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EL MÉDANO ROCK PAINTING STYLE ON THE COAST OF THE ATACAMA DESERT IN CHILE: CETECEAN HUNTING OR CETACEAN AS SOCIAL AGENTS?

ESTILO RUPESTRE EL MÉDANO EN LA COSTA DEL DESIERTO DE ATACAMA: ¿CAZA DE CETÁCEOS O CETÁCEOS COMO AGENTES SOCIALES?

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Abstract

Investigations carried out in recent decades in Paposo/Taltal (25°S, Atacama Desert coast) have contrasted the academic corpus pillars of the so-called El Médano rock painting style. This style interprets the local pictograph representations characterized by the design of marine animals and boats made with red pigment asdemonstration of physical cetacean hunting by coastal Indigenous people from 2000 years ago until Spanish/Indigenous contact moments, a behavior supposedly witnessed by the Spanish chronicler Vázquez de Espinosa in 1618. On the contrary,a reinterpretation of this traditional model, in view of the new data obtained for the archeology of Taltal, allows us to rule out physical hunting events of large cetaceans from prehistory in this coastal area, given the null presence of material indicators that attest both, technologically and as garbage disposal. The contrast between the ethnohistoric information present for the coast of Paposo/Taltal and new data on local archeology and specifically on the iconography and materiality of the Médano pictographs openup the possibility of new interpretations of the real interaction that human groups and cetaceans had in the local landscape construction since prehistory.

Keywords

Atacama Desert – Arreic coast – Rock painting – Indigenous people – Interaction – Cetaceans

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Introduction

The alleged whale hunting practiced by the prehistoric and historical Changos, Camanchaca or Camanchacos, inhabitants of the southern Andean coast in Paposo and Taltal (25°S) (figure 1), has recently been transformed into an issue of conflict around the conformation of this cultural group memory, with archeology assuming a leading role as a social agent[1]. Although Augusto Capdeville recorded the first references to the El Médano pictographs in the commune of Taltal[2] at the beginning of the 20th century, only in the 1980s archaeologists Hans Niemeyer and Grete Mostny defined them as a rock painting style[3], sustained by an initial record of the panels characterized by marine scenes painted in red.

These authors interpreted part of the visual expression of local coastal groups between 2000-450 years ago as demonstration that they would have practiced whale hunting as observed by the Spanish chronicler Antonio Vázquez de Espinosa on the shores of Despoblado de Atacama in 1618[4].

However, the information provided by the different sources that support the official interpretation of the El Médano pictographs raises doubts and contains contradictions that sustain it as a theoretical body and have made it questionable. This has led over time to intense research about issues such as chronological adscription of the pictographs, their iconographic study and their cultural context, and suggested new transdisciplinary approaches to their interpretation, from spectroscopic analysis and ethnohistory to the contribution of cetacean ethology.

The development of opposite stances in the generation of the memory of coastal groups, in the long run, has only confirmed the political character that the generation and use of archaeological and anthropological data has come to have in themes linked to modern ethnogenesis of cultural groups in the Andean region[5].

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[1] B. Ballester, “El tiempo del Médano”, Taltalia num 9 (2016): 49-62; J. Castelleti, AvtoGogitchaichvili, Solís, C., Rodríguez Ceja, M. and Morales, J., “Evidencia de tempranas manifestaciones rupestres en la costa del Desierto de Atacama (25°S)”, Arqueología Iberoamericana num *2*8 (2015): 16-21; R. Contreras, P. Núñez and O. Rodríguez, “El Médano: reflexiones antropológicas en torno a la cosmovisión de los habitantes prehispanos de la costa sur del Norte Grande-Chile”, Taltalia num 1 (2008): 87-122; G. Mostny and H. Niemeyer, Arte Rupestre Chileno (Chile: Publicación del Departamento de Extensión cultural del Ministerio de Educación, 1983).

[2] A. Capdeville, “Augusto Capdeville Rojas, notas arqueológicas”, Introduction, arrangement and textsbyRodolfo Contreras Neira, Taltalia (2009): 10-87; G. Mostny, Arqueología de Taltal. Epistolario de Augusto Capdeville con Max Uhle y otros (Santiago: Fondo Histórico y Bibliográfico José Toribio Medina, 1964).

[3] G. Mostny and H. Niemeyer, Arte Rupestre Chileno; G. Mostny and H. Niemeyer, “Arte Rupestre en el Médano, II Región”, Creces Vol: 5 num 9 (1984): 84-87.

[4] A. Vázquez de Espinosa, “Compendio y Descripción de las Indias Occidentales”, Biblioteca de los autores españoles desde la formación del lenguaje hasta nuestros días (Madrid: Aldus Velarde S.A., 1969 [1623]). The coast of the “Despoblado de Atacama” (lit. “Depopulated of Atacama”), corresponds to the arreic section of Atacama Desert, without presence of permanent rivers that flow into the sea.

[5] H. Gundermann, “Las organizaciones étnicas y el discurso de la identidad en el norte de Chile, 1980-2000”, Estudios Atacameños num 19 (2000): 75-91.

2. Material and methods

The first information source used to contrast the official interpretation of the El Médano rock painting style will be ethnohistory. This is because in the last decades, diverse authors have questioned the Discalced Carmelite Antonio Vázquez de Espinosa's chronicle as a primary source[6]. It has been proven that, although Vázquez de Espinosa—like many chroniclers of his time—traveled extensively in America, he used diverse sources to complement his work where he had no first-hand information. He did not mentioned the authors he obtained that information from nor contrasted its veracity. Researchers like Velasco Bayón[7] and Villalobos[8] estimated that Vázquez de Espinosa never visited some of the areas mentioned in his work, such as the Despoblado de Atacama coast in the Atacama Desert, but he rather obtained second-hand information or even indigenous people's oral stories from neighboring areas.

By contrast, as we shall see shortly, a large part of the data provided by various Spanish chroniclers and travelers who visited the Andean coast since the 16th century, implicitly discount what Vázquez de Espinosa narrated in his publication in 1623 about cetacean hunting, by recording habitual events of natural stranding of cetaceans on beaches[9].

Vázquez de Espinosa's whale hunting narration will be used as an axis in our deconstructive process of the traditional model for the coast of Taltal.

[6] M. N. Marsilli and P. Cisternas, "Los senderos de la idolatría: el viaje de Vázquez de Espinosa por los altos de Arica, 1618", Chungara Vol: 42 num 2 (2010): 465-476; B. Velasco Bayón, "Estudio preliminar al Compendio y Descripción de las Indias Occidentales [1623] de Vázquez de Espinosa, P. A.". In Biblioteca de los autores españoles desde la formación del lenguaje hasta nuestros días (Madrid, 1969); S. Villalobos, "Dos cronistas: Alonso Borregán y fray Antonio Vázquez de Espinosa". In Estudios y ensayos en torno a la historia de Chile (Santiago: Editorial Universitaria, 2010), 17-46.

[7] B. Velasco Bayón, "Estudio preliminar...

[8] S. Villalobos, "Dos cronistas... 39.

[9] P. Cañete y Domínguez,"Guía de la Provincia de Potosí",in Colección de la Cultura Boliviana(Bolivia: Editorial Potosí, 1952 [1787]); A. D'Orbigny, Viaje a la América Meridional(Buenos Aires: Editorial Futuro, 1945 [1839-1847]); A. González de Nájera, Desengaño y reparo de la guerra del Reino de Chile, Publisher with a biographical introduction by J. T. Medina (Santiago: Imprenta Ercilla, 1889 [1614]); A. de Ovalle, Historica Relacion del Reyno de Chile (Roma: by F. Caballo, 1646); R. A. Philippi, Viage al Desierto de Atacama (Gobierno de Chile: Librería de Eduardo Antón, 1860); amongothers.

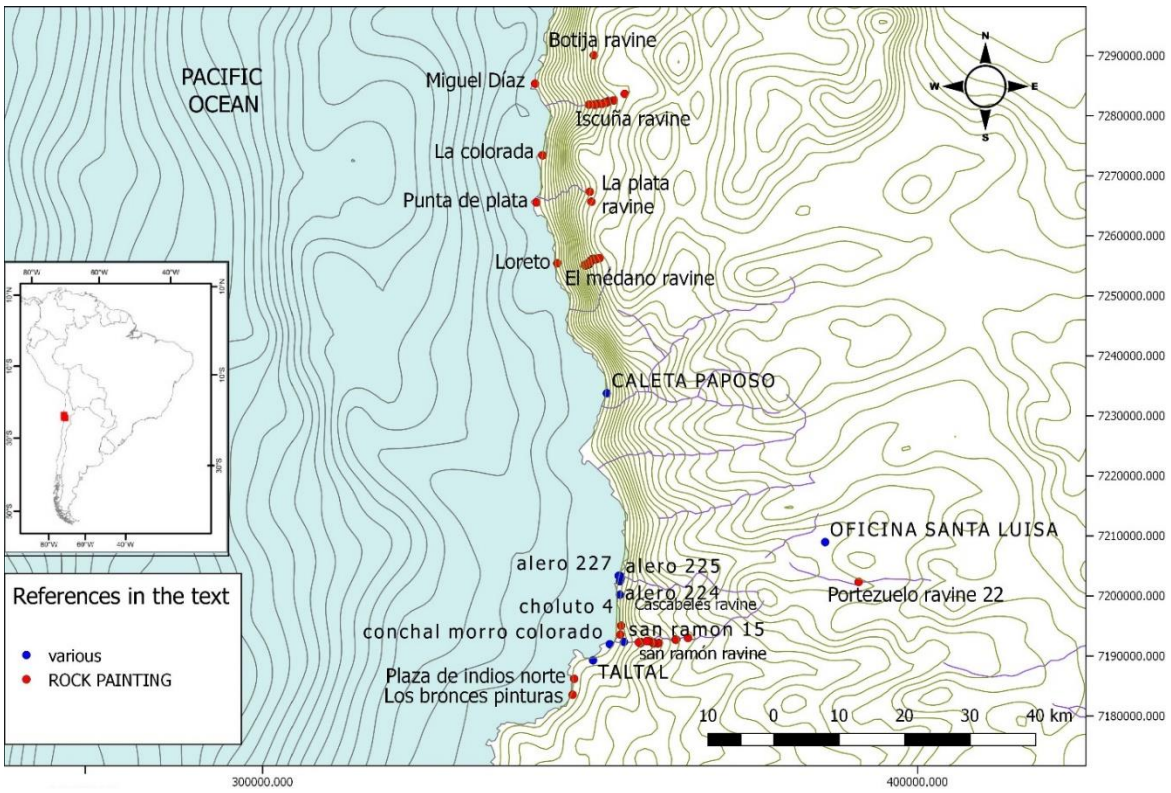

Figure 1
Map of Taltal with current populations, rock painting and other archaeological sites.

The second information source we will use to contrast the traditional model of the El Médano style will be the rock painting iconography, the materiality of the support and pigments, including its dating. The researchers point out the Paposo/Taltal coast as a regional marine rock manifestation node (figure 1).Despite this, the detection of some El Médano type of panels in areas, such as Mejillones[10], 241 km north and in the interior pampas of Portezuelo[11],has only stoked the discussion about the real dispersion and variability of this rock painting style, besides the pictographs authors' mobility patterns. Spectroscopic analyses developed in Taltal rock painting pigments[12] and the relation to iconographic patterns and features upport have allowed us to assert that one of the main characteristics of the El Médano rock painting style is its logistic variability in the technological process of design un like what Mostny and Niemeyer posed. This style presents at least five modalities or sub-styles since early times[13], each characterized by specific sources and probably different preparation of colorant, binder and charge in

[10] B. Ballester, F. Gallardo and P. Aguilera, "Representaciones que navegan más allá de sus aguas: una pintura estilo El Médano a más de 250 km de su sitio homónimo", Boletín de la Sociedad Chilena de Arqueología num 45 (2015): 81-93.
[11] I. Monroy et al., "Navegantes del desierto. Un nuevo sitio con arte rupestre estilo El Médano en la depresión intermedia de Taltal", Taltalia num 9 (2016): 27-47.
[12] Three basic analyzes were carried out, which sought to determine the elemental, mineralogical and organic composition of the samples. For elemental analysis, X-ray Dispersive Energy Analysis or EDX (Energy Dispersive X-Ray Analysis) was applied in a scanning electron microscope or SEM (Scanning Electron Microscope), JEOL brand, model JSM-7800F in UNAM's Instituto de Física. For the analysis of mineralogical composition, RAMAN (Dispersive Raman Spectroscopy) and X-ray Diffraction spectroscopy techniques were applied.
[13] J. Castelleti, "Los hijos de la Camanchaca...; J. Castelleti et al., Evidencia de tempranas...

pigment mixture, in association with a type of location and a characteristic "iconographic" grammar.

The iconographic feature that allows to interlace many of the modalities of the El Médano style[14] is the usual representation of the standardized compound cetacean/raft motif in association with cetaceans isolated or in pods, along with the marginal representation of large fish, anthropomorphic, camelids and geometric figures[15]. Additionally, thanks to the marine biology contribution[16], this thematic standardization reflects a preference for the representation of humpback whales (*Megapteranovaeangliae*) or southern right whales (*Eubalaenaaustralis*), as opposed to the figuration of other marine animals that are less frequent such are: mysticetesminke (*Balaenopterabonaerensis*), blue whale (*Balaenopteramusculus*), Bryde's whale (*Balaenopterabrydei*), fin whale (*Balaenopteraphysalus*), odontocetes (toothed cetaceans), sperm whale (*Physetermacrocephalus*), orca (*Orcinus orca*), pilot whale (*Globicephala*sp.), Chilean dolphin (*Cephalorhynchuseutropia*), bottlenose dolphin (*Tursiopstruncatus*), marine wolves (*Otariaflavescens*), turtles (probably *Carettacaretta* or loggerhead turtle, *Dermochelyscoriacea* or leatherback turtle and/or *Lepidochelysolivacea* or olive turtle), and large fish such as albacore (*Xiphias gladius*), marlin (*Istiophoridae*) and shark (probably *Galeorhinusgaleus* and/or *Notorynchuscepedianus*), as well as terrestrial animals of the families *Camelidae, Canidae and Felidae*[17].This recurrent rock painting pattern makes possible to assert that the Paposo/Taltal pictographs in coastal mountain ravines do not respond to the expected variability pattern from public sites located on mobility routes or residential areas. On the contrary, it reflects an expected thematic homogeneity for areas of private use, where recognized norms prevailed for standardized figurations.

