For example, black obsidian moved large distances, while green obsidian and Miraflores volcanic rocks were transported over medium expanses and guanaco bone were transported relatively shorter stretches (Borrazzo et al., 2015; Morello et al., 2015; San Román et al., 2014). This circulation of nonlocal raw materials is evident in the archaeological record of the three main Fueguian Islands and Southern Patagonia (Figures 12, 14 & 15).

The subsistence dichotomy between terrestrial and marine hunter-gatherers, land or sea nomads, has fire-marked archaeological research but it is based on recent ethnographic records that mainly date the end of the 19th and early 20th Centuries. Certainly positive in many ways as a nurturing ground for archaeological research, it has not been fully assessed as to the repercussions of the transculturation processes occurred within indigenous groups of Fuego-Patagonia since the XVI century onwards. Therefore, it is a good example of what Wobst identified as an ethnographic tyranny over hunter-gatherer archaeological and -we should add-physical anthropology research (Wobst, 1978). For example, as stated by Borrero et al. (2011), extreme stereotypes have been drawn based on ethnographic records. These stereotypes include the descriptions of tall and strong terrestrial hunter-gatherers on the eastern side (Aonikenk or Southern Tehuelches in Austral Patagonia and Selk'nam from the main island of Tierra del Fuego) and weak and smaller sea nomads from the archipelago to the west (Alacalufes or Kawésqar and Yaganes or Yámanas) (Borrero et al., 2011). This dichotomist ethnic model has been very influential in fueguian archaeology and the ethnographic record itself. For example, the Haush in the Mitre peninsula of Tierra del Fuego, have been dealt with as a fourth and independent fueguian ethnic group due to their mixt terrestrial-maritime culture. This segregation is possibly related to the fact that a mixt situation contradicts the dominating ethnographic model that polarizes and conflates lifestyle (marine versus land) and identity (Borrero, 2001). But also some researches emphasize their status as a Selk'nam partiality, with frequent description of ethnographic cases of mixed marriages. The archaeological record has long produced evidence that questions the extrapolation of the ehtnographic model to the past. Research has focused on discussing the identification of human groups that show a mixed way of life, first in Ponsonby site (Riesco Island, Southern Patagonia) and then in Lancha Packewaia (Beagle channel) –though not the current interpretation by Orquera et al. 2011–, among other sites (Legoupil, 2003; Morello et al., 2002; Schidlowsky, 2004). First, the archaeological discussion centered on the subsistence dichotomy between maritime and terrestrial groups. However, the ethnographic model, mentions that both terrestrial and maritime groups used the opposing resources to complement their own. Moreover, the presence of exotic materials indicated the existence of other interactions and paired interests between these

#### CONCLUSIONS

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References: Borrazzo 2006, 2008; Franco 2008, et al. 2011; Langlais & Morello 2009; Legoupil et al. 2011; Morello 2005; Jami 1992; Orquera et al. 2011; Pigeot 2003; San Román 2014; Vallin 1992)

DISCUSSION

 New paleo-ecological and geoarchaeological information for Tierra del Fuego adds exciting data for re-evaluating the influence of climatic and landscape changes over different key moments of Fueguian archipelago colonization process. For example: the Early Holocene archaeological remains, questioning preservation and survey designs, and Middle Holocene human occupation development in relation to relative humidity increases.

Innovative comprehensive approaches to the ethnographic terrestrial-maritime model are being explored, assessing the archaeological evidence as well as historic and ethnographic records.

Prehistoric human peopling interpretations that refer to homogenous, stable and continuous processes can be discussed considering cultural interaction by means of exotic raw material artifact distribution and information circulation as remains of complex technological traits.

An alternative comprehensive scheme could be to visualize Fueguian-Patagonian groups as open social formations interacting through different levels and scales of information webs (Borrero et al., 2011).

The previous perspective would allow us to understand changes in the spatial and chronological distribution of archaeological

cultural evidence as shifts in this interaction frequency, evaluated using quantity and qualitative criteria. Thus, three time period-related hypothesis can be elaborated, considering the present evidence:



Figure 16

Puerto Arturo (Figures 6 & 7) This pollen record suggests that during the early Holocene (c. 8600 - 7000 14C yr BP) the environ ment was relatively warmer and drier than presen Southern Beech woodland, although had spread into the south-western parts of Tierra del Fuego was limited by the lack of moisture and remained an open woodland with Chiliotrichium scrub (Moor 1983). During this early phase there is a high fre quency of fire likely due to the increased suscept bility of the dry vegetation to burning. The source of ignition is unclear whether it is natural or anthropogenic but it does suggest that the potential fuel was drier. During the mid-Holocene (c. 7,000-3,000 14C yr BP effective moisture levels increased either by a reduction in temperature and/or an increase in precipitation. The latter is more likely as it is coeval with a westward expar sion of southern Beech woodland into the steppe ecotone (McCulloch & Davies, 2001). As moisture levels increase the Chiliotrichium scrub gives way to Empetrum dominated heathland. The late-Hold cene is dominated by the increase and closing of the southern beech woodland and the corresponding reduction in Empetrum heathland This closing in of the woodland is a gradual proces and is largely completed by c. 2,000 14C yr BP. Tw tephra layers within the pollen core from Puerto Arturo have been geochemically identified by ele tron microprobe analysis to be from Mount Burney and Volcan Hudson.

