Mewlen, Tornadoes and Waterspouts in Chile: A Situated Geomythological Reading

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This is an English version of an article originally published in Spanish in Chasqui. Revista de Literatura Latinoamericana. Mapudungun terms and Spanish-language bibliographic references are preserved in the original. In-text verbatim quotations have been translated into English and are marked as translations from the Spanish.

Introduction

Before the tornado outbreak of May 2019 (Barrett, Marin, and Jacques-Coper; Vicencio et al.; Marín, Barrett, and Pozo), the occurrence of tornadoes and waterspouts in Chile was largely unknown to the population, and even to the scientific community. During 30 and 31 May 2019, at least seven tornadoes were reported in the Maule, Ñuble, Biobío, and Araucanía regions of southern Chile. Two tornadoes cut across large urban centers of the Biobío region: Los Ángeles on 30 May 2019 and Talcahuano–Concepción the following day. Photographic and video testimonies were widely disseminated through social media and traditional news outlets, thereby (re)establishing tornadoes in the collective memory. These events, which surprised both the general population and specialists in the atmospheric sciences, do not constitute an entirely new phenomenon in the territory. Historical records attest to the presence of tornadoes in Chile from the time of the conquest onward, with sporadic events capable of producing major material destruction and loss of life, and which have occurred principally in what is traditionally considered Mapuche territory (Bastías-Curivil et al.). Nevertheless, the atmospheric-science literature has paid scant attention to the historical and cultural dimension of tornadoes in Chile.[1]

In contrast to this gap in the institutional record, the Mapuche people retain forms of knowledge that refer to extreme atmospheric phenomena. This article proposes that Mapuche mythical narratives encapsulate a form of situated knowledge—the *inarrumen*—about tornadoes and waterspouts, in which their occurrences are signaled and relevant observations about atmospheric hazards are transmitted, with a memory that may reach back to pre-Columbian times. From the framework of a situated geomythology—which understands myths as vehicles for transmitting observed natural phenomena, but also as relational systems of interpretation—we argue that these

[1]R. Rondanelli-Rojas and M. I. Silva acknowledge the Center for Climate and Resilience Research, (CR)[2], FONDAP/ANID 1523A0002. The authors thank editor Cynthia Tompkins and the anonymous reviewers for their rigor and enthusiasm during the editorial process.

narratives do not operate as mere literary devices, but rather preserve experiences linked to severe storms in southern Chile, integrating environmental memory, ritual practices, linguistic patterns, toponymy, and the legitimation of religious figures such as the *machi*.

Historical background of tornadoes and waterspouts in Chile

Tornadoes and waterspouts are rapidly rotating columns of air, a few tens to a few hundred meters in diameter, extending vertically from the surface to the base of a cumulonimbus cloud. The most intense tornadoes occur in connection with parent storms known as supercells. The dynamics of supercell storms arises from two principal factors: vertical instability (density differences between near-surface air and air higher in the atmosphere) and vertical wind shear (differences in wind direction and magnitude with height). Supercell storms may last several hours and are usually accompanied by electrical activity, heavy rainfall, hail and, in the most severe cases, tornadoes. When a tornado forms over a water surface it is known as a waterspout and is not essentially a different phenomenon from a tornado (American Meteorological Society).

Tornadoes and waterspouts are not unknown phenomena in Chile, although they are infrequent. Some historical authors emphasize their existence as coastal phenomena—delimiting their occurrence to the zone between Biobío and Chiloé—and also note their relative rarity: "even the waterspout that from time to time majestically promenades along the coast of Arauco, Valdivia, Llanquihue and Chiloé" (Anrique and Silva 293) [translated from the Spanish]. In 1988, in one of the earliest references to tornadoes in Chile in the scientific literature, the Argentine meteorologist María Altinger de Schwarzkopf recorded an area of tornado occurrence between latitudes 35° and 40° S (Altinger de Schwarzkopf 28).

Nevertheless, scientific knowledge about the historical presence of tornadoes in Chile is limited and poorly disseminated. An illustrative case is the Valparaíso tornado of 19 June 1991: despite the clarity with which local residents described the phenomenon, Professor Sergio Erazo of the Pontifical Catholic University of Valparaíso stated categorically, "There are no tornadoes in our area […] Tornadoes are a typical phenomenon of tropical zones, but not in countries like ours, where temperatures are lower" ("Desolación" A10) [translated from the Spanish]. Another historical sign of this skepticism is found in the voice of the Abbot Juan Ignacio Molina—regarded as among the most distinguished naturalists of his time—who declared with authority in his *Essay on the Natural History of Chile* (1810): "Typhoons and waterspouts […] although they are common in the western waters of the Pacific Ocean, that is, in its Asian islands, have not been observed until now in the portion of that ocean that bathes the coasts of America" (*Ensayo* 24) [translated from the Spanish]. The documents analyzed up to 2019, with few exceptions, oscillate between skepticism and a lack of evidence regarding the presence of waterspouts and tornadoes in Chilean territory. In this context, the currency of ancestral knowledge of these phenomena

becomes especially relevant—in particular, Mapuche knowledge, grounded in attentive, dedicated observation of nature, which transmits lore about precautions in the face of such extreme meteorological events.

Theoretical and methodological framework

We propose a situated geomythological reading of Mapuche mythical narratives, understood not merely as symbolic or structuring expressions, but as complex forms of knowledge embodied in specific territories and transmitted through orality.[2] Our starting point is the classic definition of geomythology (Vitaliano), whose methodological contribution consists in correlating narratives with indications of geophysical processes. We read that program, however, in a situated key: when the event–narrative correlation is absolutized as the sole criterion of truth, the analysis can slip into reductionism (disregarding the ritual, ethical, and political density of myth) and epistemic hierarchization (subordinating other regimes of truth to modern science). Our reformulation does not deny geomythology but delimits its claim: the search for evocations of and resonances with geophysical phenomena is one dimension of reading, valuable but not exhaustive, which must coexist with the relational efficacy and the situated knowledges that the narratives activate in their territories.