Our third contrasting source will be the archaeological data, without a doubt the most controversial source. The reason behind this controversy is that the systematic archaeological record of the Paposo/Taltal area, where the El Médano rock painting style is concentrated, shows few skeletal remains of large cetaceans[18].This in the context of a

[14] J. Castelleti, "Los hijos de la Camanchaca...

[15]B. Ballester, "El Médano rock art style: Izcuñapaintings and the marine hunter-gatherers of the Atacama Desert", Antiquity Vol: 93 num 361 (2018b): 132-148; R. Contreras, P. Núñez and O. Rodríguez, "El Médano: reflexiones antropológicas...

[16] This research was supported by the marine biologist Gaston Maltrain. The species indicators were considered according to J. Capella and J. Gibbons, "Mamíferos Marinos, diversidad de especies". In Biodiversidad de Chile, Patrimonio y Desafíos, Cap. II Nuestra Diversidad Biológica (Chile: CONAMA, 2008): 234-244; Comisión Permanente del Pacífico Sur, Atlas sobre distribución, rutas migratorias, hábitats críticos y amenazas para grandes cetáceos en el Pacífico oriental (Guayaquil, Ecuador, 2012); and R. Hucke-Gaete et al., "Discovery of a Blue whale feeding and nursing ground of southern Chile". Proceedings of the Royal Society B: Biological Sciences (suppl.) num 271 (2004): S170-S173.

[17] J. Castelleti, "Los hijos de la Camanchaca...

[18]J. Castelleti, Patrón de asentamiento y uso de recursos a través de la secuencia ocupacional prehispana en la costa de Taltal (Memoria para optar al grado de Magister, Universidad Católica del Norte), 2007; N. Gaete et al, Plan de Rescate Arqueológico Ruta 1 Sector Taltal-Punta Viento, sitios "Morro Colorado, Punta Morada y Pozo Bahamondes" (Chile: Consejo de Monumentos Nacionales-MOPagreement, 2003 ms.); L. Olguín, D. Salazar and D. Jackson, "Tempranas evidencias de navegación y caza de especies oceánicas en la costa pacífica de Sudamérica (Taltal, ~7000 años CAL. A.P.)", Chungara, Vol: 46 num 2 (2014): 177-192; D. Salazar et al., "Cronología y organización económica de las poblaciones arcaicas de la costa de Taltal", Estudios Atacameños num 50 (2015): 7-46.

coastal technological organization that, since early, registers high frequencies of malacological and shore fish remains, with lower amounts of marine and terrestrial mammal remains. Scarce remains of small cetaceans (dolphins) and pelagic fish (shark, albacore, and marlin) are associated with archaic-late moments that are indicators of probable access to the open sea in boats. However, there is a low MNI[19]for these preys in the sites of their detection (Agua Dulce, Zapatero, Choluto), reflecting the exceptional nature of collecting them[20]. Information reported for the archaeological site Copaca-1, near Tocopilla, dated between 4540±25 B.P. and 7010±25 B.P, shows a high frequency of dolphinremains in domestic and funerary context. In addition, the remains of albacore (*Xiphias gladius*),shark mackerel (*Isurusoxyrinchus*), and marlin (*Istiphoridae*)[21], a group of pelagic fish and small-size cetaceans whose presence, according to the researchers, would respond to an occasional pattern of acquisition probably associated with prestige behavior. All of this above only corroborates the exceptional character and high symbolic content assigned to the cetaceans in shaping the landscape of the coastal groups from early times[22]. Our fourth contrasting source will be the coastal ergology supposedly associated with whale hunting according to the traditional model[23].This model defines a whale hunting kit composed of harpoons, ropes and even taltaloidblades[24] that would have served as knives for slaughtering. However, ethnohistoric data usually describes this instrument as part of the kit toob taina varied set of dams.[25]. Authors like Ballester[26] mentions that some types of harpoon heads, usually from 20 to 30 cm long, would have been part of the tools used for cetacean hunting during the prehistory and early history of Taltal, activity in which the hunter's ability would have played a preponderant role. However, without local corroborating data it is difficult to assume that these instruments made of wood or bone were able to killlarge whales up to 20 m long and penetrate their thick layer of skin and fat(up to 30 cm thickness[27]), since the taltaloidblades show no traces of having been use for cutting, shaving or scraping[28]. Given the absence of records of whale hunting in ethnographic groups on Andean coasts[29] to corroborate hunting behavior, Ballester made use of supposed ethnographic analogies of Changos with

[19] Minimum number of individuals.

[20] J. Castelleti, Patrón de asentamiento...; L. Olguín, D. Salazar and D. Jackson, Tempranas evidencias…

[21] V. Castro et al., "Ocupaciones arcaicas y probables evidencias de navegación temprana en la costa arreica de Antofagasta, Chile**",** Chungara. (2016): 503-530.

[22] J. Castelleti, "Los hijos de la Camanchaca...

[23] B. Ballester, "Tecnología de arponaje en la costa del desierto de Atacama, norte de Chile", Estudios Atacameños num 57. (2018a): 65-95; B. Ballester, El Médano rock art style...

[24] Hojas taltaloides in Spanish.

[25] R. de Lizárraga, Descripción breve de toda la tierra del Perú, Tucumán, Río de la Plata y Chile. Libros I and II (Buenos Aires: Unión Académique Internationale, Academia Nacional de Historia, 1999 [1605 y 1608]); A. de Ovalle, Histórica relación…; amongothers.

[26] B. Ballester, Tecnología de arponaje...

[27] Comisión Permanente del Pacífico Sur, Atlas sobre distribución; C. Guerra et al., "Presencia de cetáceos frente a la segunda región de Chile". Estudios Oceanológicos num 6 (1987): 87-96. For reference, Lucas Bridges mentions bone heads 40 cm long, along with "canes" of five meters for hunting only "seals", porpoises and "tiny" whales among the yagans (E. Lucas Bridges, El últimoconfínde la tierra (Buenos Aires: Emecé Editores S.A., 1952 [1949]: 93).

[28] J. Castelleti, Patrón de asentamiento..., 2007; D. Salazar et al., (coord.), "Trayectorias Históricas de Larga Duración en Sociedades Cazadoras-Recolectoras" Research Seminar (Taltal, November 29 to December 04, 2017), 2017b.

[29] J. Lozano Machuca, Carta del factor de Potosí Juan Lozano Machuca (al virrey del Perú Don Martín Enríquez) en que da cuenta de cosas de aquella villa y de las minas de los Lipes (año 1581), transcription of J. M. Casassas, Estudios Atacameños num 10 (1992): 30-34.

reported ethnographic groups of whale hunters in the Arctic, on the northwest coast of North America and Indonesia[30]. All these groups are noticeably influenced by the western whaling industry of the 18th and 19th centuries[31].

Finally, our fifth source of study on the alleged whale hunting on the Andean coast will be the cosmovision[32] of Andean and Patagonian coastal cultures with regard to cetaceans. This isa cultural area, in which the orca and the whale figure since Paracas/Nasca in the early Intermediate period on the central coast of Peru[33] (figure 9c),and in which ethnohistorically and ethnographically the psychopomp mythical role of sea lions and whales are recorded, as it happens in the south-central and extreme southern Andean coast[34]. The narratives of solemn fishing ceremonies of historical moments for these areas[35] and the narratives of initiation ceremonies of the Selk'nam, Yagan and Qawescar Patagonian groups[36] are characterized by the use of whale figures to materialize forces that, according to their worldview, intervene in the conformation of the local landscapes.

3. Ethnohistorical data

Niemeyer argues that the El Médano paintings make up an immense sanctuary of votive art associated with abundant fishing and –mainly- the hunting of large marine animals and guanacos[37]. Niemeyer interprets the frequent presence of cetaceans associated with rafts in the paintings, as the visual representation of whale hunting described by Antonio Vázquez de Espinosa in 1618, corroborating the physical whale hunting by the pre-Hispanic and protohistoric coastal groups[38].

However, since the 1960s various studies have contrasted the patterns of style and historical information contained in Vázquez de Espinosa's chronicle, using data recorded in other Andean chronicles and local sources of archaeological and ethnographic information[39]. It is known that, like many chroniclers of his time, who used information contained in other authors' chronicles or documents—many of these unpublished—, Vázquez de Espinosa mixed stories and first and second order information, especially for regions that he did not visit. Much of this information may have been obtained "by the

[30]B. Benjamín "La caza de cetáceos en la costa del desierto de Atacama. Relatos escritos, pinturas rupestres, artefactos y restos óseos". In Baleeiros do Sul II, W. Castellucci and D. Quiroz org. (Salvador, Bahía: EDUNEB, 2018c), 59-84.

[31] F. Valdés, "Balleneros del norte rumbo al sur: las primeras industrias en Sudamérica (siglos XVII y XVIII)". In D. Quiroz y P. Toledo (eds.), Balleneros del Sur. Antropología e Historia de la industria ballenera en las costas sudamericanas (Santiago: Andros Impresores, 2014), 17-54.

[32] Or world view.

[33]H. Silvermann and Donald Proulx, The Nazca (Blackwell, 2002).

[34]J. de Arriaga, Extirpación de la Idolatría del Pirv (Lima: por Geronymo de Contreras Impressor de libros, 1621); Abate J. Ignacio Molina, Compendio de la Historia civil del Reyno de Chile, Secondpart, (Madrid: Imprenta de Sancha, 1795).

[35] J. de Arriaga, Extirpación…, 1621.

[36] C. Anne. Hain. Ceremonia de iniciación de los Selk'nam de Tierra del Fuego (Chile: Editorial Pehuén, 2012a [2002]); C. Anne. Yaganes del Cabo de Hornos (Chile: Editorial Pehuén, 2012b [2010]); M. Massone and A. Prieto, "Ballenas y delfines en el mundo Selk-nam. Una aproximación etnográfica", Magallania Vol: 33 num 1 (2005): 25-35.

[37] G. Mostny and H. Niemeyer, Arte rupestre… 47.

[38] G. Mostny and H. Niemeyer, Arte rupestre… 48-50.

[39] M. Marsilli and P. Cisternas, Los senderos…; B. Velasco Bayón, Estudio preliminar…; S. Villalobos, Dos cronistas...

imagination" or from "what people talked about"[40]. According to these authors, Vázquez de Espinosa would never have visited the coast of Despoblado de Atacama in the Atacama Desert, and may have collected information of this region when he passed through the neighboring Arica[41].Therefore, his story about the supposed whale hunting of the coastal groups of Despoblado de Atacama could correspond perfectly well to narratives obtained from what people talked about[42]in the neighboring area of Arica.This coincidentally indicates the same standardized concept about cetaceans, maintained from the archaic period on the coast, which probably still figured in the ideological matrix[43]of the indigenous peoples at the time when Vázquez de Espinosa visited them early in the 17th century.

According to the ethnohistorical information available and following Niemeyer thesis, it is worth asking: does the prehistoric and historical coastal context register show evidence of whale hunt?

Some authors[44] corroborate that the use of sea lion skin rafts was not only restricted to subsistence fishing operations, but also the coastal inhabitants observed exceptional navigation ceremonies, which is consistent with low frequency of unusual marine species remains in mortuary or domestic archaeological contexts. The chronicler Joseph de Acosta describes the coast of Ica:

> "They used to go fishing in hides, or swollen sea lion skins, and from time to time they blew into them, like wind balls so they would not sink. In the valley of Cañete, formerly named Guarco, there were innumerable indigenous fishermen, and because of their resistance to the Inca when this latter conquered the land, pretended to be at peace with local people, and many thousands of indigenous fishermen made a solemn fishing ceremony to prepare a feast. In their rafts they entered the sea, but on the way back, the Incahad placed quiet soldiers and wreaked cruel havoc on them, leaving a land that was once so abundant, so uninhabited."[45]

Nevertheless, the most significant fact that explains much information about cetaceans on the Paposo/Taltal coast is the large number of travelers' diaries and even chronicles of Spanish/Indigenous contact moments, which point out the natural cetacean stranding phenomenon, as well as fish and mollusk mass deaths that occur on Chilean coasts. This phenomenon even follows an annual cycle through migration routes (table 1). Alonso de Ovalle's record is enlightening to discard whale hunting:

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[40] Sensu S. Villalobos, Dos cronistas... 43.

[41] B. Velasco Bayón, Estudio preliminar…; M. Marsilli and P. Cisternas, Los senderos… It is probable that Vázquez de Espinosa in his compendium and specifically for the Despoblado de Atacama area and Chile, used diverse sources such as the oral tradition of neighboring indigenous groups, in addition to the chronicles of Garcilaso de la Vega and Antonio de Herrera, and in the case of central/south Chile, from the report of the orator Machado to the Viceroy Montesclaros of 1614, S. Villalobos, Dos cronistas… 42-43.

[42] Sensu S. Villalobos, Dos cronistas..., 2010. He points out that V. de Espinosa complemented his own information with traditional stories, "[...] giving credit to what people told him, without verifying anything", S. Villalobos, Dos cronistas… 45.