#### Puerto Yartou (Figures 7 & 8)

The pollen assemblage of LPAZ PY-1 is typical of tundra/steppe conditions at the site with gras Poaceae) and daisies, ragworts, etc (Asteraceae) dominant. Southern beech woodland is absent (the occurrence of Nothofagus pollen <10% is probably enrichment of the local pollen rain by more distal sources), which is persuasive, not conclusive, of colder conditions at the site between .12,700 and 11,200 14C yrs BP. After c. 11,000 14C yrs BP southern beech appears to expand in the local area and reaches ~35% of Total Land Pollen (TLP) by c. 10,700 14C yrs BP. This is the earliest record of the appearance of southern beech in the region and is consistent with the iden tification of a fuegian Nothofagus gene pool (Premoli, Mathiasen, & Kitzberger, 2010) which likely persisted in refugia with favourable microclimates during the Late-glacial. After c. 10,300 14C yrs BP the return of aquatic flora and the expansion of southern beech to highest levels during the Holocene suggests a return to more humid and temperate conditions lowever, this period is relatively short lived as the site infills and develops into a fen peat. This then followed by a significant shift to drier conditions which likely promoted the increase in f frequency seen during LPAZ PY-5. It is not clear if the switch from lacustrine to peat site was a to the more gradual process of infilling and hydroseral succession or if the switch was driven or least accelerated by a reduction in effective moisture. During this phase the southern beech w land appears to have been more open with the persistence of ground cover flora. This pattern of relatively severe dry conditions between c. 9,500 - 5,500 14C yrs BP is replicated elsewhere in t

ter 5,500 14C yrs BP (LPAZ PY-6) there is a reduction in fire frequency and a shift to more sed southern beech woodland

#### groups





Thus, we question and examine the colonization process of Fueguian Islands, that has been argued as homogeneous, continue and stable during the last 6 millennia (cfr. e.g. Orquera et al., 2011) and evaluate the weight of the ethnographic bias. A broad and comparative assessment has been undertaken, with a methodological focus on two elements: I.- Objects and/or artifacts whose origin evidence transport and face to face relations. Figure 3 shows the distribution of green and black obsidian, Miraflores rock artifacts, and guanaco bones found in islands outside their known natural distribution. Chronological information available for the archaeological sites were these materials have been found is provided. The sites included date to c. 6,500 14C yrs BP till modern age. II.- Technological traits related to archaeological elements that involve more complex teaching-learning processes, sha-Updated information is shown in Figure 16 for two technological traits: complex core reduction (Levallois method and rela-

ted concept) and cranial modification techniques. Both include cultural material elements that involve information transmission and more complex processes than just the diffusion of morphologies (Figure 13) - (Alfonso-Durruty et al., 2015).

#### igure 7 & 8 (left)

Pollen diagram from Puerto Yartou and aerial photograph (modified from McCulloch 2010, McCulloch et al. 2011)

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The Middle Holocene peopling of the Patagonian and Fueguian archipelago is dominated by a very strong cultural interaction, which spans within a spatially large scale distribution of human groups sharing a collective information web. This period is related to the Englefield Cultural Tradition (c. 6,500-5,500 14C yrs BP).

ii. Shortly after, interaction patterns are interrupted and replaced by closer raw material transport webs in the case of guanaco bone provision (cfr. San Román et al. 2014) and isolated cases of much stretched exchange of black obsidian artifacts. Technological trait sharing is scarcer and less varied compared to the previous period, but qualitatively significant (Figures 3 & 4). This evidence has been used to suggest possible influence of northern groups that migrated to the area following the Pacific shoreline between 5,000 to 3,000 14C yrs BP.

iii. During the last 2,000 years the density and variability of the archaeological record can be explained as a reduction in the spatial distribution of information webs and a strengthening of identification strategies as a reaction to the increase in cultural interaction due to a demographic expansion. Though lithic and bone industries seem to vary over a regional basis, other technological traits as cranium modification have a wide span, thus shedding light on the persistence of shared webs of information on a larger scale.

#### These cultural interaction and information webs can be considered part of the social adaptation strategies of indigenous groups, with evidence coming from archaeological, historic and ethnographic record.

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