Definitions and debates on myth

Throughout the nineteenth century, myth was understood fundamentally as a way of explaining nature and the differences and similarities in the character of peoples, attributed to the imprint of the natural environment. As Leonard and McClure note (12), this nineteenth-century reading saw in myth a "primitive science" that sought to describe the origin of the elements of the world—fire, storm, sun, rain—and to explain the unpredictable forces of nature. In this frame, authors such as Max Müller (Müller; Carroll) and Adalbert Kuhn (Kuhn) conceived myth as the result of a confusion between poetic language and observation of the environment: ancient peoples supposedly "personified" natural phenomena, generating narratives that translated what were really physical processes into divine figures.

[2]Here we must note that our documentary corpus consists of mythical narratives transcribed into Spanish from a first or second source, and therefore a recognizable epistemic distance from orality exists. Our translation is thus removed from the primary source, which can be found in what Elicura Chihuailaf calls *oralitura*, and which Pérez de Arce explains as follows: "Oralitura […] includes the inflections of the voice, gestures, sounds; it is sensitively linked to the surroundings of life. In short, it is an open, dynamic system, opposed to the rigid and closed system proper to writing" (79). [Translated from the Spanish.]

Structuralism, for its part, shifts attention toward the internal logic of myth (Lévi-Strauss, *El Pensamiento Salvaje*). For Lévi-Strauss, myths are not to be understood as pre-scientific narratives but as rigorous systems of thought that organize the experience of the sensible world through oppositions, analogies, and associations drawn from the environment. Structuralism thus breaks sharply with the naturalist tradition of myth by seeking a universal internal grammar whose function is precisely to mediate the tension generated by those oppositions. Yet the structural approach has its limits: its high degree of abstraction tends to detach narratives from their territorial and historical contexts (Bensa 35-40; Leonard and McClure 23) and from the religious and cultural practices that sustain them. This move—analytically powerful—can reproduce epistemic hierarchies if it turns structure into the sole criterion of intelligibility and displaces indigenous readings to a secondary plane. Still more problematic is the mediated character of the ethnographic archive on which many structuralist comparisons were built. As Briggs warns (para. 27), the "mythical texts" analyzed by classical anthropology are often colonial artifacts, appropriated, filtered, and fragmented by the practices and expectations of non-indigenous researchers and missionaries.

In contrast to structuralist universalism—which translated myths into abstract structures of thought detached from their territories—Latin American perspectives have emerged that reinscribe indigenous narratives within their own ontological and epistemological regimes. In the Andes, for example, Marisol de la Cadena has shown that the relationship between humans and earth-beings is not organized around the modern separation between nature and culture, but unfolds as a coexistence among human and more-than-human entities endowed with agency and speech. From Amazonia, Eduardo Viveiros de Castro proposes Amerindian perspectivism, an ontology that reverses modern perspectivism: "the world is inhabited by many species of beings […] endowed with consciousness and culture, and […] each of these species sees itself […] as human, seeing the others as non-human, that is, as species of animals or spirits" (36) [translated from the Spanish]. Rivera Cusicanqui (*Mito y desarrollo*) shows the capacity of Andean myths to encode historical memory, whose reactualization in ritual forms of insurgency has been able to anticipate and orient resistance to old and new colonialisms (72-73). This Andean perspective thus shows that the relations among earth-beings encoded in myth possess political and ethical agency, displacing myth from the condition of an object of representation of nature to that of situated thought, where the bond between territory, narrative, and being is not allegorical but ontological. At this point, it would be impossible to exhaust the discussion of the multiple explanations of myth's origin and function found in the literature, or to try to answer the question of whether myth is true and, if so, in what sense—historically or historico-naturally—as would be most pertinent for our case. The different perspectives highlight diverse aspects but converge in recognizing in myth a claim to truth: not understood in terms of empirical verification, but as a form of narrative and social

coherence that orients how communities understand their surroundings and regulate their conduct (Armstrong 7).

By myth, we understand in this article a ritual and oral, authorized and intergenerational narrative that formulates claims to truth and orients collective action, condensing the memory of significant—often traumatic—events and of the relationships among human beings, animals, and more-than-human beings. Read from a situated geomythology, the mythical narrative resonates with observational records, relating to modern geophysics in a non-hierarchical way: coexisting without being conflated, and generating interpretable affinities rather than correspondences, within a relational regime of truth.

Geomythology and its limits: toward a situated perspective

In its modern formulation, Vitaliano defines geomythology as the geological application of euhemerism: the search for the "true" natural phenomenon underlying myths and legends. This reading operates alongside the cosmological-ritual dimension of mythical narratives—which it does not purport to evaluate—and methodologically suspends that plane in order to focus on observational clues and spatial anchorings that might refer to significant, usually catastrophic, geophysical events. From there, the object of study encompasses oral traditions (myths, legends, sagas) whose relevance lies in the enduring imprint they leave on collective memory. Geomythology, however, considers the truth-value of mythical narratives to correspond to the natural phenomena that gave rise to them, and in this sense it does not depart in "form" from the methodological attempts of nineteenth-century naturalist mythology. If geomythology has managed to broaden its scope compared to naturalism, this is not so much due to the intrinsic power of its method as to the accelerated evolution of the methods proper to the Earth sciences over the past century and a half, which have expanded the concept of the observable to spatial and temporal scales previously out of reach. Read literally, geomythology falls into a scientistic reductionism when it treats myths as distorted chronicles of geophysical events. By disregarding their symbolic density and their own epistemological value, it becomes instrumental and extractive: it takes from the narrative whatever is useful to "read" the event and discards its cosmovisional and performative context, disarticulating its integrity and reproducing hierarchies that subordinate ancestral knowledges to "objective" knowledge. This critique resonates with what Villagrán and Videla (251-52) observe, warning that any attempt at unilateral interpretation is insufficient to grasp the complexity and richness of meanings inscribed in such narratives. These limitations do not annul the structural and epistemological contribution of myth; they call for its complementation with a view that restores the narrative's circumstance. We propose, therefore, a situated geomythology: inspired by the idea of situated knowledges (Haraway 583-84; Harding 54-55), which assumes that all knowledge—scientific included—is produced from a concrete place and history. Under this approach, research renounces the claim to universal neutrality and

objectivity and orients itself to reading mythical narratives from the territory and the temporality that generated them, thus avoiding external, anachronistic, or extractive interpretations.

