Intertwining volcanoes and society in Chile through arts and interdisciplinary connections

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Abstract

The separation between nature and society, of concern within social science and interdisciplinary discussions, has generated a division that often characterizes the way communities perceive their environment. The arts have played an important role in demonstrating the entanglement of Earth and society through their ability to frame and shape the dynamics of the Earth across sensations. This has been achieved through various explorations of the artistic language, delving into colors, shapes, sizes, compositions, and more. However, the capacity for art to play this role is often underestimated. Through an examination of artistic representations in Chile, we seek

to show how the proximity of Chilean society to the presence of volcanoes has been eloquently conveyed through various artistic styles throughout different historical epochs. Our study extends from the birth of the Chilean nation in 1818 to 2021, and examines a wide range of artistic representations, that encompass national symbols, image-making techniques, sculpture, art installations, poetry, music, and audiovisual works. Our research represents a pioneering effort to explore the diverse representations of volcanoes in Chile and has uncovered a remarkable diversity of artistic expressions that reflects the deep connection between Chilean society and volcanic processes and landscapes. Ever-present and often breathtaking, volcanoes have served as enduring symbols of national identity and as sources of inspiration for artists of diverse disciplines and aesthetic sensibilities. We show how the arts reveal the relationship between volcanoes and human social life, and we provide the basis for a detailed analysis that explores the temporal and spatial contexts and evolution of the representations of volcanoes presented and the human perception of geological phenomena in Chilean culture.

Keywords: volcanoes, arts, interdisciplinary, geology

1. Introduction: the journey to interdisciplinary connections

The question we seek to answer in this study is: how are Chilean society and volcanoes intertwined? The main point of this manuscript is to show how the arts have played a key role in expressing the relationship between Earth, especially volcanoes, and society from an interdisciplinary approach. This question emerged from a collaboration that began in 2022 among us, young researchers in volcanology, visual

arts, sociology, and history. Our first goal was to create what we called "*Volcanoteca"* (from the Spanish words *volcán* = volcano and *biblioteca* = library)*,* a neologism to capture the physical space of a volcanic library open to the public that was going to be located in Pinto, in the surroundings of the *Nevados de Chillán* Volcanic Complex. The idea was to build a bridge that connects different disciplines and civil society through various materials in order to create, discuss, and reflect on our volcanic heritage as inhabitants of a country crossed by the Andean Cordillera and with 87 active volcanoes (SERNAGEOMIN, 2023). Our main objective was to integrate and connect different visions of volcanoes, geology, and society. During the design of this project, we realized that volcanoes are represented in different ways in Chilean culture, and we wanted to start learning more about them.

Previously, each of us had worked separately within our own disciplines, an all-too common practice. Matías had been trying to understand volcanic processes and risk communication; Sebastián by making aesthetics out of the ruins of disasters, where formal discontinuities, material fractures, and traces of the passage of time are key aspects of his artistic work. From a different perspective, Valentina, has been researching critical disaster studies and thinking about the relationships between the Earth and socio-political processes in order to bring geo-social formations, disruptions, and transdisciplinary experiences into conversation.

In this journey, we attended our first scientific conference together, organized by the Geological Society of Chile in Temuco, where we presented the preliminary results of our research (Riffo et al., 2023). From there, we began to think more systematically about our interdisciplinary connections. Both virtual and face-to-face meetings were

necessary to continue the journey and to facilitate and streamline communication about what we were reading and thinking. Here we are, more than a year after the *Volcanoteca* experiment, writing together about our conversations and feelings about volcanoes and geology. Starting from moments of sharing, we began to realize that although we come from very different disciplines, we also have methodological similarities: observation, drawing, and writing are analytical tools that we share in our daily work as starting points for our interdisciplinary connections. Not only that, but we also share a common goal: to show how volcanoes are intertwined with human social life in Chilean culture.

The distance between nature and society has been of concern within the social sciences and interdisciplinary discussions. Latour (2012), for example, suggested that the constitution of modernity has dissociated nature and society. Scientific practices would have been protagonists in this dissociation, as they have become means to regulate what nature is on the one hand and what society is on the other. This dissociation is also present in the tension between sociocultural theory and settler geology, a division that has suppressed liveliness that humans have attributed to material things (Palsson and Swanson, 2016). And political geology has recently joined this concern proposing that Earth and society are co-determined rather than dissociated. The main point is that Earth is not just a scenario of socio-political processes and vice versa (Bobbette and Donovan, 2021).