[43]Sensu N. Castro and J. Hidalgo, "Brujos y brujería en la Atacama colonial" In J. Hidalgo (ed.), Historia Andina en Chile (Santiago de Chile: Editorial Universitaria, Vol. II, 2014), 171-181.

[44]D. de Rosales, Historia General de el Reyno de Chile Flandes Indiano (Valparaíso: Imprenta del Mercurio, 1877 [1674]); J. de Acosta, Historia Natvral y Moral de las Indias (Impreso en Sevilla: Casa de Juan de León, 1590).

[45] J. de Acosta, Historia Natvral… (author's translation).

> "There were so many whales found near some islands, that it was necessary to sail with great carefulness, fleeing from one to another, since there were so many crossing the pass. They prevented the ships from going their own path, so these took the risk in getting lost, because the animals were so terrible that they seemed like skerries and sea rocks. They occupy all the area, even before entering the strait until the mouth of it and all those seas in front of Copiapó and Guasco,[...] We do not know if these fish die violently, because their deformed greatness defends them both from men and any other enemy. However, since they are not exempt from the common debt that all living beings pay to death, when they feel they are close to die, they approach the land. There, the sea does not consent any corruption and throws them, dead or moribund. You just have to see how those corpses of such immense size end up on those coasts and beaches. And no matter how much you see them, you always admire them. Right there, the oil is produced by the burning sun that melts the fat, and when time has consumed the flesh, there are the ribs and other white bones left that the indigenous men take advantage of to make benches, and many other things."[46]

The notable aspect of the ethnohistorical and even ethnographic data about the Andean arreic coast cultural groups[47] is that among its earliest records—e.g., Juan Lozano Machuca factor's letterin 1581, "*Libro de Varias Ojas*" of the Chiuchiu parish in 1622, and the priest Francisco de Otal's" Proof of merits" in 1641[48]—, none of these contemporaries with Vázquez de Espinosa's supposed visit to the coast of Arica in 1618 points out any whale hunting behavior in Changos or Camanchaca.This subject will be under discussion again with the beginnings of the western whaling industry at the end of the 18th century, registering for the Andean arreic coast in the documents of the royal official Pedro Cañete y Domínguez of 1787 and the commissioner José Agustín de Arce, the same year[49]. Although these sources discuss the frequency of cetacean sightings in that area, they corroborate the lack of housing facilities and water, along with the lack of whale huntingknow-how among the native population: "but with the misfortune of not having a single person that understands its benefit in these places."[50]This conduct is not described inneither oral tradition of Paposo[51].

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[43] A. de Ovalle, Historica Relacion… 43-44.

[47] J. Castelletti, Los hijos de la Camanchaca..., 2017; V. Castro, M. Escobar and D. Salazar, "Una mirada antropológica al devenir minero de Taltal y Paposo", Chungara Vol: 44 num 3 (2012): 401-417; R. Contreras, "Recolección y pesca: pasado y presente en la costa de Taltal", Taltalia num 3 (2010): 57-86.

[48] V. Castro, De Ídolos a Santos. Evangelización y Religión andina en los Andes del Sur (Santiago: Universidad de Chile, 2009); J. M. Casassas, La Región Atacameña en el siglo XVII (Universidad del Norte, 1974); J. Lozano Machuca, "Carta del factor de Potosí Juan Lozano Machuca (al virrey del Perú Don Martín Enríquez) en que da cuenta de cosas de aquella villa y de las minas de los Lipes (año 1581)", J. M. Casassas C.transcription,Estudios Atacameños num 10 (1992): 30-34.

[49] P. v. Cañete y Domínguez, Guía de la Provincia de Potosí…; J. Hidalgo, "Dos documentos inéditos y un mapa de Cobija: Informes del comisionado Dr. José Agustín de Arce, 1786-1787", Chungara num 10 (1983): 139-145; B. Ballester, La caza de cetáceos…

[50] J. Hidalgo, Dos documentos inéditos… 144 (f2r).

[51] O. Guajardo et al., Los niños de Paposo piensan y escriben junto al mar. Autores: alumnos de la Escuela "Paranal" G-107 de Paposo (Antofagasta: Secretaría Ministerial de Educación, 1999 ms.); G. Gutiérrez and L. Lazo, La estancia ganadera en el área de Paposo, Plantas medicinales silvestres de uso tradicional en la localidad de Paposo, costa del Desierto de Atacama, II Región (Chile: Fondo Nacional de Desarrollo de las Artes y la Cultura, Ministerio de Educación, 1996).

Chronicles and other records	Cetaceanusufructstrategy	Chronicles and other records	Cetaceanusufructstrategy
1. González de Nájera (1601)	Strandedwhales	**9. Cañete y Domínguez (1787)**	Stranded and slaughteredwhales
2. Ovalle (1646)	Strandedwhales	**10. Molina (1788)**	Stranded and slaughtered whales (not hunted)
3. D'Orbigny (1828)	Strandedwhales	**11. Carvallo i Goyeneche (1876)**	Stranded and slaughtered whales (not hunted)
4. Sayago (1897)	Strandedwhales	**12. Rosales (1629)**	Tunas and albacorehunting
5. Capdeville (1914-1924)	Strandedwhales	**13. Ovalle (1646)**	Tunas and albacorehunting
6. Guerra (1987)	Strandedwhales	**14. Lizárraga (1572-1602)**	Tunas hunting
7. Hucke-Gaete (2004)	Strandedwhales	**15. Vázquez de Espinosa (1618)**	Whalehunting
8. Comisión Permanente del Pacífico Sur (2012)	Strandedwhales	**16. Thomas and Lucas Bridges (s. XIX-XX)**	Stranded whales and "hunting" of tiny, sick or hurt whales inYagan.

Latitude	Spermwhale	Humpbackwhale	Blue whale	De Brydewhale	Southernrightwhale
60-70					
50-60					
40-50		8		2	
30-40	97	38	132	15	
20-30	119	1772	69	15	
10-20	37	24	28	18	
0-10	1942	537	72	74	
0-10 S	2413	765	47	97	
10-20 S	321	53	27	84	10
20-30 S	1788	23	24	83	24
30-40 S	117	46	32	7	63
40-50 S	22	274	165		7
50-60 S	5	32		1	13
60-70 S	2	27			24
70-80 S				3	
TOTAL	6863	3599	596	399	141
%	59,2	31	5,1	3,4	1,2

Table 1

Mention of Andean coastal behavior of cetaceans and large fish in historical documents up[52], and down, frequency of cetacean sightings by species and latitude in the eastern Pacific between 1983-2010 (Comisión Permanente del Pacífico Sur 2012).

[52] The only exception to the rule corresponds to occasional "hunting" on sick or dying individuals due to orca attacks, as well.
as on "tiny" whales, registered among the patagonianY agan. See E. L. Bridges, El último confín… 70-71, 93.

4. The materiality of the rock manifestations

A battery of spectroscopic sample analyses of rock pigments was carried out in recent years in Paposo/Taltal[53](table 2), producing an elemental and mineralogical characterization of the recognized El Médano rock painting style. These analyses are only the iconographic registration complement performed in the last 10 years by rock painting expert teams in the area, generating a database that allows to contrast the morphological and thematic characteristics of the El Médano style[54].

Site	RX	Raman	Si	Ca	C	S	Fe	Al	Na	Cu	Ta	Ti	I	B
Loreto (orange)	**Gypsum**(CaSO4.2H2O)		11,8	0,6	5,2	0,7	31,8	9,7	1,5	0	0	0	0	0
	Iwakite (Mn1.7Fe1.3O4)													
	Halite (NaCl)													
Loreto (red)	**Hematite**(Fe2O3)	**Hematite** (Fe2O3)	6,15	15,4	9,6	6,55	4,55	1,5	0,8	0,1	0	0	0	0
	Yeso (CaSO4.2H2O)	**Calcium sulfate** (CaSO4)												
Pta. de Plata	**Hematite**		28,37	4,1	5,4	2,25	2,42	1,37	0,64	2,13	2,9	0,1	0	0
	Petalita (LiAlSi4O10)													
	Cupalite(AlCu)													
Miguel Díaz	**Gypsum** (CaSO4.2H2O)	**Calcium sulfate** (CaSO4)	2,75	16,15	3,2	12,3	1,6	1	6,25	1,9	0	0	0,15	0
	Brushite(CaPO3(OH).2H2O)													
	Halite (NaCl)													
MED04	**Prehnite**(Ca2Al2Si3O10(OH)2)	**Hematite**	16,33	8,3	5,57	0,07	10,27	8,47	0,17	0,05	0	0	0	0
	Methcinnabar (HgS)	**Prehnite**(Ca2Al2Si3O10(OH)2)												
	Nontronite (FeSiO2)													
MED18	**Hematite**		15,93	6,73	4,13	1,23	22,63	4,37	0,23	0,2	0	0	0	0
	Clinozoisite(Ca2Al2(Al0.79Fe0.21)(SiO4)3(OH))													

[53] J. Castelleti, Los hijos…; F. et al., "Flujos de información visual, interacción social y pinturas rupestres en el Desierto de Atacama (norte de Chile), Estudios Atacameños num 43 (2012): 35-52; Avto Gogitchaichvili et al., "The use of pictorial remanent magnetization as a dating tool: State of the art and perspectives", Journal of ArchaeologicalScience: Reports num 8 (2016): 15-21.

[54]B. Ballester, El Médano rock art…; J. Castelleti, Los hijos…; F. Gallardo et al., Flujos de información visual...; I. Monroy et al., Navegantes del desierto…

Los Bronces	**Hematite**		24	2,45	3,85	0,4	7,35	6,5	0,9	0,1	0	0	0	0,35
	Ginite (Fe5(PO4)4(OH)3.2H2)													
	Clinozoisita													
Piedras Negras	**Hematite**		25,73	4,03	5,73	0,67	3,83	6,2	2,33	0,1	0	0	0	0
	Calcite													
	(Ca(CO3))													
	Zeolite (Heulandite) orBauxite													
	(CaAl2Si7O18·7.5H2O)													
	Stellerite (Bauxite) (Na2(Al2Si7)O18·7H2O)													

Table 2
Mineralogical (RX and Raman) and elemental (%) conformation (SEM-EDX), in samples of Taltal rock pigments. All red pigment, with the exception of the orange sample, was taken from Loreto rock shelter (Castelleti, 2017).

According to Paposo/Taltal archeology, early human occupation related to the Huentelauquén culture and others early groups dating from ca. 11000 years B.P., settledat the mouth of coastal ravines, such as Iscuña, El Médano, La Plata, and Cascabeles. All of these are around aguadas[55] and form the starting points for the access routes to the interior of the Pampa[56]. These groups of high N-S coastal mobility, mostly settled in rocky shelters, established coastal nodes from where they controlled E-W access routes; with 14C absolute dating ranging from 9489±37 B.P. in Paposo Norte 9 rock shelter;10290±60 and 10040±60 B.P. in 226-5 rock shelter;10210±40 B.P. in Miguel Diaz rock shelter; 10530±30 B.P. in 224A rock shelter; 10770±30 B.P. in 225 rock shelter; and 11120±40 B.P. in Loreto rock shelter[57]. The excavations carried out in these deposits have demonstrated successive human occupations since the beginning of the Holocene, which were characterized by marine resources consumption and the use of coastal technology. Among these occupations, hematite concretions, the main ingredient of red pigment in pictographs, have been occasionally detected at the mouth of the Cascabeles ravine between Paposo and Taltal[58], as reported for the 226-5, 225, 227, and 224A rock shelters. This is a remarkable fact given the detection and study of the San Ramón hematite mine, 15 km south, that was also occupied and exploited from archaic moments (between 10600 and 9100 B.P.; between 4270 and 3800 B.P.[59]). New data shows that human groups

[55] Orwatersources.
[56] J. Castelleti, Los hijos de la Camanchaca...; J. Castelleti et al., “Ocupaciones en abrigos rocosos en la costa de Taltal: Patrón de uso del espacio desde momentos Holocénico tempranos”. In Actas del XVII Congreso Nacional de Arqueología Chilena (Valdivia, Chile, Tomo 2, 2010), 685-695; D. Salazar et al., “Fromthe use of space to territorialisationduringtheEarlyHolocene in Taltal, coastal Atacama Desert, Chile”, Quaternay Internacional (2017a): 1-17.
[57] J. Castelleti, Los hijos de la Camanchaca...; D. Salazar et al., Fromthe use of space...; A. San Francisco and B. Ballester, “Antiguos aleros al norte de Paposo”, Taltalia (2018): 7-35.
[58] J. Castelleti et al., Ocupaciones en abrigos…; J. Castelleti, Los hijos de la Camanchaca...; D. Salazar et al., Fromthe use of space...
[59] D. Salazar et al., “Cronología y organización económica de las poblaciones arcaicas de la costa de Taltal”, Estudios Atacameños num 50 (2015): 7-46.

stamped paintings of marine scenes characterized by sets of cetaceans and orcas on the ceilings and walls of some rocky shelters north of Paposo, from archaic preceramic moments(Northern Coastal Modality).All the rock painting sites evidence use of paints rich in clay, hematite, gypsum, and calcite[60] (table 2).