Rather than seeking empirical "proofs," situated geomythology trains the ear to the evocations that narratives trace with geophysical processes, without subordinating those resonances to their relational, political, and ritual dimensions. It thus departs from the nineteenth-century comparative mythology that reduced myths to natural explanations, and from structural or functionalist anthropology, which read them solely in terms of form or function, disregarding their territorial anchoring. The truth of myth does not depend on a factual correspondence with verifiable events but on situated criteria that integrate its relational efficacy—its capacity to generate understanding and to orient action—with the material and ethical relationships among the beings of the territory. The field of situated geomythology stands at the frontier where myth mediates between the human and natural forces; its limit is operational: if a narrative activates neither situated affinities nor relational efficacy, it falls outside this approach without losing validity in other regimes. We therefore attend to these evocations without translating them into "facts" or subordinating them to modern science, and we work on two complementary planes: (i) situated affinity, when a mythical narrative evokes features present in geophysical phenomena; and (ii) relational efficacy, when the narrative activates memory, care, and regulation in the territory. In this framework, ancestral knowledges and science coexist in contiguity and without pretensions of reconciliation, as a *ch'ixi* epistemology "rooted in our territories and bioregions," one that makes it possible to "build networks of meaning and ecologies of knowledges" in order to generate a "habitable territory" and a "language with a homeland" (Rivera Cusicanqui, *Un mundo ch'ixi* 81) [translated from the Spanish].

In the case of tornadoes and waterspouts, this perspective is especially pertinent. Because of their brief duration and low frequency—despite being potentially catastrophic and lethal—they tend to leave no persistent material traces and, as we have seen, they have frequently remained outside the official historiographic or scientific record. In cultures such as the Mapuche, however—with a dense oral tradition and a long-standing system of ecological observation—these events can be inscribed in mythical narrative, whose currency is continually updated through ritual practices and symbolic prohibitions.

The construction of knowledge: inarrumen and epew

In Mapuche thought, the earth—*mapu*—is neither a resource nor a passive background: it is a space endowed with agency and the capacity for relation. Within it, the visible and invisible dimensions of the world are interwoven. Human language is not conceived as a system arbitrary to or external from nature, but as the very voice of the earth: *Mapudungun*—literally "speech of the earth"—expresses that ontological continuity between territory, word, and knowledge. Orality,

in all its manifestations, is therefore a way of relating to the environment, of interpreting its signs and participating in its balance. Within this structure of thought, the *inarrumen* constitutes a situated epistemology, the result of a practice deeply rooted in the everyday experience of the territory. According to Ñanculef (*Tayiñ Mapuche Kimün*), the term is not limited to the simple action of "observing" in a restricted sense, but integrates attention, perception, memory, and dwelling as inseparable acts. Etymologically, *inarrumen* combines *ina*—"to pass carefully along a dangerous edge"—and *rumen*—"to travel frequently or continuously"—evoking the image of a subject who moves attentively through an unstable environment, interpreting natural signs in a prolonged and conscious way, in the service of life and survival: "It is an epistemology, an instinctive methodological act of becoming aware of the world, of the total universe, of being Mapuche, of understanding nature and its laws" (23) [translated from the Spanish].

This knowledge is sublimated in oral narratives, especially the *epew*[3] (mythical narrative stories) and *nütram* (explanatory stories or conversations that may or may not have a narrative structure) (Hugo Carrasco, *Relato Mítico Mapuche* 115), which are not mere supernatural tales but narrative devices that articulate collective memory, cosmovision, and social norms. The mythical narratives thus function as vehicles of the *inarrumen*, crystallizing experiences in culturally intelligible narratives that guide communal action in relation to the environment. Within this framework, *epew* and *nütram* transmit not only scientific knowledge (*kimün*), but also fundamental values for life in community—such as respect (*yamüwun*), reciprocity, and harmony with the other beings inhabiting the earth—and make it possible to socialize emotions within the community (Riquelme Mella et al. 6-8).

From this perspective, narratives about storms, tornadoes, and whirlwinds are not mere metaphors but narrative technologies of memory and knowledge. Through the *inarrumen*, the *Nag-Mapu* is conceived as a space of record and relationship, where mythical narratives function as tools of preservation and of collective orientation. This mode of knowledge articulates the empirical with the symbolic and grounds its validity in the relational coherence between the territory and the balance of the forces of the beings that inhabit it. Through the production and utterance of these mythical narratives, communities observe, interpret, and transmit information about the natural and social world, integrating memory, sensible experience, and norms of collective action.

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[3] According to Ñanculef ("Astronomía, Cosmovisión y Religiosidad Mapuche" 30): "Everything was observed (it was made *Inarrumen*), and for that reason we have argued that many people eventually became persons exclusively devoted to observation […], who, from observing one thing or another so much, issued their reports of what they had observed, through the mechanism of the *Epew*…" [Translated from the Spanish.]