Through interdisciplinary connections, we began to realize that the arts can make an important contribution to this debate. Especially in regions with active volcanism, because volcanoes provide a valuable means to explore how humans perceive the

planet and the interaction between human existence and the Earth system (Holmberg, 2020). These interactions have been increasingly explored with the aim of developing effective disaster risk reduction strategies in southern Chile by understanding the geographic imaginaries of community members living near active volcanoes (e.g., Vergara-Pinto and Romero, 2023; Walshe et al., 2023).

From a broader context, and in order to make more visible, meaningful and predictable relationships between human social life and volcanic processes, we would like to navigate in one interface where volcanoes and society are sedimented: the arts. In order to investigate this question, we ask ourselves whether or not this capacity of the arts was truncated with the constitution of modernity, since we are aware of the importance of arts in observing and communicating environmental phenomena since prehistoric times, as demonstrated by art rock and oral memory (e.g., Grebe et al., 1972; Isasmendi and López Campeny, 2022).

In this manuscript, we investigate how visual and audiovisual arts, music, literature, sculpture and art installations, have had a special sensitivity to expressing how volcanoes are intertwined with human social life in Chilean history between 1818 to 2021. Volcanic processes are present in ornaments, coins and banknotes, murals, paintings, songs, novels, and poems. As Sigurdsson (2015) affirms, volcanic eruptions have been an important motif for artists, and these works preserve an important history of how different cultures around the world have viewed this catastrophic phenomenon. Hamilton (2012) emphasizes this by conducting research of artistic expressions worldwide that have captured volcanoes and their processes, deepening the emotions

that volcanoes evoke in the authors and in the historical context in which world-renowned works of art were created.

Despite the above, there has been no significant reflection in Chile on the capacity of art to express how human social life and volcanoes are entangled, although this has been done in other Andean countries, such as Colombia, where different representations of volcanoes have been found (Sánchez and Calvache, 2018; Calvache and Sánchez, 2022). Here we emphasize the *entanglement* as a way of expressing a closer relationality between Earth and society, which can be mediated by an artistic sensibility to capture Earth dynamism and excess. Where the proximity between the two implies a pragmatic material affection with Earth that is often not represented explicitly in scientific research. Along this paper, we will examine how the arts have played an essential role in showing the entanglement of Earth and society through their capacity to frame and shape Earth's dynamism across sensations.

2. Geo-social background

2.1. Volcanoes and human social life

Volcanoes have been of interest since classical or ancient history. In particular, in Western philosophy, Greek and Roman thinkers devoted their time to explaining the behavior of volcanoes from a realistic point of view. Empedocles, for example, saw the world divided into four elements with volcanoes associated with fire. Plato and Aristotle thought of underground channels of fire or rivers. Later, Roman philosophers such as Lucretius or Pliny the Elder paid attention to minerals and the relationship between

volcanoes and earthquakes. With the advent of Christianity, during the following centuries, rational explanations gave way to religious understandings of volcanoes (Kozák and Čermák, 2010).

Non-Western societies present many examples of deep and well-considered connections between volcanoes and social life as exhibited through the intimate connection between indigenous Andean societies and Earth. For Andean worlds, "Mother Earth" becomes relevant through the *Pachamama*, which refers to the giving quality of the Earth in the sense of fertility (Mariscotti de Görlitz, 1978). In Andean philosophical terms, *Pachamama* is also the universe as an interrelated cosmos (Estermann, 2015). It encompasses the Andean feeling of an Earth inhabited by natural forces of which human beings are only a tiny part (Castro and Aldunate, 2003). For Andean worlds, *Pachamama* behaves like a sacred whole to be worshiped and even feared.

Among the central sacred forces of the *Pachamama* are the mountains, volcanoes, and water, which are considered living material beings with agency capacities (Salas Carreño, 2017; Pazzarelli and Lema, 2018; Vilca, 2020). Mountains are considered sacred in Andean because they have multiple levels of meaning. First, they are providers of fertility and wealth; second, they are sacred dwellings; and third, they are ceremonial (Castro and Aldunate, 2003).

In this sense, relationships between Andean cultures and volcanoes can be found, for example, in the use of volcanic materials for the production of moai in Rapa Nui (Gioncada et al., 2010), in the integration of volcanic features in mobility networks and

social dynamics in the Andean highlands (Loyola et al., 2022), or in the Atacameño cosmovision of the world, where volcanoes are important agents that connect the world below with the world above (Ramos Chocobar and Tironi, 2022).