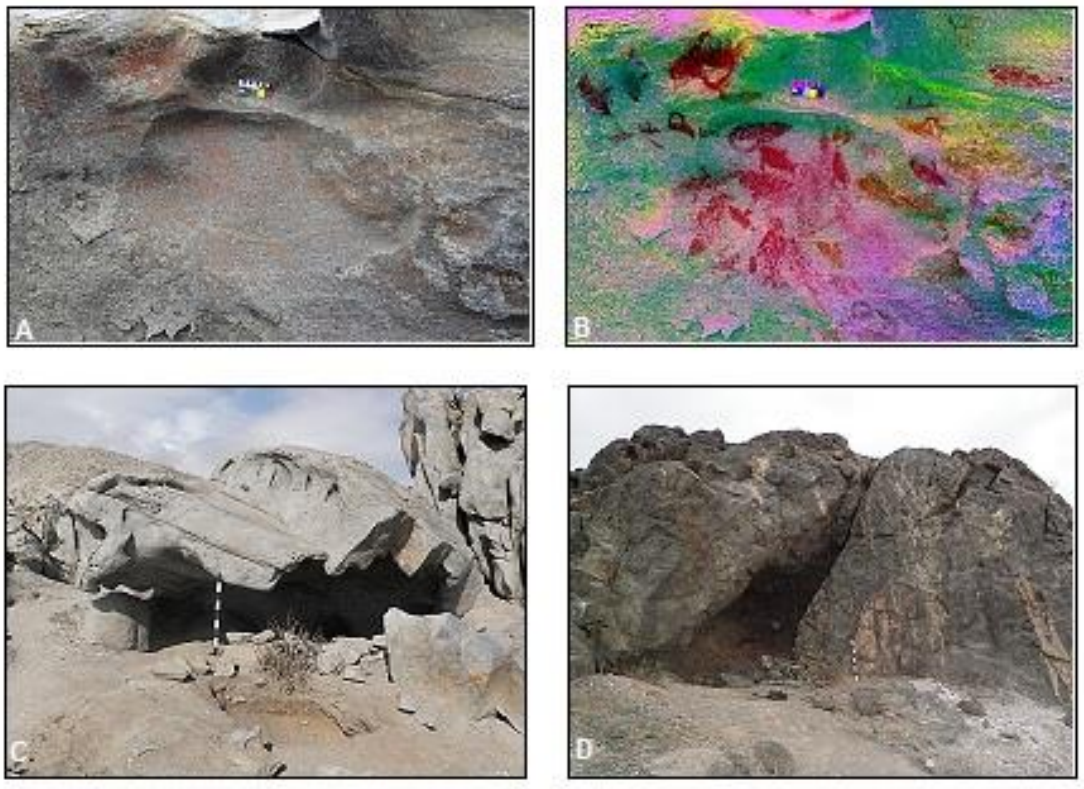


Figure 2
Panel 1 of the Punta Miguel Díaz rock shelter (A: without D-Stretch, B: with D-Stretch), and coastal rock shelters with paintings of the Northern Coastal Modality (Miguel Díaz [C] and Punta de Plata [D]) (Castelleti, 2017)

The coastal human groups established early an E-W public mobility circuits along the coastal mountain range ravines towards the desert pampa. These had access routes through the ravines of Taltal, San Ramón, Bandurria, Cascabeles, Matancillas, and Paposo, as well as rupestrian routes that materialized a rather private circuit inside the ravines of El Médano, Iscuña, Botija, La Plata, San Ramón, and perhaps others that are not yet discovered. In all these sites there were pictorial manifestations painted on rocky outcrops, normally in areas of limited access between 1100 and 1700 m elevation on the border of terrain level damped by camanchaca[61]. The standardization of the raft/cetacean rock painting motif is highlighted in these pictorial sets (figure 3), observing in low frequency the elaboration of other themes that presented other marine figures, scenes of anthropomorphic, camelids and geometric figures (table 3).

[60] J. Castelleti, Los hijos de la Camanchaca..., 2017; J. Castelleti et al., Evidencia de tempranas…
[61] Name given to the coastal haze since late moments in northern Chile (see M. Escobar and M. García, “Camanchaca. Flujos etnonímicos y neblineros en la costa del norte de Chile”, Revista de Geografía Norte Grande, num 68 (2017): 11-32; amongothers.

There is limited dispersion of the recognized Northern Coastal Modality in the coastal rock shelters of Miguel Díaz and Punta de Plata, along with some panels of Loreto rock shelter (figure 1). This modality only has scenes of marine animals without boats, andit used red pigments rich in hematite, gypsum and clay with high percentages of iron oxide, copper and silica. By contrast, the Raft/cetacean Modality is the result of the repetitive design of a thematic standardization consisting of a large cetacean (figure 3)—usually a humpback whale or a southern right whale—, united by one or up to four lines to a skin sea lion raft type boat. In opposition to Northern Coastal Modality, the Raft/cetacean Modality manifests itself in inner ravines, and was preferably painted with pigments rich in hematite and clay(with abundant clinozoi site), but low percentage of gypsum (table 2). A different configuration that could correspond to the result oftaphonomic processes, as well as the use of different technological strategies by painters.

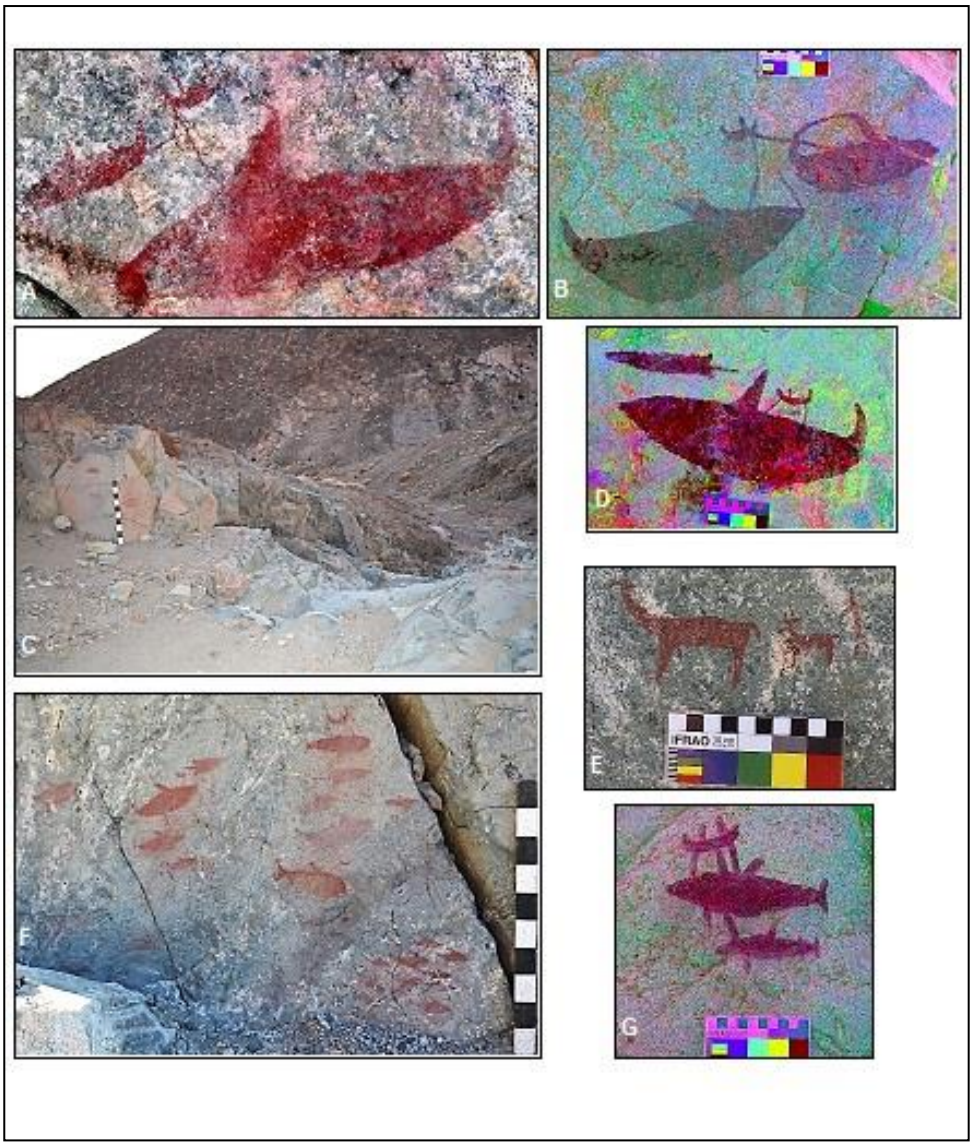


Figure 3
Raft/Cetacean Modality in El Médano style (In Castelleti, 2017)

A significant aspect in relation to the development and proliferation of the Raft/cetacean Modality in the El Médano style (which represents almost ¾ of the total motifs frequency), is its location. This is usually recorded on rocky outcrops that generate rocky falls in the ravines (figure 3c), areas where visual objects were designed on rocky surfaces that offered the required chromatic contrast. In these sectors, it is possible to demonstrate the objectification of behaviors that required private spaces for their implementation. These also materialized a space different from the everyday coastal and domestic world. This was a limited access space located at the limit of the cloud level. The limbo, creator of the marine and terrestrial life, offers antagonistic space to the underground world where the dead restand where the repository of marine figurations among their offerings will bealluded[62].

The frequency relationships of rock painting motifs of the El Médano ravine show the intentional conformation of two completely different sets (tables 3, 4). On one hand, a majority represented humpback and southern right whales within the standardized scene of the raft/cetacean motif (figure 4). On the other hand, there was less frequent design of local marine and terrestrial fauna, as well as human and geometric figures and even "hybrids" or figures with anatomical features of two or more species. In addition to the information of Andean and Patagonian coastal symbolism available, this structuring suggests the addition of knowledge about the periodicity of faunal marine migrations among the traditional Chango groups, whose direct antecedent is the probable coastal gnomon of the Standing Bone[63]ravine[64].

It is proposed that the iconographic statistical trends observed for each rock painting site are the result of the marine species figuration that appears naturally on the coast according to an annual calendar (tables 1, 4),material indicator of a probable pre-ceramic calendrical matrix in use among the different coastal groups[65].

“Chaku” hunting scenes consisting of camelids and armed anthropomorphic figures normally occupy marginal places in the panels and demonstrate low frequency registry, embodied only in inner ravines probably in the latest moments of Raft/cetacean Modality (table 3).

[62] G. Mostny, Arqueología de Taltal. Epistolario de Augusto Capdeville con Max Uhle y otros (Santiago: Fondo Histórico y Bibliográfico José Toribio Medina, 1964).
[63] Or Hueso Parado.
[64] J. Castelleti, Los hijos de la Camanchaca..., 2017; R. A. Philippi, Viage al desierto…, 1860. Philippi describes in 1853: “We left at 11 in the morning, and crossed a low hill to get to the beach. We spend in this stretch of the road the great rib or whale jaw fixed on the ground, and surrounded by a semicircle of large stones, which gives the name ‘Standing Bone to this place. I could not find out the origin and significance of this monument”, R. A. Philippi, Viage al desierto… 20. During the doctoral research in 2015, the site was able to locate the remains of a semi-circular structure with two openings, one towards 76° and the other towards 163°, with a third probable towards 330° (in the direction of Morro Colorado). The simulations and observations in the field allowed to corroborate the orientation of the east opening of the structure (76°) towards the solstice of June and the southern opening (163°) towards the solstice of December.
[65] J. Castelleti, Los hijos de la Camanchaca...

MOTIF / ROCK PAINTING SITE	Albacore	Indeterminate marine animal	Anthropomorphic figures	Raft	*Camelidae*	*Canidae*	*Cetacea*	*Delphinidae*	" Trianguloide"	Sea lion	Fish	Turtle	Compoundsgeometricmotifs	Simple geometricmotifs	Indeterminatemotifs	Total
Loreto		3					1			3				8	4	19
M. Díaz							24						3	8		35
MED01				3			4			4	7					18
MED02		1	5	10	9	1	7	2	1		4	3	2			45
MED03		1		1					1							3
MED04		33		30	3	1	25	2	1	2	8	2	9	4		120
MED05		1		1												2
MED06				1			2									3
MED07				1			1									2
MED08				1			1									2
MED09		3		2			4									9
MED10		1		8			2		1	3	13		11	18		57
MED11				1			1				2					4
MED12			1		5											6
MED13		1		1									1			3
MED14	3	70	7	78	36		136	5	28	18	41	1	7	12		442
MED15		2		1			1							1		5
MED16				3			5		1							9
MED17		2	2	3	3		5						2	1		18
MED18		11	10	50	43		69	6	2	3	11	2	3	2		212
MED19		1		2			1									4
MED20				1			1				1		1			4
MED21		4		10	3		9				5					31
MED22	4	24	5	64	35		96	2	5	2	19		4	11		271
MED22N				1				2								3
MED23		4		5			4			2	3					18
MED24		1		2	5						1					9
MED25		15	1	30	9		32	1	1	3	15		2			109
MED26		6		10	6		24	1		4	4					55
MED27			8	2	30		3	1						1		45
Pta. La Colorada							2									2

Punta Morada				2			4									6
Punta de Plata		6					14		1				7	2	7	37
San Ramón ravine	2	8	4	3	7	2	15	1	1	13	10	1	12	9	28	125
Total	**9**	**198**	**43**	**327**	**194**	**4**	**493**	**23**	**43**	**54**	**147**	**9**	**64**	**77**	**39**	**1724**