A tornado in La Araucana: Carahue (La Imperial), April 1554

The first plausible literary record of a tornado in Chile—and one of the earliest on the continent—corresponds to 23 April 1554 in La Imperial (today Carahue), narrated by Alonso de Ercilla y Zúñiga in *La Araucana* (Canto IX, Book I). Although the work is an epic, the author himself claims a historical vocation: "It is an account without corruption, drawn from the truth, cut to its measure" (I, 3) [translated from the Spanish], and criticism tends to favor its testimonial value (Durand). From a situated geomythological reading and in light of current meteorological knowledge, several passages presented as prodigies—an antecedent roar, large hail, intense electrical activity, a sweeping whirlwind—are consistent with the phenomenology of a tornadic storm. This key allows us to reevaluate the supernatural explanations of the episode (in *La Araucana* and related chronicles) and reinforces the plausibility of the testimony that Ercilla gathered from indigenous and Spanish informants shortly after the event. In this sense, and with some methodological flexibility, the account can be regarded as a geomythological chronicle, based at least in part on testimonies collected through *nütram*, as Ercilla himself attests. The story in question begins in octave 8 of Canto IX of Book I. In this canto, Ercilla relates the Mapuche advance upon the city of La Imperial, where a "miracle" is said to have occurred that prevented a confrontation between the Mapuche, commanded by the *cacique* Caupolicán, and the Spanish soldiers who were defending the city:

> *When the camp from there was about to move,*
> *and the trumpet already sounded the march,*
> *suddenly the air began to tumble,*
> *and thickened with mournful prodigies:*
> *clouds with clouds came together to close,*
> *a turbulent roar was rising up,*
> *and with violent, wrathful rushes,*
> *the four winds displayed their fury.*
> *Harsh water, hail, dense stones*
> *the tangled clouds discharged:*
> *bolts, thunder, lightning in haste*
> *rent the heavens and tore the earth;*
> *the winds piled into a rough dam,*
> *contending in their full violence:*
> *whatever it meets the whirlwind snatches,*
> *lifting it in a furious eddy. (IX, 8-9) [Translated from the Spanish.]*

In this description by Ercilla we recognize the atmospheric phenomena that, only on the occasion of the recent May 2019 tornadoes, have come to be associated with the presence of tornadoes and their parent storms: "a turbulent roar was rising up" evokes the deafening noise preceding a tornado's impact, today likened to the rumble of a train or many trucks. "Hail, dense stones" undoubtedly refers to the large hail that usually accompanies the most severe storms

generating tornadoes in Chile; "bolts, thunder, lightning in haste" to the electrical activity typical of such severe storms; "whatever it meets the whirlwind snatches…" clearly describes the tornado and its effects on surface materials which, once reached by the vortex, are often lifted into the air —"lifting it in a furious eddy"—and set to spinning, forming what in English is called tornado debris.

This autumn storm and aborted battle were of great symbolic and cultural significance for both sides confronting each other in the Arauco War, regardless of whether a tornado was actually generated.[4] When the storm occurred, Ercilla had not yet arrived in Chile and therefore—as he states in the last octave cited—the account is a compilation of details "reported by many," with an exact date given "so that it may be told with greater authority" (IX, 18) [translated from the Spanish], which lends greater credibility to a narrative that he himself feared might be taken as fantastic and supernatural, clouding the truthful vocation of his work. After the description of the storm, the account in Canto IX continues with what is known as the "miracle." It is impossible to ascertain whether the mentions of religious figures such as *epunamün*, the Virgin Mary ("in a cloud a woman came") and the Apostle Santiago—military patron of the Spanish—("accompanied by a white-haired elder") arose from the interpretation of actually observed atmospheric phenomena, or whether they are merely Ercilla's literary contributions[5] (IX, 13-14). Here, however, we will adopt a reading from situated geomythology.

Regarding Epunamon, Ercilla noted: "it is a name they give to the devil, by which they swear when they wish to bind themselves infallibly to fulfill what they promise" (846) [translated from the Spanish]. Etymologically it corresponds to a being of two (*epu*) feet (*namün*). Ercilla describes it as a slender being of fire and light, with a deep, hoarse voice, similar to a dragon wrapped in flames, which appeared in the sky during the electrical storm: "At this Eponamon appears to them in the form of a horrible and fierce dragon, with coiled tail, wrapped in fire" (IX, 10) [translated from the Spanish]. Mariño de Lobera describes the episode in his chronicle in similar terms: "[…] it happened that the work was thoroughly drenched by force of fire; for while the opposing army had encircled the city, a flake of fire fell from the heavens, which for a time struck the Indians dumb with no small awe and dread" (176) [translated from the Spanish].

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[4]Bengoa describes this period as one of a profound religious response from the Mapuche to the events immediately following the death of Pedro de Valdivia: the massacre and preventive war that erupted around La Imperial and the depopulation of Concepción (Bengoa 257-58).

[5]A discussion of the "miracle" appears in Prieto, where independent texts predating *La Araucana* are compared. In particular, Pedro de Valdivia's 1550 letter to Emperor Charles V describes a miracle in which the same figures—the Virgin, the Apostle Santiago, and the devil—play the same roles as in *La Araucana*, and the same occurs in Vivar's chronicle (Prieto 208-09).

Outside the context of an electrical tempest, a “flake of fire” might be a meteorite or incandescent volcanic material. In the context of the storm, this flake of fire resonates with the idea of “ball lightning,” an atmospheric-electricity phenomenon observed by various cultures and whose explanation, and even physical reality, remains a matter of study. Stenhoff defines it as a phenomenon “luminous and approximately spherical, with a diameter of about 20 to 50 cm and a total lifetime of a few seconds, which moves independently in the air, usually in a horizontal direction” (1-2) [translated from the Spanish]. Ball lightning occurs in the great majority of cases (>95%) in association with thunderstorms, and in particular, tornadic storms are among those most intense in electrical activity. It is not surprising, then, that reports of ball lightning exist during tornadic storms (Stenhoff 34). If the “flake of fire” was indeed ball lightning, Mariño de Lobera’s chronicle would contribute an additional and independent element confirming the presence of an electrical storm during the aborted battle at La Imperial described by Ercilla. Another curious element pointing in the direction of the accuracy of Ercilla’s account with respect to the occurrence of the electrical storm is the possibility that the Mapuche who witnessed the “descent of the Virgin” were struck and injured by the ball lightning or by a conventional lightning bolt: “it seemed to them that from some perceptible fire behind them their backs were being set ablaze, and so they ran with even greater haste” (IX, 17) [translated from the Spanish]. Although ball lightning is usually harmless, there are cases indicating that it may produce burns and even death (Stenhoff 74).