Andean societies have not only been shaped by volcanoes, indigenous ontologies in South America have also constructed different levels of meaning with them (Petit-Breuilh, 2006). Stories are told about couples, marriages and/or love affairs between volcanoes which will be repeated; fights, frictions and/or wars among themselves; as taboo, forbidden and/or cursed places; or as prisons, dwellings and/or residences of gods or mythical men. Volcanoes are inhabited by spirits who have the agency to activate eruptions, tremors, or thermal waters as a way to show that they are there.

At the same time, the entangled relationship between society and volcanoes has attracted the attention of political geology and critical Anthropocene studies. For example, Bobbette (2019) problematizes the ways in which volcanoes are understood and how the geological is always a contested space. Through the idea of "speculative volcanology", Clark et al. (2018) raise interesting questions about the temporization of Earth and its destructive and generative sociopolitical capacities. New materialists have also sought to connect the geological with human social life through the concept of "geosocialities" as "the entangled relations of the earth and biologic beings" (Palsson and Swanson, 2016).

While we acknowledge these conceptual and theoretical contributions as a way to make visible the intertwined nature or proximity between geological forms and everyday life experiences, we have also seen that arts have not been a conceptual

and pragmatic concern beyond a provocation to elaborate geosocial conceptualizations. In the next section, we move from provocation to conceptualization of the arts, taking seriously what it could mean to think of the arts as a bonding or sensible mediation between the geological and the social, facilitating aspects that are otherwise invisible, or, to put it another way, the arts play a central role in making the Earth affect us.

2.2. Volcanoes and arts: framing Earth's chaos

The most direct connection between volcanoes and art is their ability to evoke emotions. When eruptions occur, human fragility appears in the midst of chaos, and if we have the time, we become aware of our death. From this point of view, Earth is an incomprehensible entity beyond its catastrophic and existential qualities: it behaves as something indomitable, unpredictable, and inapprehensible for humans.

But the arts, through their colorful palettes and safe spaces (museums, galleries or schools), process through the human sense what is incomprehensible about nature or Earth. Safe spaces allow us to be moved, to feel, to be touched, because art captures part of the chaos of Earth.

In this regard, Grosz (2008) elaborates an analytical key to our understanding of art in the context of volcanic processes. She argues that art has the capacity to elaborate, feel, and think about chaos. Here, the notion of Earth's chaos behaves as an excess of nature or as the real external forces of terrestrial matter, behaves as a disruptive

and unpredictable quality of the cosmos that can only be directly grasped by human beings through the sensations that art frames and shapes.

Framing or stabilizing of Earth's chaos by extracting its qualities (e.g., color organization or composition) is what art can do through sensations and affections. As Guattari and Deleuze (1994) propose: "art takes a bit of chaos in a frame to form a composed chaos that becomes sensory, or from which it extracts a chaoid sensation as variety". In this way, the arts are the quintessential catalysts of the forces of the Earth, since through them chaos can be elaborated, felt, and thought.

In order to see how the singularity of the arts to comprehend the geological through sensations is done in our volcanic territory, it is first exposed and then analyzed the artistic manifestations of volcanoes in the history of Chilean art. More specifically, it is first traced the presence of volcanoes as part of the conformation of the nation-state; then, volcanoes as a source of autonomous inspiration for various artists analyzing their styles and historical-political contexts.

3. Methods

The methodology used in this work was based on exploratory research of artistic and cultural expressions through the collection and identification of primary and secondary data sources which included any form of representation of volcanoes in Chile between 1818 to 2021. The works of art found were described by combining the knowledge of three disciplines through interdisciplinary lectures, using conceptual tools from the three backgrounds: art, geology and social sciences.

Primary sources were used to obtain additional and complementary information. For this purpose, the virtual databases of the institutions of the Biblioteca Nacional Digital were used: Memoria Chilena, Centro de Documentación de las Artes Visuales del Centro Nacional de Arte Contemporáneo, (CEDOC-CNAC), MusicaPopular, Cinechile, SURDOC (from the Heritage Assets Documentation Center for the museums of the National Cultural Heritage Service of Chile), among others.

Secondary data sources were collected by reviewing the Chilean classic arts bibliography. Only edited sources such as books, catalogs, and archived documents were consulted. It should be noted that all works of art and/or cultural expressions that were not previously documented in books or virtual dissemination platforms were not included in this study.

The works are presented according to the criteria of artistic disciplines, grouped in chronological order: traditional image-making practices (including drawing, graphics, and painting), sculpture and art installations, music and poetry, and film and audiovisual.