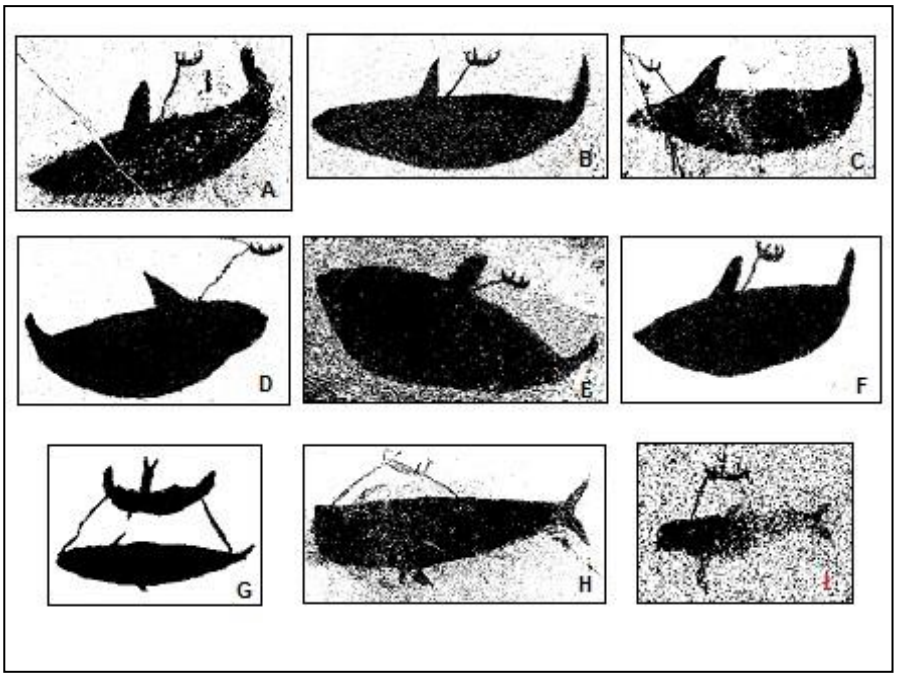
Table 3

Frequency of motif categories by theme in the rock painting sites (Castelleti, 2017)

MÉDANO SITE / MOTIF	Humpbackwhale	Southernrightwhale	Spermwhale	Pilotwhale	Minkewhale	Seiwhale	Blue or Fin whale	Brydewhale	Turtle	Albacore	Killerwhale	Dolphin	Shark	Sea lion	*Camelidae*	*Canidae*	Fishingwith net
MED01	1													1			
MED02	4	1		1	3				2	1				1	2	2	
MED03						1					1						
MED04	8	1		7	9	2								1	1		
MED05					1												
MED06		1															
MED07				1													
MED08					1												
MED09	1				1												
MED10	2			3	8					2				3	1		4
MED11	1														1		
MED12															1		
MED13																	
MED14	32	33		16	14	11	4		2	6	7		5	5	13		5
MED15	2	1															
MED16	1	1									1						
MED17	1	1	1	1	1					1				1	2		1
MED18	15	15	1	2	4	1	3		2		2	1		1	10		1
MED19		2															
MED20												1		1			
MED21	2			1	1	1											
MED22	14	24	3	1	3	2		2	1	5	5		5	1	15	1	1
MED22N											1						
MED23	2	1							1		2	1	1		1		1
MED24				2											1		
MED25	10	13	2	2	4	5				4	1			1	3		5
MED26	4			3					1	1		1		2	3	2	1
MED27	1										2				5	1	

MED28																	
MED29																	
Total	**101**	**94**	**7**	**40**	**50**	**23**	**7**	**2**	**9**	**20**	**22**	**4**	**11**	**8**	**59**	**6**	**19**

Table 4
Number of panels per represented species in El Médano ravine (Castelleti, 2017)



Figures 4
Representations of Humpback whales (A-C), Southern right whales (D-F), Minke (G), Sperm Whale (H) and pilot whale (I) in paintings of the El Médano ravine (A: panel 6 MED18; B: panel 21 MED18; C: panel 10 MED14; D: panel 3 MED01; E: panel 41 MED25; F: panel 21 MED14; G: panel 2 MED02; H: panel 3 MED22 & I: panel 5 MED21) (Castelleti, 2017)

A third modality or rock painting substyle found in the area of Paposo/Taltal was named Epigonal Raft/cetacean. It is suggested that this modality is associated with domestic deposits of the Formative period (ca. 3500-1500 B.P.), around the mouths of San Ramón and El Hueso ravines, near the current city of Taltal[66] (figure 5a-5c). It is probable that the notable proliferation of this substyle in the San Ramón ravine, from the configuration of panels on blocks and outcrops around aguadas or rocky falls, indicates the conformation of a liminal territory for local groups, preferably inhabitants of Morro Colorado and Punta Morada that lived in the area from 8400 B.P.[67]. Probably around 4000 B.P. these groups began to appropriate agricultural and mining spaces around inner aguadas, where rock paintings emerged as territorial and calendar marks. An iconographic aspect that stands out in this modality is the emergence of the raft/cetacean traditional motif. However, this motif is distinctly stylized and simplified in comparison to the paintings of the El Médano ravine. It is simplified to a horizontal line that constitutes the boat; a thick line is the rope, and one to three vertical or horizontal lines are the cetaceans or large fish. There are also panels that show isolated marine animals and scenes of terrestrial mammals with anthropomorphic figures.

[66] J. Castelleti, Patrón de asentamiento…; N. Gaete et al., Plan de Rescate…
[67] D. Salazar et al., Cronología y organización…

It is interesting to note that the dispersion of this substyle to the rock shelters of Loreto, La Colorada and Los Bronces, and even the El Médano ravine (MED04) (figure 1), is consistent with the dispersion of pre-Hispanic settlement systems[68]. It is also consistent with the patternuse of the coastal territory carried out by traditional families; like the Almendares or the Gutiérrez[69],who from the residential nuclei of Paposo, Cobija and Caldera, separated by 150 km, occupy the local territories from control nodes and satellite camps in distant coves, around aguadas[70]. The values observed in the rock painting pigments used in Loreto and MED04 likewise show different sources of hematite and clay collecting, but in these cases, composed of phyllosilicates and even metacinnabrium, complementing the pictorial mixture that includes a calcic element, components that testify obtaining routes and probably differential manufacturing strategies among the coastal human groups (table 2).

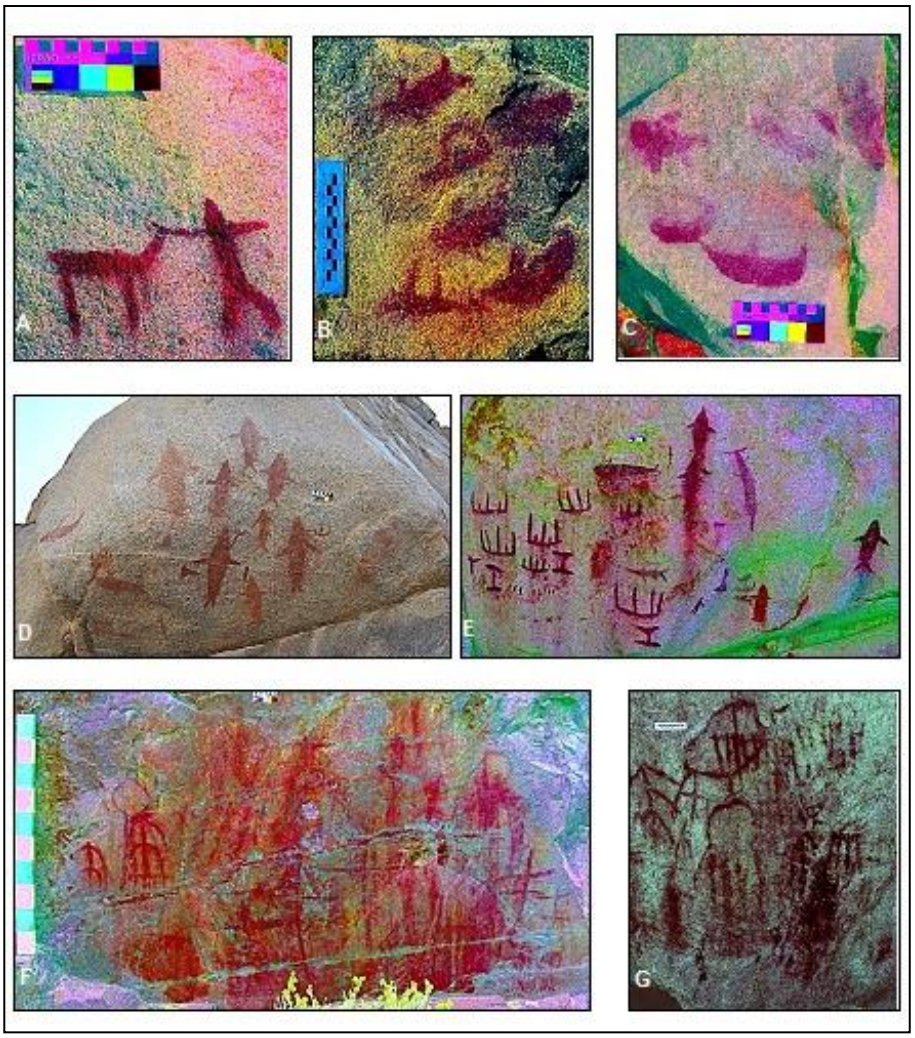


Figure 5
Epigonal Raft/cetacean Modality (A, B, C), Northern Linear Modality (D, E) and Southern Linear Modality (F, G) in rock paintings of Taltal district

[68] J. Castelleti, Patrón de asentamiento…
[69] J. Castelleti, Los hijos de la Camanchaca...
[70] V. Castro, De ídolos a santos…; J. Castelleti, Los hijos…; C. M. Sayago, Historia de Copiapó (Buenos Aires-Santiago de Chile: Editorial Francisco de Aguirre, 1997 [1874]).

The rock painting modality named Northern Linear has been detected in the Paposo/Taltal rock manifestations in theIscuña and Botija ravines, as well as in some nodes of the El Médano ravine, such as MED10 and the San Ramón ravine. This modality presents a raft/cetacean configuration and, to a lesser extent, camelids and anthropomorphic figures. Northern Linear Modality has been associated with a large number of panels that presented very stylized linear motifs, usually horizontal lines with two or more perpendicular appendices ("comb" type motif), together with quadrangular and rectangular meshed figure, and straight and short parallel lines (Figures 5d, 5e).This modality demonstrates motifs morphometrically very similar to those detected in the La Capilla cave and other rock shelters between Arica and Camarones, whose associated deposits have been dated between 3670 and 2790 B.P.[71].

Finally, a fifth rock painting modality is presented in the set sampled of Paposo/Taltal, the Southern Linear Modality[72]; found in some panels of the sector of the Los Bronces ravine mouth about 10 km south of Taltal, next to the Piedras Negras rock shelter about 8 km north of the city (figures 5f, 5g). All of these panels are associated with shell midden deposits dated between 3000 and 500 B.P. The interesting thing about this modality is that its pigments present low percentages of calcium minerals besides high percentages of clay, probably of the bauxite type in the case of Piedras Negras. In addition, the Los Bronces paintings show the presence of clay rich in clinozoisite, alike to the pigments recorded in MED18 (table 2), indicators of probable differential routes of mineral source use. This modality is characterized by the configuration of an iconography marked by the presence of sets of lines and circular shapes, registering from anthropomorphic figures and circles with appendages, to other complex geometric motifs similar to some patterns described in Limarí and Quebrada las Pinturas rock painting styles in the Andean semiarid zone, southern neighbor region of Taltal[73]. The Southern Linear set is superimposed on motifs of the Epigonal Raft/Cetacean Modality and is associated with extensive areas with ceramic dispersion of the Copiapó type, typical from the Andean western semi-arid region[74].

5. Hunting and marine fishing technology

Recent studies on marine fishing and hunting technology in the southern Andes interpret a probable instrumental kit for whale hunting[75]. For this reason, it is necessary to use the information available to perform a deconstructive study of thetotal archaeological body of information that supports the model of the supposed whale hunting among the inhabitants of the Paposo and Taltal coast, dismissing it or accepting it. Next, we will analyze gradually the archaeological information contained in the discourse on this apparent whale hunting.

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[71] I. Muñoz, “Ritualidad y memoria de los pescadores de la costa de Arica durante el periodo Arcaico Tardío: el caso de la cueva de La Capilla”. In I. Muñoz y M. S. Fernández (eds.), Mil años de historia de los constructores de túmulos de los valles desérticos de Arica: paisaje, monumentos y memoria (Arica: Ediciones Universidad de Tarapacá, 2014), 39-64.

[72] J. Castelleti, Los hijos de la Camanchaca...

[73] G. Mostny and H. Niemeyer, Arte rupestre…

[74] N. Gaete et al., Plan de Rescate…; V. Varela, “La Cerámica arqueológica de Taltal”, Taltalia num 2 (2009): 119-128.

[75] B. Ballester, Tecnología de arponaje…; B. Ballester, La caza de cetáceos...

5.1 The sea lion leather raft

This is not the place to detail the extensive body of information on the construction and use of sea lion skin raftsin the traditional coastal groups of the Southern Andean coast during historical[76] and prehistoric[77] moments. On the contrary, it is only to emphasize that all consulted authors recorded a wide variability of functions granted to this contraption, whose utility ranges from fishingusing a net or a hook, to transport freight and passengers[78]. It is therefore clear that the morphological and technological characteristics associated with sea lion skinrafts have not depended on just one factor or hunting only one species, but on a cluster where the conditions of the sea and climate also played a fundamental role. The use of these rafts for hunting in the open sea was an eventual strategy to hunt different species, as shown by Coquimbo coastal natives during Lizárraga's visit in 1602. Lizárragastates the following: "it is generous [the sea] with very good fish. Fish some tunas. They do not go in groups like in Spain, but one by one. The indigenous fisherman goes deep sea looking for them, two and more leagues on his little sea lion skin raft. He carries his harpoon, fishes it with the spear and ties it until it bleeds to death; once it is bled out hetakesit to the coast"[79]. However, Lizárraga himself describes the use of harpoons for other functions too, like the harpoon of "three hooks" or "pothook" for beach fishing[80].

5.2 Harpoons

Harpoons are usually defined as a throwing weapon developed by coastal groups to hunt marine animals[81].The seconsist often of two parts. A distal part thatis a detachable head made of bone or wood, whose end is usually reinforced with a carved lithic projectile point, and one to three barbs of bone that locks the prey once hit. The head is inserted at the end of a handle also made of wood or bone and cylindrical in shape. Meters of rope are tied to the head, usually made of mammalian tendons, which is attached to the handle and serves to hold the prey. It is common that other varieties of harpoons are only a single piece or have more hooks on the head[82].