On the basis of Ercilla’s description and the other contemporary chronicles, the flake of fire attributed to Epunamón evokes the presence of a *cheürfe*, a luminous being that traverses the sky in search of victims to feed upon, heralding death as it moves across the firmament, whose manifestations were visible in the lightning of electrical storms and in volcanic columns, as well as in comets and meteors disintegrating upon entering the atmosphere (Bastías-Curivil 272). Another element that may support the interpretation of Epunamón’s appearance as akin to ball lightning is the equivalence recognized by Alonqueo (111) between Epunamón (“being with two thin feet”) and Anchimalén (“little girl with phosphorescent light”). Concerning Anchimalén, Alonqueo tells us: “her size is small” and “she is detectable only at night by the phosphorescence she radiates, which makes her visible as she moves” [translated from the Spanish]. Again, the smallness of Anchimalén and the characteristic of “walking in leaps and turns, like a whirlwind, because the light comes out of her mouth” (111) [translated from the Spanish] evoke descriptions of ball lightning.

The mention of the appearance of the Virgin Mary in a cloud after the storm, for its part, resonates with the phenomenon of crepuscular rays, which occur when sunlight is partially obstructed by objects along its path, such as clouds or mountaintops. Tornadic storms, unlike the classic rainfall of southern Chile produced by the passage of a midlatitude depression, present cleared-out regions (the so-called “clear slot”). The photograph in Fig. 1 shows a real example of

such a storm, where, at the same time as a tornado is observed, crepuscular rays can be seen forming in the clear region of the storm.

The cultural preservation of tornadoes in Mapuche indigenous memory

Mythical narratives can, in certain contexts, constitute the only form of record available for natural events that leave no enduring trace or written evidence. Unlike phenomena such as volcanic eruptions, which leave visible deposits in the landscape, tornadoes and waterspouts have a fleeting presence: their effects disappear with the regeneration of vegetation or do not even mark the ground when they occur at sea. In territories where written culture did not develop or was not imposed, as in the case of the indigenous peoples of southern Chile, oral transmission was the fundamental medium for preserving the memory of the extraordinary. One argumentative path allowing this hypothesis to be supported from the Earth sciences is the application of the principle of uniformitarianism, formulated by James Hutton in 1795. This postulate holds that the physical, chemical, and biological processes operating today are the same that acted in the past, though their intensity or context may have varied (Iriondo 251). If we accept that the current atmospheric conditions favoring the formation of tornadoes have remained relatively stable for centuries, and if we know that these phenomena have occurred—however sporadically—in the recent history of Chile, it is reasonable to suppose that they also occurred in times prior to written records. In the absence of direct documentation, myths and legends could constitute the only available archive of such experiences.

In what follows we present a series of oral accounts, legends, and traditional tales from the Mapuche world whose reading, in a geomythological key, allows us to identify the possible inscription of tornadoes and waterspouts in indigenous cultural memory. Each one attests, from different registers, to how the extreme atmospheric phenomenon is observed, narrated, and reinterpreted so as to acquire meaning within a communal, ecological, and symbolic logic.

“Cuento de un Terremoto” (“Tale of an Earthquake”)

We begin by citing the account of the Mapuche Nahuel Huinca, from the locality of Maquehua, collected by Tomás Guevara in 1908 and titled by him “*Neyim ñi epeu*” or “Cuento de un Terremoto” (“Tale of an Earthquake”):

> Nahuel Huinca was still young at the time of the earthquake.
>
> Four diviners named Maripil, Puran, Ruquil, and Paillal announced a tremor to the caciques. It would last six days. They said that from a lagoon a caicai (“myth”) was going to emerge and join with the Llul Llul (“animal shaped like a cat”). If they joined, the world would end.
>
> Then the caciques held a nguillatún at Puancho, on the shore of the lagoon from which the caicai was to emerge. They killed many black ewes, and a Mapuche man named Antio they

> killed with a lance, and they told him not to let the caicai pass. The diviners cast his body into the sea.
>
> On the fourth day of the tremor they felt something like a whirlwind of wind outside the lagoon, from where it had come out; it was the caicai. They threw the lasso on it and, with lances, all together they turned it back into the lagoon. It trembled no more. (335-36) [Translated from the Spanish.]

The mention of the earthquake evidences the profound effect of such phenomena on Mapuche collective memory. In the account, the "earthquake" is said to have lasted four days—an implausible duration for an individual seismic event. If one considers pre- and post-event seismicity, known as "swarms, precursors, and aftershocks" (Ruiz and Madariaga), it is reasonable to interpret the reference as alluding to a period of days or weeks of continuous seismic activity, whose effects became integrated into the mythic memory of the communities.

Nahuel Huinca's legend also reveals psychological aspects of the Mapuche people, in which concepts such as dualism, value-laden and associative symbolisms with animals, and the performance of a human sacrifice in order to "check" the development of the waterspout in the Puancho area emerge (Grebe, Pacheco, and Segura 65; Latcham 129). In the Mapuche worldview there is a logical transitivity of symbols based on natural elements, and ideas of balance and intrinsic reciprocity are also present, in which both material and immaterial beings belong to a "totality," and subtracting from or modifying that "totality" brings misfortune upon the community (Bastías-Curivil 153; Foerster 60).