The descriptions of the artworks were enriched by an interdisciplinary dialogue that allowed for a broader and deeper analysis of the different representations. Interdisciplinary approaches were also used to contextualize and discuss the artworks in relation to their time, their influence on art and society, and their relevance in the cultural context. Where possible, physical characteristics of volcanoes and volcanic processes were described and linked to the corresponding eruptive records available on the website of the Chilean volcanic monitoring network (SERNAGEOMIN, 2023).

Given that the art world is vast (including not only the production of artworks, but also the entire system itself, official, alternative, and independent modes of circulation), and does not need to be validated by peer-reviewed publications like scientific knowledge, its proliferation is always unexpected and emerges from the most unexpected territories. In this sense, we acknowledge that we are giving visibility to works to which the art system (museums, galleries, and specialized publications) has already bestowed value and meaning upon. Therefore, it is expected that many more will appear in the future; thus, this publication is only an initial attempt to document what has the potential to be understood as something much greater.

4. Results

4.1. Volcanoes as symbols of power, freedom, and national identity in Chile

Volcanoes have been a central element in the construction of the national imaginary and Chilean identity. Since the early years of independence, volcanoes have been used as symbols of power and freedom, appearing on various decorations, flags, and coins. For example, in 1817, the order of merit was created with the image of a volcano in recognition of the bravery and sacrifice of the soldiers who fought for Chilean independence (Figure 1A). The importance of volcanoes as national symbols was also reflected in the flag of Chilean independence, designed by Antonio Arcos and José Ignacio Zenteno in 1818 and produced by Dolores Prats de Huici, with a volcano as the central element (Figure 1B). Volcanoes also appeared on the early coins of the Republic of Chile, further emphasizing its role as a symbol of the Chilean nation, now on a pocket-sized, widely circulated coin with a real value scale (Figure 1C): "…an

eruptive volcano alluding to the seismic force of the new nation" (Martínez, 2013). Undoubtedly, money was assigned a pedagogical attribute of social cohesion, capable of fostering a sense of belonging to the territory of the new republic (Cruz de Amenábar, 2016).

In the same period, the Chilean coat of arms, which preceded the current one, was created after the independence of Chile by order of Bernardo O'Higgins, the former supreme director. This coat of arms used between 1819 and 1834, includes the volcanic arc, with volcanoes erupting simultaneously (Figure 1D), intended to represent the "pillanes", spirits of ancient political and spiritual authorities who, according to Mapuche worldview, live inside volcanoes (MNBA, 2019). Among the various elements that represent the strength and freedom of the Chilean people and the Chilean territory, it is possible to find symbols of military and civil power. Ignacio Andía y Varela (1757-1822) engraved this shield in wood in the front of the Palace of Independence (now the National History Museum). In his work, Andía y Varela added an indigenous person representing Chile above an alligator that is biting a dragon, a scene symbolizing America eating the lion of Castilla (Cartes Montory, 2013). The coat of arms appears in an 1821 portrait of Bernardo O'Higgins by the famous Peruvian painter José Gil de Castro (1785-1841).

Almost 200 years later, volcanoes were once again part of everyday life when the current banknotes came into circulation in 2010. The back of the 2000 Chilean peso banknote shows the Nalcas National Reserve, with a representation of Lonquimay volcano (Figure 1E), while the back of the 20000 Chilean peso shows the landscape of the Surire salt flat which is surrounded by volcanoes (Figure 1F). The current

Chilean passport also contains volcanoes in its design. This identification document, active since 2013, includes the volcanoes Parinacota, Licancabur, Ojos del Salado, Maipo, Nevados de Chillán, Villarrica and Osorno.

4.2. Volcanoes in traditional image-making practices in Chile

Several Chilean and international artists have explored and reflected on the presence of volcanoes in Chile through the creation and dissemination of artistic images. This exploration has taken place in drawing, graphics, and painting. Among the earliest painters to depict Chilean volcanoes as central figures in their representations is the German artist Juan Mauricio Rugendas (1802-1858) (Diener, 2012) (Figures 2A to 2E).

Between 1834 and 1842, the artist embarked on various expeditions throughout Chile to capture its diverse natural and cultural scenes. His artistic corpus was extensive, comprising over a thousand drawings, watercolors, and around 150 oil paintings. Undoubtedly, this body of work stands as a documentary testament to the burgeoning realm of Chile, with the Andes mountain range serving as a profound source of inspiration (Diener, 2012).