The data provided corroborates the historical development of the harpoon as a ductile weapon, which can be used both for hunting and fishing support, obtaining a wide range of marine species[83]. This variability is corroborated with the information obtained

[76] G. de Bibar, Crónica y relación copiosa y verdadera de los reinos de Chile (Santiago de Chile: Edición Facsimilar y a plana del Fondo Histórico y Bibliográfico José Toribio Medina, 1966 [1558]); R. de Lizárraga, Descripción breve…; W. H. Russell, Una visita a Chile y la Pampa salitrera de Tarapacá (London: J.S. Virtue& Co. Limited, 2011 [1890]); amongothers.

[77] H. Horta, "El Señorío Arica y los Reinos altiplánicos: complementariedad ecológica y multietnicidad durante los siglos pre-conquista en el norte de Chile (1000-1540 d.C.)" (Tesis doctoral para optar al grado en Historia mención Etnohistoria. Universidad de Chile: Facultad de Filosofía y Humanidades, Depto. de Ciencias Históricas), 2010; G. Mostny y H. Niemeyer, Arte rupestre en el Médano...

[78] W. H. Russell, Una visita...; C. M. Sayago, Historia de Copiapó...

[79] R. de Lizárraga, Descripción breve... Cap. LXXIV, secondbook.

[80] R. de Lizárraga, Descripción breve... Cap. LXXIV, secondbook.

[81] B. Ballester, Tecnología de arponaje...

[82] B. Ballester, Tecnología de arponaje...; J. Silva and D. Bahamondes, "Investigaciones arqueológicas en Taltal, Informe Preliminar", Rehue num 2. Actas del IV Congreso Nacional de Arqueología de Chile: Universidad de Concepción and Instituto de Antropología (1969): 7-25.

[83] B. Ballester, Tecnología de arponaje...

from the formative burial of Choluto4 (ca. 2450 years B.P.) on the coast of Taltal[84], which showed the inhumation of an adult male individual andan infant, whose personal possessions consisted of instruments of varied functions.Among these possessions stand outheads type darts made of cetacean bones, in association with fragments of a 64-cm-long spear-thrower made also of cetacean bones (figure 6). We detected in the fillings of the object remains of mollusks and shore fish and a vertebra of *Delphinidae*. The association between head bones and a spear-thrower in Choluto, and not handles as indicated for this type of daggers, is undoubtedly an example of the versatility achieved by the ergology of hunting and fishing on the southern desertic coast since pre-Hispanic times.

Figure 6
Artifactual set of aformative grave ofCholuto area(Castelletiet al. 2018)

It is at this point that substantial data arises for the interpretation of harpoons in relation to the activities developed by traditional coastal groups: the pattern of differential deposit of remains and instruments in the archaeological sites of Paposo/Taltal.

Although it is suggested body full use as a cause of the undetected remains and instruments associated with a supposed whale hunting in Paposo/Taltal[85], the truth is that after the classic archaeological excavations performed by Augusto Capdeville and MaxUhleduring the early 20th century–un fortunately partial and, sometimes, badly recorded[86]–, the last two decades have seen a rebirth in archaeological research in the Paposo/Taltal area. This has led to the construction of a solid set of absolute dates that support a sequence ranging from ca. 11 ka until today, built on the systematic excavation

[84] J. Castelletti et al., "Funebria y paisaje local durante la transición arcaico-formativa En Taltal. El caso del Portezuelo Choluto", Taltalia num 11 (2018): 37-60.
[85] B. Ballester La caza de cetáceos...
[86] A. Capdeville y A. Capdeville Rojas, notas arqueológicas...; J. Castelletti, Patrón de asentamiento...; G. Mostny, Arqueología de Taltal...

of more than 100 archaeological sites[87]. This large body of information indicates that in coastal archaeological sites there are marked differences in the patterns of deposition and discarding in domestic and funerary contexts, corroborating the exceptional nature of the latter. Among large malacological and osteofaunal deposits of associated domestic areas, no instruments or large cetaceans remains have been detected that indicate their entry, consumption or processing in the daily life of coastal groups, although occasionally large fish (marlin, albacore, shark) have been found[88]. What could have happened in the archaeological record that systematically erased the remains of supposed large cetacean hunting in Paposo/Taltal?

Since the lack of information that proves large cetaceans hunting from pre-Hispanic times, authors like Ballester[89], following Vázquez de Espinosa's description[90], suggests that whale hunting would have involved logistics in which the whales were slaughtered on the coast, and subsequently the remains were recycled by the beach, so the animal was totally consumed, stored or used. Although this argument is appealing, unfortunately it is tautological because we must not forget that the usual presence of large cetacean remains on the beaches in Paposo/Taltal, as well as other smaller marine species, is due to natural stranding that have been systematically documented[91].

6. Hunting strategies v/s strategies of rock painting manufacture

Umberto Eco pointed out 40 years ago[92] that all semiotic construction, that is to say, the arbitrary union of a signified to a signifier in a sign, is based on what he called the "referential fallacy". This concept is the no-coincidence between the conditions of significance and the conditions of truth in a semiotic relationship. This means that given the multi-signifying capacity of signs and symbols, which gives them their utilization in varied contexts, the possibility that these signs have been produced in reference to physical or even social truths is greatly reduced. Human groups can articulate visual objects according to meanings that even contradict physical or social truths. Other authors[93] have emphasized this common methodological error in the studies of rock paintings in Chile. The exaggerated functionalist view in archaeological contexts has resulted in the configuration of rock painting styles that are nothing more than the sum of morphological attribute classifications, seeking to satisfy theoretical paradigms that depend on functionalist postulates. This gives artistic and visual manifestations a purely mimetic function of the environment.

The rock paintings of El Médano have not managed to escape from the interpretative errors of the traditional academic model. Mostny and Niemeyer Model[94] only understand the phenomenon in coincidence with functional aspects of the subsistence

[87] J. Castelleti, Patrón de asentamiento...; J. Castelleti et al., Ocupaciones en abrigos...; L. Olguín, D. Salazar y D. Jackson, Tempranas evidencias...; D. Salazar et al., Cronología y organización...
[88] L. Olguín, D. Salazar and D. Jackson, Tempranas evidencias...
[89] B. Ballester La caza de cetáceos...
[90] A. Vázquez de Espinosa, Compendio...
[91] Comisión Permanente del Pacífico Sur, Atlas sobre distribución; A. González de Nájera, Desengaño y reparo, 2012; R. A. Philippi, Viage al Desierto...; amongothers.
[92] U. Eco, Tratado de Semiótica General (Editorial Lumen, 1995 [1976]).
[93] A. Dettwiler, "Análisis del Arte Rupestre, entre la miopía funcionalista y el imperialismo de la semiótica", Chungara num 16-17 (1986): 451-458.
[94] G. Mostny and H. Niemeyer, Arte rupestre...; G. Mostny and H. Niemeyer, "Arte Rupestre en el Médano... 84-87.

patterns observed in coastal occupations[95] rather than analyzing the rock painting phenomenon in its significant context (the conditions that gave meaning to the visual construction). Fortunately, several rock painting studies in the Andean zone and in other American areas have assumed the methodological challenge of tracing the conspicuous technological, social and even cosmogonic relationships that are established in each rock painting site, expanding greatly the possibilities of registration and interpretation[96].

Because of this reason, once obtained the El Médano style information about the rock painting materiality and its significant context, this can now be used for a systematic tracing of the proposed cetacean hunting strategy, in parallel to the process of rock painting manufacture to evaluate their relations and the knowledge involved.

The whale hunting story in Vázquez de Espinosa's chronicle[97] will be considered as a guide to the alleged traditional hunting process, notwithstanding the above mentioned doubts[98]. This will be evaluated critically in opposition to the rock painting manufacture process.

According to some authors[99], the first moment of traditional whale hunting, is when natives entered the sea to hunt cetaceans. Vázquez de Espinosa relates:

> "Then the indigenous man stalked it [the whale] during its sleep. He is skilled and arrives in his sea lion raft that he uses to take advantage of it without losing sight of it. And he arrives where the whale sleeps and shot it a harpoon-shot under the fin.Where it is its heart. And instantly he falls into the water to escape the blow of the whale that seeing itself hurt, outrages,bellowing and striking blows in the water, splashing water very high with the fury and anger that the pain causes, and then pull hard into the sea, until it feels tired and moribund."[100]

The standardized motifs of the El Médano style do not record technical details of cetacean hunting, except for limited differences that could indicate sequences of hunting, such as the opposition of panels with large marine animals being harpooned "downstream" and dragged "upstream". However, these details do not alter the schematic raft/cetacean standardization (figures 7a, 7b). Perhaps in more detail, it is usual to observe the design of the sequence of hunting land animals like camelids, as recorded by MED27 (Figures 7c-7f), where panels that expose the strategy of hunting herds, including offspring, are arranged in opposition, probably from later times than some marine design groups.

The fact that the design is standardized makes probable that these panels correspond to induction or education behaviors, rather than the reproduction of daily coastal life. These standardizations are not only characteristic of initiation ceremonies, but also of funerary or foundational rites. The repetition of hunting scenes of notable animals

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[95] A. Llagostera, "Tres dimensiones en la conquista prehistórica del mar". In Actas del VIII Congreso de Arqueología Chilena (Chile: Ediciones Kultrún, 1979), 217-245.

[96] C. Aschero, "El arte rupestre del desierto puneño y el Noroeste argentino". In Arte Rupestre en los Andes de Capricornio (Santiago: Museo Chileno de Arte Precolombino, 1999), 97-135; C. Boyd, "Pictographic evidence of peyotism in thelower Pecos, Texas Archaic". In C. Chippindale y P. Tacon (eds.), The archaeology of rock art, (Cambridge University Press, 1998), 229-246; amongothers.

[97] A. Vázquez de Espinosa, Compendio...

[98] M. N. Marsilli and P. Cisternas, Los senderos...; S. Villalobos, Dos cronistas...

[99] B. Ballester, Tecnología de arponaje…; G. Mostny and H. Niemeyer, Arte rupestre...

[100] A. Vázquez de Espinosa, Compendio... Cap. 32, p. 1751-1752.

of their symbolic universe shows the development of themes that allude to narrations of a mythical time, that help to generate the "socialized" body of the creator[101], as some kind of generation of this new body that the person has, it is his co-essence[102].

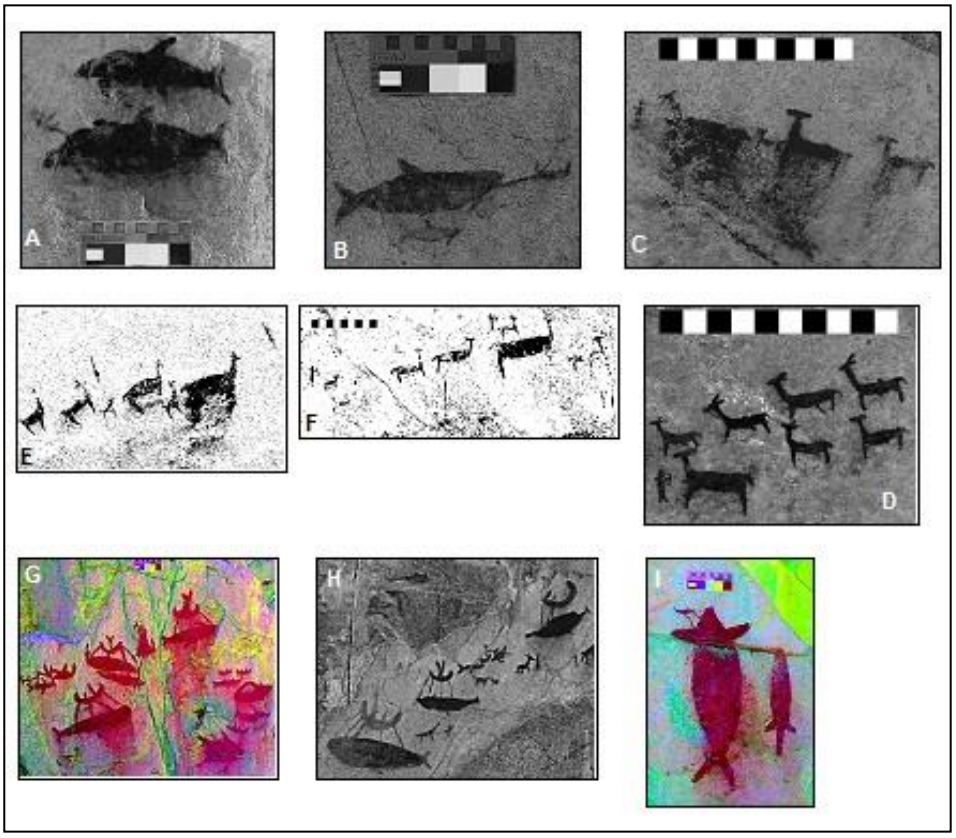

Figure 7
Hunting process of marine (A-B) and terrestrial (C-F) animal figures in node MED27 (E and F probable *chaku*) and the dragging of cetaceans or great fish (G-I), obtained in paintings of the ElMédano ravine(Castelleti, 2017)

This visual standardization recorded in El Médano coincides only partially with the strategy related by Vázquez de Espinosa, consisting of harpooning the whale under its pectoral fin. On the contrary, we can observe in the paintings that several of the points of the probable harpooning are on the head and body of cetaceans (figures 4a-4f; 7a, 7b)[103]. Another significant feature in the El Médano pictographs is the usual design of the obtain strategy of cetaceans and camelids in which it is observed probable offspring or companions (figures 3, 7). Vázquez de Espinosa does not mention this aspect.