In this sense, we are told that four diviners or *machi* were the ones who prophesied the four-day earthquake with its corresponding waterspout at Puancho. The number "four" alludes to the idea of duality—that is, to the idea of harmony, which is achieved only if each aspect of reality comes in twos or multiples of two: day/night, life/death, man/woman, and so on (Grebe, "Presencia del dualismo"; Grebe, Pacheco, and Segura 65-69; Lévi-Strauss, *Antropología Estructural* and *Mito y significado*). It is no accident that four *machi* prophesy the imbalance; here one might say that harmony preceded chaos. The account also mentions the presence of the Llul Llul, an animal also described under the names *ñull ñull* or *chinchimén* (Latcham; Plath 336). The union of this being with the Kaikai would signify the *mapu feipingüm* or "end of the world" of the Mapuche, an eschatological event understood as a dramatic renewal or "new beginning" for them, the best-known narrative of this type being precisely the struggle between Trentrén and Kaikai (Fritz and Contreras 110-13; Trivero 82-86).

Guevara described the Llul Llul as an animal that lives exclusively in aquatic environments, with "a cat's head and a very long tail" (324), and which in Mapuche culture is strongly linked to meteorological variations: "… it is an animal that is lord of the water. When it wishes to make rain, it goes out to sea; many little birds follow it. It brings fair weather when it is far at sea. It is

an animal that governs the weather. It draws the waters; if it were to come out of the sea, the waters would come out with it as well" (325) [translated from the Spanish]. Other authors such as Latcham and Plath, for their part, maintained that this animal corresponds to the Chungungo, also known by the Spanish as "sea cat," which in the Mapuche world would be a *ŋen-lafken* or "lord of the water," to whom was attributed the production of the "sound of the waves" (Latcham 134), and to whom veneration was formerly rendered for favoring fishing. Plath himself noted:

> The waves and the roar of the sea are caused by the lord of the sea, the Ñull-Ñull or Chungungo, a kind of sea otter. The Nguenlafquén, Lord of the sea, is invoked in fishing. None of these may be killed or even captured, and if anyone should do so, the ocean would pursue him until he released it, on pain of being swept away by the fury of the waves. (336) [Translated from the Spanish.]

From this one may also intuit the importance of animals in the Mapuche worldview, since they correspond to "living" symbols that materialize natural phenomena, including meteorological ones.

In the particularity of this account, the behavior of the Chungungos, like that of other animals in other Mapuche myths and legends, has been interpreted as meteorological, seismic, or volcanic signals, through logical-transitive associations (Bastías-Curivil 244). To close the analysis of this narrative, we note that sacrifices are a cultural element frequently invoked in the mythical narratives of the Mapuche worldview. In particular, in this account as in other Mapuche myths and legends to be examined later, it becomes apparent that the idea of sacrifices of animals or people responds to an attempt to "restore" or "return" to nature—perturbed by human action—its constituent elements or "favors granted," as well as to reinstate customs and ritual practices associated with the myth (Petit-Breuilh 129; Armstrong 15; Bastías-Curivil 204).

"La Historia del Budi" ("The Story of the Budi")

The second account we cite was narrated by Beverly Antonieta Castillo Igor (2015), a young woman from Temuco, whose story is of family origin and which she transcribed at age thirteen while studying at the Adventist School of Temuco. She titled her account "La Historia del Budi" ("The Story of the Budi"):

> Some time ago, my grandfather told me a story, and I want to share it with you. He told me that many, many years ago, near Puerto Saavedra there was a small community in which a cacique named Domingue Anticura lived with his seven wives, who bore a beautiful girl they called Sayén:
>
> This girl was the apple of her father's eye. When she was thirteen years old she wanted to see the sea, and her father took her; but not long after they had reached the beach, a whirlpool of water rose up, enveloping her and causing her to disappear forever. The cacique waited three

> days, but the sea did not return her to him. So great was his sorrow that he went away weeping bitterly from the very spot, while the sea kept forming a small channel behind him.
>
> When he drew near his village, he sat down on a stone, exhausted and consumed by grief, and fell asleep. When he awoke, he saw himself on a small island in the middle of a beautiful salty lake, a mixture of sea and tears. The cacique named it Lake Sayén after his daughter.
>
> The years went by and the name was changed; it became Lake Budi, and the port came to be called Puerto Domínguez, in memory of the cacique Anticura. My grandfather says that, in exchange for the sweet and innocent Sayén, the sea returned a lake full of fish and birds. The communities give thanks to Father Antu to this day. (Castillo 201) [Translated from the Spanish.]

Once again, underlying the narrative is the theme of restitution, as a way of re-establishing the balance lost after the abduction. In this case, the girl's misfortune meant for the community a greater availability of food—a restitution similar to that described in the analysis of Nahuel Huinca's account. The narrative just described is one of the many versions of the Sumpall (Carrasco, *El viaje al otro mundo*). Carrasco notes that the Sumpall may abduct the girl in his "direct" form (as a merman or sea lion) or in his "indirect" form (wave, whirlpool, tide, wind, or storm), depending on the variant (25). The mention of a "whirlpool of water" evokes the image of a waterspout, consistent with the interchangeability of natural phenomena in myth and with the enumeration of wind and storm as agents.

We may also note the intergenerational preservation of the narrative, as well as its geographical relocation (from the coast at Lake Budi toward Temuco in the Central Valley), a mechanism of propagation and conservation that is proper to myths (Lévi-Strauss, *Mito y significado* 55). Finally, it is interesting to note that the Sumpall-character taken on here by the whirlpool connects it to the foundational myth of Trentrén and Kaikai, inasmuch as the Sumpall are said to have been men transformed into mermen by Trentrén in order to save them from the great flood produced by Kaikai (Tobar Loyola 77-78).

The Meulén as minor gods

Continuing with other Mapuche mythical and linguistic mentions of tornadoes, waterspouts, and whirlwinds, many authors recognize that the numerous whirlwinds that occurred on the coast or in the Central Valley were known to the Mapuche as the *mewlen*, although also under names of similar phonetics depending on the writing system[6] and/or the author, such as *meulén, meullín, meullén, maulén*, and *meulín*. For example, Plath (334) states that they were produced by the camouflage and survival movements of lizard-like beings when a "hurricane" broke out. As early as 1776, Abbot Ignacio Molina explained that the Meulén is "a beneficent God," a sort of *ulmen* or

[6]A proposed writing system for Mapudungun. The most widely used today are Raguileo, Unificado, and Azümchefe.