A second moment of the alleged process of hunting cetaceans and marine animals of great size is the dragging of the harpooned animal. Vázquez de Espinosa points out the following: "meanwhile the indigenous fishermen returns to his raft, and comes to land to watch where it comes to die [the whale] on the coast, and so he keeps stalking it until he

[101] Sensu S. Vigliani, “Pinturas espirituales. Identidad y agencia en el paisaje relacional de los cazadores recolectores y pescadores del centro-oeste de Sonora” (Tesis para optar por el grado de Doctora en Arqueología. México D.F.: ENAH-INAH-SEP), 2011.
[102] Sensu S. R. Hutson, Dwelling, Identity, and the Maya (Altamira Press, 2010).
[103] B. Ballester, La caza de cetáceos...

see where itis going[...]"[104]. However, the process of dragging the harpooned animal is not described in the same way in the rock paintings of El Médano. In the paintings the dragging is carried out by the same rafter that clamped the animal with several ropes from his boat[105](figures 3a, 3b, 3c, 3g, 4g-4i, 7g-7i), unlike Vázquez de Espinosa's description where the rafter waits on the shore for the animal to bleed to death and strand.

The last phase of the supposed hunting process on the Taltal coast is the usufruct of the hunted whale remains. Vazquez de Espinosa relates that "[...]then all this community and family that have been carefully watching; for the treat all together, friends and neighbors, cut upthe animal on one side where there are some of them eating; some inside, some others outside. During six to eight days until they are unable to bear the stench"[106]. Although this moment does not appear in the rock manifestations of the zone, moments of social convergence around the hunting of big prey or massive strandings have been recorded in Andean and Patagonian ethnographic groups[107]. However, without discarding that the rock manifestations have been part of such events, none archaeological indicator on the coast of Taltal is recorded for these social encounters around cetacean stranding or hunting.

By contrast, pre-Hispanic and historical coastal registration of fish hunting strategies is common, in many cases with nets. Vázquez de Espinosa details that the indigenous people of Andean arreic coast, as on the coast of Arica do the following described: "[...] they wear sea lion skins, and from these, they make their boats or rafts,with two leathers full of wind, in which they go out to the sea to fish, because on that coast they can fish a big amount of conger, houndshark, mullets, yellowtail, armados, catfishes, horse mackerels, tunas, octopus, and much other kind of fishes, which they salt."[108]In the representations of El Médano, the denominated Northern Linear Modality includes usually pictographs of marine scenes in which fishing with nets and *chaku*[109] is interpretable and whose visual indicators are the marine animals surrounded by rafts[110] and the covering of the pods by nets (figures 8a-8d), taking advantage of natural fish stranding on the coast, as Vazquez de Espinosa mentions about Arica coast.[111]

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[104] A. Vázquez de Espinosa, Compendio... Cap. 32, p. 1752. Author's translate.

[105] In fact, it is common to see rock painting scenes in which rafters drag more than one dam. Within this model, the presence of "raft/cetacean" motifs with the cetacean arranged perpendicular to the raft, does not necessarily refer to a moment of the eventual physical hunting of cetaceans or their towing, but could correspond to a visual construct of the type group identity marks, as well as other motifs such as cetacean "with pectoral and caudal fins attached" (figures 3b, 5b, 7g), the headdresses of some crew (figures 4g, 7g, 7h), the recognized "Trianguloid" (figures 3d, 3f) or maybe the scenes with camelids and anthropomorphic (Figures 5a, 7c-7f) (Cf. J. Castelleti, Los hijos…, 2017, cap. X).

[106] A. Vázquez de Espinosa, Compendio... Cap 32, p. 1754. Author'stranslate.

[107]A. Chapman, Hain…, 2012b; N. Fuenzalida y F. Gallardo, "Exchange and ritual funeraryconsumption: late marine hunter-gatherers of the Taltal coast (Atacama desert, northern Chile)", AndeanPast num 11 (2013): 263-281; M. Gusinde, Los indios de Tierra del Fuego, Tomo I volume II (Centro argentino de etnología americana, 1986).

[108] A. Vázquez de Espinosa, Compendio... Cap. 32, p. 1752. Author's translate.

[109] Behavior normally associated with the hunting of terrestrial animals consisting of the rodeo arranged on the herd by thegroup of hunters, to obtain the desired prey. Some chroniclers describe fishing by rodeo in the Andean world (cf. G. Benzoni, La historia del mondo nuovo, Madrid: Biblioteca Virtual Miguel de Cervantes, Biblioteca Nacional, 2009 [1572]) (figure 9b).

[110] For example MED10 records sea lion, albacore, and some cetaceans and rafts, in association with a high frequency of linear motif sets, interpretable as fish shoals. SeeTable 3.

[111] A. Vázquez de Espinosa, Compendio... Cap. 59, p. 1420.

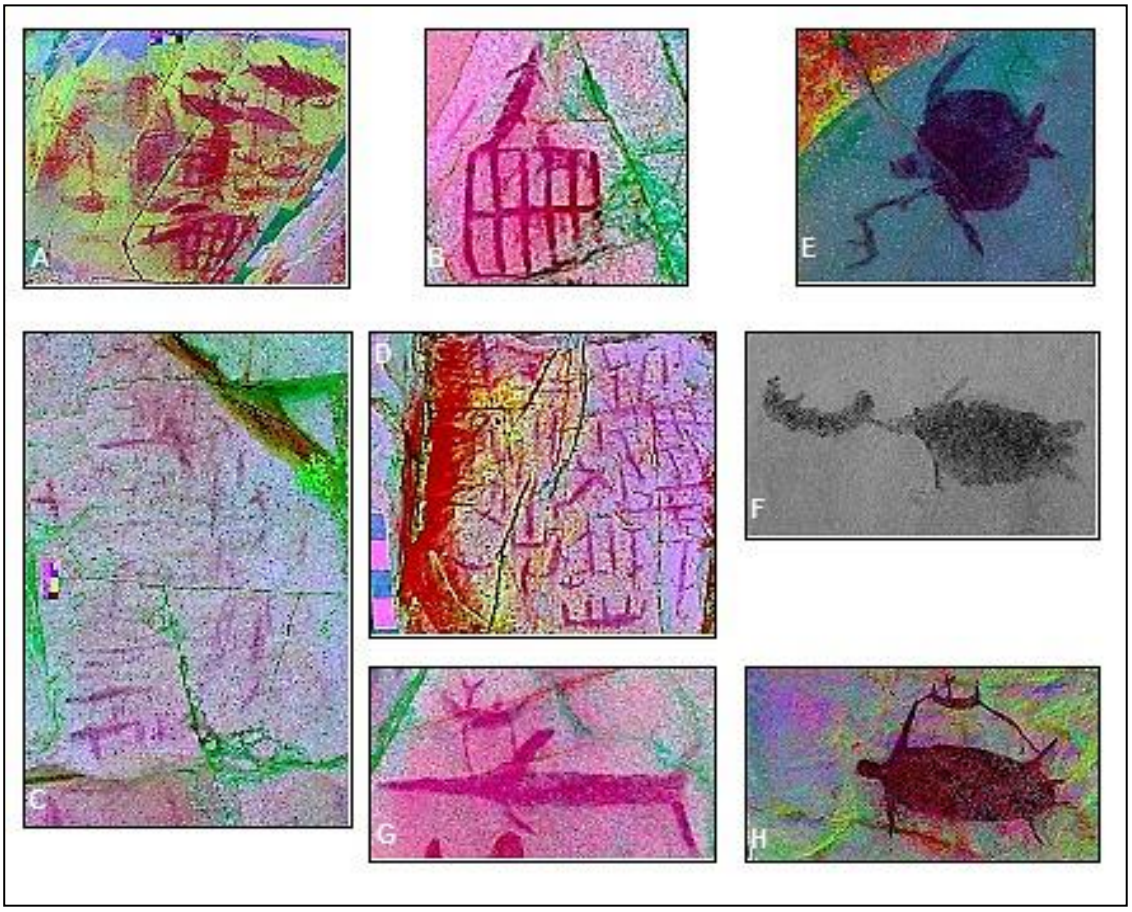

Figure 8
Probable fishing scenes (using "chinguillo" type nets and rodeo or *chaku*) (A-D), and disproportionate animals in relation to the size of rafts (E-H) in the El Médano paintings (Castelleti, 2017)

This level of analysis will befinished by referring to an aspect normally associated with prehistoric rock painting, which is the disproportion in the size of some designed motifs. It is common to observe patterns in which certain traditional figures (or anatomical parts of them) are disproportionate in relation to the remaining figures on the panel[112]. This behavior is clearly regulated in the rock paintings of El Médano, where the disproportion in relation to the size of the rafts is observed only in some marine species; precisely those that appear in pre-Hispanic archaeological deposits (large fish, smaller cetaceans, and turtles) (figures 8e-8h), since the design of large cetaceans shows correct proportions. Several technological and social factors could have produced this. Nevertheless, the conformation of two sets differentiated by the presence or absence of this disproportion is clear, probably due to the different symbolic load that large cetaceans would have had in relation to fish, chelonians and small cetaceans.

[112] A. Leroi-Gourhan, Símbolos, artes y creencias de la prehistoria (Madrid: Editores Istmo, 1984); J. Clottes y D. Lewis Williams, Los Chamanes de la Prehistoria (Barcelona: Editorial Ariel, 2001); A. M. Llamazares y C. Martínez S., El Lenguaje de los Dioses. Arte, chamanismo y cosmovisión en Sudamérica (Buenos Aires: Editorial Biblos, 2004).

However, the common feature that underlies these representations and all of those previously mentioned, is that they denote the embodiment of instruction moments to technical knowledge and probably also to access a cosmovision in which many of these skills and abilities will acquire meaning. It is at these moments, in the solitude of inner ravines, where rock painting performers "capture" marine animals in a rock painting manufacture process. In these paintings, the marine figures are firstly painted in isolation and then joined to rafts through lines or "ropes". The similarity shown by this behavior pattern in Paposo/Taltal with habits linked to the figuration of cetaceans in other ethnographic records on the coasts of the extreme Andean South and Patagonia, allows us to interpret that the rock manifestations on the arreic coast would be associated with the performance of highly regulated social reproduction ceremonies[113].

7. Discussion

A varied set of information that has emerged in the last 20 years of investigations in Taltal questions the pillars of the traditional interpretive model for the El Médano rock painting style.

A first point is the chronological ascription of the pictographs, which shows a sequence with at least five modalities or substyles. Several factors such as unusual Fe, Ca and C indexes (table 2) in the samples submitted to AMS (Punta de Plata, MED04, MED18, and Piedras Negras) corroborated the presence of red pigment rich in iron oxide and a probable binder. The date obtained in pigment of a cetacean painted in the panel #8 of Punta de Plata coast rock shelter was 7882 ±160 B.P. (cal. 7022-6509 B.C. 68%, 7172-6412 B.C. 95%), with a δC^{13} of -23‰[114]. Known criticisms of dating (AMS) of organic remains obtained from rock paintings in environments rich in calcareous substances stem from occasional records of contaminants such as oxalates[115]. For this reason, a sample of the same Punta de Plata panel was submitted to dating by archaeo-magnetism, a method that dates the intensity, orientation and declination of the ferrimagnetic molecules arranged in the painting, based on the record of natural variations that the direction and intensity of the Earth's magnetic field has undergone[116]. The ranges of dates obtained by archaeo-magnetism for the Punta de Plata sample, from 9132-9065 B.C., 6492-6426 B.C. and 5203-5114 B.C.[117], confirm the archaic date of initial moments of the pictorial confections.

In addition, the archaeological record of more than 100 archaeological sites excavated systematically on beaches, terraces and mountains in the commune of Taltal in the last two decades does not show large cetaceans remains among the domestic remains, only recording their occasional presence in funerary contexts[118]. It is estimated, therefore that this fact alone suggests the incorrectness of the idea established by Mostny

[113] A. Chapman, Hain...; A. Chapman, Yaganes...; M. Gusinde, Los indios...; S. Vigliani, Pinturas espirituales...
[114] Lema 209, Institute of Physics, UNAM; J. Castelleti, Los hijos…
[115] M. T. Boschín et al., “Chemical analysis of the organic and inorganic fractions of rock art and pastes from argentinian septentrional patagonian archaeological sites”, Zéphyrvs num 55 (2002): 183-198.
[116] J. M. AvtoGogitchaichvili et al., The use…
[117] LIMNA, Institute of Geophysics UNAM, Morelia. Terrestrial magnetic field model SHA14KDIF, dating platform Pavon-Carrasco et al. 2011, uncertainty of 1 sigma and 65% probability.
[118] J. Castelleti, Patrón de asentamiento...; N. Gaete et al., Plan de Rescate...; L. Olguín, D. Salazar and D. Jackson, Tempranas evidencias...

and Niemeyer[119], which identifies the cetacean hunting among the prehistoric or historical Chango groups, given the absence of physical remains that testify it[120]. In this manner, along with the traditional coastal pattern of abundant malacological and ichthyological remains, it is noted an absence of large marine animals in early holocenic moments, appearingin low frequency in the Paposo/Taltal shell middens only since the Middle Archaic period. The archaeological data registers remains of few MNI of pelagic fish, such as albacora (*Xiphias gladius*), marlin (*Istiophoridae*) and sharks (*Galeorhinusgaleus* and *Notorynchuscepedianus*), in layer dated 7426-6414 B.P. in the site of Zapatero; 6306-6132 B.P. in Cachinales; 6258-6826 B.P. in Agua Dulce,and 5035-4839 B.P. in Bandurria. This set is explainable as the result of occasional pelagic hunting carried out by the coastal groups[121].