"minor god," whose function is to keep the actions of the *wekufü* (malevolent beings) confined or in balance (*Compendio de la Historia* 85-87) [translated from the Spanish]. Examples of this mediation by Meulén and the restoration of natural equilibrium are the narratives of the creation of Lake Budi and of Nahuel Huinca.

In the 1870s, Claudio Gay noted that the Mapuche believed the Meulén to be produced by snakes that rose vertically seeking the sky (248). Guevara, in 1908, for his part noted that, for the Mapuche, some mental illnesses were caused by the Meulén[7] under the idea of logical transitivity —in this case, between atmospheric imbalance and mental instability:

> The meulén, a spirit that resides in the whirlwind, persists still as a harmful genie, for when it passes through any place and happens to envelop a Mapuche, it causes him some grave illness; it can be averted by magical means. The Mapuche consider that some epileptics and madmen have been enveloped by the meulén, and that, in general, those who suffer from delirious and convulsive illnesses are possessed by an evil spirit. (299) [Translated from the Spanish.]

It is not possible to determine clearly, from these accounts, whether the references to Meulén as a whirlwind in the air are related to tornadoes or to dust devils, the latter being more common, especially in the Mapuche territory west of the Andes (Castillo and Ladio 97). Still, the narratives described confirm the importance of the Meulén in Mapuche beliefs. It lies beyond our intention here to resolve the apparent contradiction between the mentions of Meulén as a beneficent spirit (in Molina, for example) and those that designate the Meulén as malevolent spirits. On this point, Ñanculef confirms what was set out by Guevara:

> The Mewlen is a whirlwind that usually passes at midday, over a span of time no longer than two hours—that is, from one o'clock by the wigka clock until three in the afternoon. During that span, […] the children's clothes that had been hung out in the morning after washing had to be brought in, because it was said that if the Mewlen swept through them, then the negative energy carried by that whirlwind would envelop the clothes, and the children would then develop complex illnesses… (Tayiñ Mapuche Kimün 53) [Translated from the Spanish.]

It is illustrative to note that the period between one and three in the afternoon coincides with the time of maximum insolation, a condition that favors the formation of dust devils, whose greatest frequency is observed precisely at those hours (Kurgansky et al. 292-93). It is therefore reasonable to consider that these dust devils are included under the denomination *mewlen*. Alonqueo (104) and Montecino (443-44) distinguish a gradation in the intensity of the *mewlen*—strong, moderate, and weak—according to the category of the victim of the malady. The *pichi mewlen*—the daytime manifestation of the *anchimallén* according to Alonqueo (111)—evokes the

[7]The *mewlentun* is a health disorder that occurs when a person is touched by a whirlwind or tornado, producing "a *trafentun*, that is, when a person is possessed by a wind" (Caniullan and Mellico 46). [Translated from the Spanish.]

dust devil and, being the weakest of the *mewlen*, would explain why it is advised to shelter children and to take in their garments during that period.

With respect to the benign or malign character of the Meulén, Ñanculef adds a very important observation: "… I have been able to verify that there are bad Mewlen and good Mewlen. The bad ones are those that turn as a whirl from left to right, and the good ones, those whirlwinds that turn from right to left" (*Tayiñ Mapuche Kimün* 53) [translated from the Spanish]. It is well known that dust devils may appear both with a cyclonic rotation (clockwise in the Southern Hemisphere) and an anticyclonic one (counterclockwise), distributed in roughly equal proportions between the two. Tornadoes, in contrast, are almost exclusively cyclonic and are systematically associated with greater destructiveness. It is therefore understandable, from both an empirical and a symbolic perspective, that whirlwinds turning in a cyclonic direction[8] would be considered malign in the Mapuche tradition: their motion mimics that of tornadoes—phenomena that represent a real threat to life and to social and natural equilibrium.

Grebe ("El subsistema de los ngen" 61-62) offers an additional observation that reinforces this pattern: the *mewlen-kürrëf* are located in the northwestern quadrant of the Mapuche spatial plane, traditionally associated with negative referents. This spatial attribution coincides remarkably with the predominant trajectory of both historical and modern tornadoes in Chile, which tend to move from northwest to southeast (Vicencio et al. E613). We interpret these evocations not simply as coincidences or ornaments but as the result of a systematic practice of observing the environment —what Ñanculef describes as *inarrumen*: a form of conscious, slow, and meticulous learning, anchored in everyday life and in experience immersed in nature. The *inarrumen*—more than "observing" in the Spanish sense—implies an attentive and reflective mode of dwelling, in which every phenomenon of the landscape is interpreted in its dynamics, direction, recurrence, and danger. Through this dense and continuous process of observation, Mapuche communities not only identified relevant meteorological patterns but symbolically integrated them into their narrative system as warnings, omens, and forms of anticipation of risk.