The artifact set associated with alleged cetacean hunting and remains of its manufacture in the Paposo/Taltal archaeological sites is a matter of debate until today. According to Vázquez de Espinosa, the supposed "Chango" whale hunting kit is described as consisting of a raft made of sea lion skins, bone harpoons with copper oxide tips and ropes of sea lion tendons, to which some authors have added the taltaloid lithic blades, typical of funerary contexts of the Late Archaic period[122] (figure 9d). However, all these tools form part of a kit to hunt various species in the southern Pacific littoral[123]. A second feature that draws attention to the alleged cetacean hunting kit presented for the Paposo/Taltal coast[124] is that none of its remains—except for lithic tips and barbs, also conforming other instruments— appear in domestic or logistic contexts of the pre-Hispanic sites excavated near Paposo and Taltal. The marine hunterkit is recorded only in graves. The above described demonstrates the exceptional nature of the use and, consequently, the collecting of raw material to make the marine hunter kit (many artifacts are made of whale bones), becoming a set highly preserved. This is probably originated in exceptional events of whale remain collecting after the stranding of the animal according to information[125]. Although it has not been possible to carry out actualistic or experimental studies that allow to assert a direct relationship between the use of certain harpoon typologies and specific hunting strategies per species[126], a common artefact in the prehistory of Taltal has been mistakenly associated with hunter kits. This artefact is the taltaloid lithic blades[127], which do not have traces of having been used as cutting or slaughtering instruments. This instrument ranges from 7to 21 cm long andhas a lanceolate or foliaceous shape obtained by retouching siliceous bifaces whose sources have been detected in the interior pampas.These blades do not show any trace or micro-traces that testify their use in activities such as slaughtering of prey, and do not appear any complete or fragmented copy in domestic contexts[128].

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119 G. Mostny and H. Niemeyer, Arte rupestre en el Médano...
120 J. Castelleti, Los hijos...
121 L. Olguín, D. Salazar and D. Jackson, Tempranas evidencias...
122 B. Ballester La caza de cetáceos...
123 Cf. G. de Bibar, Crónica...; R. de Lizárraga, Descripción breve...; A. Vázquez de Espinosa, Compendio...; amongothers.
124 B. Ballester, Tecnología de arponaje...
125 J. Castelleti, Patrón de asentamiento...
126 Cf. B. Ballester, Tecnología de arponaje...; J. Castelleti, El Médano rock art...
127 B. Ballester et al., “La vida en comunidad de los cazadores-pescadores marinos del desierto de Atacama (4000-2000 cal A.C.)”. In F. Gallardo, B. Ballester y N. Fuenzalida (eds.), Monumentos funerarios de la costa del desierto de Atacama, (Chile: Andros Impresores, 2017), 183-198.
128 G. Mostny, Arqueología de Taltal...; J. Castelleti, Patrón de asentamiento...; I. Monroy et al., Navegantes del desierto...; D. Salazar et al., Trayectorias Históricas...

For all these reasons, a supposed knowledge about how Changos[129]hunted cetaceans lacks of material corroboration nowadays. Specific whale hunting behavior could have been a theoretical construct and even an identity design, but without corroborated regular physical presence in coastal daily life. The daily life meanings and the rupestrian meanings among coastal groups seem to have walked on parallel paths. While the “know how” about whale hunting lacks of support between the materiality, the “Know how” for obtain rupestrian whales standardized the visual codes that we today named “El Médano”.

The application of other methods that seek to relate the rock paintings to archaeological deposits of the context should be part of a critical contextual record and taken "with a grain of salt"[130]. This is the case of the painting associations in caves or rock shelters with sedimentary deposits on their floors. Although in this study methods of direct and indirect dating have been considered to ascribe diachronically some of the rock painting modalities in El Médano[131], in fact each association is based on a critical tracking of the information collected. Casting doubt on them has also implied caution in associating the paintings diachronically with data generated in adjacent altered deposits or in the state of “huaqueo”[132], like the Punta de Plata rock shelter, that althoughit was systematically excavated, was almost 100% altered by previous illegal excavations, leading it to be considered only as referential information[133].

Diametrically opposed to the traditional model of the Taltal archeology, the cetacean remains observed in the prehistoric and historical archaeological record of this area are perfectly explained by their bone collecting, oil and meat in occasional strandings on the coast during the annual migration cycles of these marine animals, as chroniclers, soldiers, travelers and researchers systematically have indicated since the 17th century[134] (table 1). What happened before the Spanish conquest on the arreiccoastcan only be interpreted based on information from Spanish/Indigenous contact moments and archaeological data. Along with the scarce or nonexistent presence of cetacean and large fish remains in the domestic deposits of pre-Hispanic coastal archaeological sites, there is a conspicuous set of objects and materials that allude directly or indirectly to these marine species in symbolic contexts. As it is the case of modeled marine animals or objects made of whale bones present in the offerings to graves from the late Archaic period (ca. 6000-3500 years B.P.)[135], raw material that in events such as the offerings deposit of the formative grave studied in Choluto (2450 years B.P.), was used to make 33% of the pieces[136]. Examples of graves with cetacean bone remains are common in the prehistory of the South-Central and southern Andean coast, as it is seen in the graves of Chinchorro black mummies (ca. 7000 B.P.), the late archaic graves dating to 4850±25 years B.P. in Copaca, near Tocopilla, or the Late Archaic graves of the coast of Taltal with the recognized "People of stone circles"[137]. There are notable examples of offerings of

[129]B. Ballester La caza de cetáceos...
[130] R. Bednarik, “Art Origins”, Anthropos num 89 (1994): 169-180.
[131] J. Castelleti, Los hijos…
[132] Or illegal interventions in archeological sites.
[133] Cf. B. Ballester, El tiempo... 58.
[134] J. Castelleti, Los hijos...
[135] See G. Mostny, Arqueología de Taltal...
[136] J. Castelleti, Los hijos...
[137] B. Arriaza and V. Standen, Catálogo de momias (Arica, Universidad de Tarapacá, 2016); V. Castro et al., Ocupaciones arcaicas...; G. Mostny, Arqueología de Taltal...

cetacean remains in pre-Hispanic graves in the vicinity of Tocopilla[138]with the remains of dolphins in graves and moments of late occupation in Copaca-1 site, which constitute 47% of the total mammals of the deposit, which, at the same time, make up half of the archaeofaunal record studied[139].

The foregoing information corroborates not only the role granted to cetaceans and large fish in the conformation of funerary contexts, the coastal landscape and the cosmovision of human groups from early times, but also the role of fishing events or exceptional marine huntingamong the Andean coastal groups. Thisis probably linked to ceremonies that implied a kind of social prestige for fishermen, and that perfectly explains the income of low MNI of exceptional species (especially marine species) to the domestic and funerary archaeological record[140]. It is estimated that all these coastal behaviors situate the large cetaceans and, above all, their annual migrations in the position of agents in the conformation of an annual calendar for the conformation of the coastal landscape, which could have even survived until late historical moments[141].

Once we have discarded the traditional model to interpret the El Médano rock paintings on the southern Andean coast, we face the next question: Can we interpret the El Médano rock paintings through other theoretical or cultural schemes? Other authors have sought answers in the ethnographic analogy, based on supposed environmental and cultural conditions that allow such a comparison. This is the case of the analogy established between hunting practices of archaeological and ethnographic Arctic cultures and the northwestern North American coast, ethnographic groups of Indonesia and the prehistoric and historic-early Changos of the arreic coast[142].This is a focus strongly criticized in the local academic environment due to lack of sustenance in relationship to the diachronic correlations established between the groups under study and for not considering the local history of each group, many of them directly influenced by the western whaling industry since the 18th century[143]. For this reason, as a final interpretation exercise of the relationship that humans and whales developed on the Andean coast, it is suggestive to understand this prehistoric and proto-historical phenomenon through the ideological matrix of Andean and Patagonian neighbor coastal groups, where, except for the scarce references of occasional whale hunting events (table 1)[144], a cosmovision described as marked by the figuration of moments of the year, celestial bodies or forces of nature, through the image of different whales species or other marine species, as for example described by the informants of the cleric Martin Gusinde and the anthropologist Ann Chapman among ethnographic groups from Patagonia[145]. An example is Xalpen, central character of Hain Selk'nam, described by Gusinde as anichthyomorph. Also Tanu, Xalpen's sister, is described as a whale (*Ochen* or northern sky), probably a minke[146], which characterized in its "Tanu del oeste" version, was photographed by Gusinde in

[138] B. Ballester La caza de cetáceos...
[139] V. Castro et al., Ocupaciones arcaicas...
[140] Cf. J. de Arriaga, Extirpación...; V. Castro et al., Ocupaciones arcaicas...
[141] Cf. R. A. Philippi, Viage al desierto...
[142] B. Ballester, Tecnología de arponaje...; B. Ballester La caza de cetáceos...
[143] P. de la Fuente, "Las 'otras' ballenas del Cabo de Hornos: aprovechamiento y significado de los cetáceos en el mundo canoero yagán, siglos XIX y XX". In D. Quiroz y P. Toledo (eds.), Balleneros del sur. Antropología e Historia de la industria ballenera en las costas sudamericanas (Santiago: Andros Impresores, 2014), 117-141; F. Valdés, Balleneros del norte...
[144] E. L. Bridges, El último confín...
[145] A. Chapman, Hain...; A. Chapman, Yaganes...; M. Gusinde, Los indios...
[146] M. Massone and A. Prieto, Ballenas y delfines...

1923[147], presenting a morphology similar to the motif called "trianguloid"[148] in the El Médano pictographs (figures 3d-3f, 7i, 9a).

Figure 9
Ethnohistorical and archaeological contexts with figuration of cetaceans or fishing techniques on Andean and Patagonian coasts: Western Tanu photographed by Gusinde in 1923 (Gusinde 1986) (A); Lithography published byBenzoni in 1572 (Benzoni 2009) which reproduces fishing by rodeo and navigation on the central Peruvian coast (B); Nazca ceramic vessel with an orca modeled (C) (ca. 200 B.C.-600 A.D.) In http://www.museolarco.org/catalogo/ficha.php?id=14798; and ataltaloidblade (D).

It is likely that some symbols of the central and southern Andean coastal cosmovision, specifically those that revolve around cetaceans and large fish from probably late archaic and formative periods (ca. 6000-1500 B.P.)[149] (figure 9c), and that were massified with the metallurgical, ceramic and textile iconography of the Late Intermediate Period (PIT) (ca. 1000-450 B.P)[150], link the presence of large cetaceans together with the red pigment use, a process that for the arreic coast allowed the paint of panels with standardized scenes of cetaceans linked to boats, ceremonial moments in which the coastal groups in all likelihood developed their knowledge about calendar cycles linked preferentially to cetacean strandings, and to a lesser extent to other natural or social events.

[147] M. Gusinde, Los indios...; A. Chapman, Hain...
[148] Trianguloid: three-cornered form.
[149] H. Silvermann y D. Proulx, The Nazca…
[150] B. Ballester, El Médano rock art...; D. Salazar et al., “Minería y metalurgia en la costa arreica de la Región de Antofagasta, norte de Chile” Boletín del Museo Chileno de Arte Precolombino Vol: 15 num 1 (2010): 9–23.

In protohistoric moments, some Andean coastal regions also recorded local groups in occasional marine raid ceremonies, as attested by the indigenous guidelines for navigation and guano obtaining on the Peruvian south coast, reported in chronicles as in the following testimony:

> "And in the town of Huacho when they wentto the islandsseeking guano, where the cliffs of Huauraare, they made a sacrifice, spilling *chicha* on the beach, sothe rafts do not sufferdisturbance, after two days of fasting. And when they arrived on the island they adored HuacaHuamancantac as the guano lord, and offered him the offerings, so that he would let them take the guano, and when they arriveback to the port, they would fast for two more days, and then they danced, sang and drank."[151]

Not discounting their link to the ceremonies described above, the figures of cetaceans and large marine animals are recorded symbolically connected also to the funeral space among traditional Andean groups, such as the well-known work of psychopomps granted to whales and sea lions on the south coast of Peru, similar to the MapucheTrempulkalwe[152]:

> "... Others have as tradition that the souls of the dead go where their Huacas are. Those of the town of Huacho, and the others of the coast, say that they go to the island of the guano, and that the sea lions that they call Tumitake them there."[153]

8. Conclusion

In this study, aspects that support Niemeyer's thesis on the El Médano rock painting style[154] have been questioned, by combining a series of iconographic, ethnohistoric and archaeological factors. Likewise, the reference of the narrative involved in the rock paintings and the supposed Camanchaco whale hunting related by Vázquez de Espinosa is also questioned, given the lack of cetacean remains and large fish in pre-Hispanic and historical domestic coastal deposits, along with their almost exclusive detection in funerary contexts, which is consistent with the occasional events of hunting such marine animals, probably through regulated ceremonies but especially from strandings. This phenomena, a recurrent event on the arreic coast from the Miocene, it is specified from paleontological studies to chronicles of Spanish/Indigenous contact moments[155]. Coincidentally, the Paposo/Taltal coastal groups would have interacted with these natural cycles through the execution of sporadic ceremonies that implied the induction of socially standardized knowledge, probably since pre-Ceramic times.

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[151] J. de Arriaga, Extirpación... Cap. V, p. 31.
[152] Abate J. I. Molina, Compendio... 91.
[153] J. de Arriaga, Extirpación.... Cap. VII, p. 41.
[154] G. Mostny y H. Niemeyer, El arte rupestre...; G. Mostny y Hans Niemeyer, Arte rupestre en el Médano…
[155] A. Capdeville y A. Capdeville Rojas, Notas arqueológicas…; A. de Ovalle, Historica Relacion…; N. Pyenson et al., "Repeated mass strandings of Miocene marine mammals from Atacama region of Chile point to sudden death at sea", Proceedings of Royal Society Vol: 281 (2014).

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