Finally, the appearance of the *mewlen* in the narrative of Calfucurá's confrontation—collected in an *epew* compiled by Rodolfo Lenz as part of an episode of war in the region of Boroa (Lenz and Calvun 368-69)—deserves particular attention. In this account, while Calfucurá and his men were celebrating a successful raid, a *füta mewlen* (tornado) suddenly appears from the forest, invoked—according to the indigenous interpretation—by a spirit or *wekufe* in defense of the inhabitants of Boroa. The phenomenon is not presented as a mere meteorological curiosity but as

[8]Although Ñanculef's citation regarding the rotation is ambiguous, most people consulted understand "from left to right" as the clockwise direction (cyclonic in the Southern Hemisphere). This is the "natural" direction if one takes as the natural reference the apparent motion of the sun and stars across the sky.

an agent endowed with intentionality and potency, capable of intervening directly in the course of human events: the tornado lifts the horses, disorganizes the invading forces, and facilitates the liberation of the captives. This atmospheric irruption operates as a form of cosmic justice, restoring the balance broken by Calfucurá's abuse of force against the inhabitants of Boroa. The figure of the *mewlen*, thus understood, emerges as a liminal instance: neither strictly beneficent nor wholly maleficent, but contingent on the moral balance of human actions and acting in favor of the restoration of a lost equilibrium. It is striking how this episode dialogues with the account in *La Araucana* of the battle of La Imperial, where it is likewise a tornado that pauses and ultimately dissolves an imminent confrontation. In the case of *La Araucana*, Caupolicán and his forces withdraw temporarily to their lands, marking the beginning of a great famine that would last two years, whereas Calfucurá decides to cross the cordillera toward the Puelmapu, where he will end up establishing a powerful indigenous confederation based on the exploitation of salt (Jong and Ratto 246). In both cases, the whirlwind and the storm not only alter the natural order but also reconfigure the human order, acting as active symbols of judgment, protection, and restoration of balance. This narrative recurrence confirms the central place of the *mewlen* in the Mapuche system of knowledge as an agent mediating among nature, conflict, and destiny.

The centrality of the *mewlen* is also manifested on the nominative plane. Various colonial and republican sources record orthographic variants—*mewlen, maulén, meulén, meulín, meullín*—associated with toponyms such as the Meulén hills in Gorbea, as well as with coastal places where whirlwinds are frequent, such as the island of Meulín in Chiloé. Such designations operate as markers of territorial memory of risk: they fix in the landscape the recurrence of the whirlwind and prescribe local prudences. In parallel, the term is also recorded in names and surnames, in medicinal herbs called *mewlen lawen*, and in ritual designations—all signs of an identitary internalization of the phenomenon.

Conclusions: toward a situated geomythology of the mewlen

From the sixteenth century onward there have been literary records of tornadoes and waterspouts in Chile, beginning with *La Araucana*, the foundational work of the country's written tradition. Despite this presence in both textual and oral sources, for long periods institutional meteorology cast doubt on the occurrence of tornadoes, with practical consequences: the scarcity of systematic observations and a belated awareness of the risk, particularly in territories inhabited by the Mapuche people. In contrast, Mapuche mythical narratives and the erudite references to the Meulén attest to the centrality of these beings in an oral tradition possibly predating the Conquest. If a principle of uniformitarianism is granted (continuity of physical processes), it is reasonable to infer a long-standing coexistence of the peoples of the Mapuche territory with tornadoes and waterspouts, as well as the search for explanations and for protective practices encoded in myths.

The descriptions compiled exhibit traits of notable observational refinement—cyclonic rotation, predominant trajectories from the northwest, greater frequency in the early hours of the afternoon, and even a gradation of intensities—consistent with a situated epistemology (*inarrumen*): attentive, sustained practices of observation oriented toward the continuity of life. In this key, myths function as devices of anticipation and transmission. The reading in the key of situated geomythology that we propose makes it possible to recognize resonances and evocations in the constitutive elements of these narratives, without seeking to invert hierarchies or to force translations, and renders visible the contrast between the persistence of this situated knowledge about the Meulén and modern skepticism regarding tornadoes.

The situated geomythological reading also illuminates the historicity of Canto IX of *La Araucana*. The episode of the "miracle" at La Imperial (1554) can be read as the first historical-literary record of a tornado in Chile, bearing features proper to present-day tornadic storms: location, season of the year, extraordinary hail, roar, and electrical phenomena. More than a poetic invention, it is plausible that Ercilla gathered converging testimonies from Mapuches and Spaniards, exercising his double role of epic poet and chronicler. Our analysis provides additional indications in support of this interpretation in the key of situated geomythology. Taken as a whole, the materials examined support the view that Mapuche mythical narratives operate as epistemic devices for recording, interpreting, and transmitting significant or catastrophic meteorological experiences, articulating systematic observation, symbolic structuring, and ethical orientation. Here the proposal of "situated knowledges" (Haraway 581) becomes effective: partial, embodied, and responsible perspectives, anchored in specific territories and relationships; and the "strong objectivity" of Harding (69) resounds: broadening the criteria of validation by incorporating historically subordinated standpoints and taking responsibility for the position from which we come to know. Situated geomythology proposes a critical reading that puts historically hierarchized regimes of knowledge into tension. This enables an epistemological copresence (*ch'ixi*) in which the validity of myth is grounded in its internal coherence, its relational efficacy, and its cultural legitimacy—not in its conformity to the standards of modern science.

Finally, the disjunction between the Mapuche narratives that preserved the memory of the Meulén and certain influential actors in institutional science in Chile who, during long periods, dismissed the possibility of tornadoes, has had—and continues to have—material effects. By displacing the phenomenon outside the horizon of the possible (or, paraphrasing Rivera Cusicanqui, by not walking while facing the living memory of the past), its consideration in prevention protocols was omitted, which increased the communities' exposure to risk. Recognizing the *epew* as a narrative technology of memory of the relationships between human and more-than-human beings could have nourished local vigilance and preventive practices, in the same way that oral memories have operated in the face of the threat of tsunamis, floods, or droughts among other peoples (Burbery 12). Our analysis of the mythical narratives of the Meulén shows

clearly the adaptive value of a situated geomythology: by taking into account epistemological plurality, the repertoire of adaptation strategies is expanded, cultural resilience is strengthened, and the monopolies of validation of knowledge are called into question—monopolies that can exacerbate, as the case of tornadoes in Chile shows, vulnerability in the face of climatic extremes.

Fig. 1. Crepuscular rays (at left) in cumulus clouds occurring simultaneously with a severe convective storm in which a tornado is also visible (at right), in Minneola, Kansas, U.S.A., 24 May 2016; photograph by Jason Weingart.

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