The presence of Rugendas on this continent cannot be dissociated from a more general phenomenon that occurred throughout the 19th century: "the growing concern for scientific knowledge of nature" (Galaz and Ivelic, 2009). According to the national art theorist, Catalina Valdés Echenique, the importance of promoting an approach to nature through the arts and sciences was not limited to the renewal of plastic and

literary languages: "...aspired to nourish the identity of the new American nations with local iconography and references. The administrative independence achieved by the revolutions of the second decade of the century now had to be complemented by the cultural and symbolic autonomy that would lead each of these nations to integrate into the West on its own terms and in its own image" (Valdés Echenique, 2014). This process of image-making was part of the intentions of the ruling elite to create a national identity based on the geographical specificities of the recently independent country, which contrasted with European conceptions of American nature as an inhospitable land (Cid Rodríguez and Vergara, 2011).

The historian Rafael Sagredo also explains the link between art and science through his work about naturalists of the 19th century in America. For him, the influence of Alexander von Humboldt, Romanticism, and the possibility of capturing natural, cultural, and social reality in rapid strokes, as it was usually done by traveling artists, are dimensions that are very present in the work of Rugendas and coincide with the consolidation of landscape as a pictorial genre. Particularly important is the subjectivity present in Rugendas artistic production, where the scenes emerge from reality but do not truly reflect what reality was (Sagredo, 2012).

One of the works of Rugendas, “Volcanic Eruption in the Juan Fernández Archipelago” (ca. 1836), was based on the report and lithographs made by Sutcliffe (1839), the former British governor, describing a submarine volcanic eruption with an eruptive column and lightning is described (Figure 2E). This eruption was thought to have occurred in the Cumberland Bay, Robinson Crusoe Island in 1835 and was recently discredited by Lara et al. (2021). In this study, an interdisciplinary effort concluded that

the information contained in the reports of Sutcliffe and subsequent related works was a misinterpretation of a distant earthquake-triggered tsunami that may have generated rockfalls on the cliffs of the archipelago.

In 1848, Pedro José Amado Pissis (1812-1889), a French geologist and geographer, was commissioned by the Ministry of the Interior to conduct a comprehensive study of Chilean geology and mineral resources. His mission was to produce a topographic and geological map of the Republic of Chile. In 1875, he published his most important work titled *Geografía Física de la República de Chile* [Physical Geography of the Republic of Chile], which remains a highly regarded geographical reference in the Americas. This seminal publication includes an atlas showing the physical geography of the Republic of Chile and provides an comprehensive overview of the geological features of Chile, including its mountains, volcanoes, and rivers (Pissis, 1875). Furthermore, this map served as an important resource for studying valuable mineral resources in Chile.

For the purposes of this study, it is worth mentioning Pissis's watercolors of volcanoes, which "show a high quality morphological register, but also a personal vision of the monumentality of the landscape, expressed in the color and expressiveness of his technique" (Martínez and Campos, 2022). In his work, it is possible to find volcanoes as in *Volcán de Chillán* [Chillán volcano] (1863), a painting of an eruption in the Nevados de Chillán Volcanic Complex (Figure 3A), where the author registered an explosion during the 1861-1865 eruptive cycle when the Santa Gertrudis eruptive center was formed (Orozco et al., 2016). Volcanoes also appear in *Interior del cráter del volcán de Antuco* [Interior of Antuco volcano crater] (1869) (Figure 3B) and in

Volcán de Antuco [Antuco volcano] (n.d.) (Figure 3C). The first was created during the 1869 eruption (Moreno, 2016), and shows a fumarole slightly dispersed by the wind in a reddish-yellow crater, the colors representing the effects of hydrothermal fluids on the rocks. Of particular interest is the watercolor *Volcán de Aconcagua* [Aconcagua volcano] (n.d.), in which the highest mountain in South America, located in Argentina, is represented (Figure 3D). It is important to note that although the Aconcagua is not currently an active volcano, it was during the Miocene (Godoy et al., 1988). It is in a region where the volcanic arc is currently discontinued due to variations in the dynamics of the subduction zone between the Nazca Plate and the South American Plate (e.g., Stern et al., 2004). It should be noted that the first published studies on these geologic phenomena date back to the 1980s, more than 200 years after the work of Pissis (e.g., Kay et al., 1987). These works are available in the MHN (National History Museum of Chile).

Thomas Somerscales (1842-1927) was an English artist who was one of the most representative in the field of landscape, sea, and naval glory painting in the 19th century in Chile. His realistic representations of rivers, lakes, and especially the Pacific Ocean are a proof of the productive phase that 19th century painting had in Chile (Cinelli, 2020). One of his paintings, *Vista del Volcán Antuco* [View of the Antuco volcano] (1881), introduces the observer to the landscape, including the fauna and the rocks around the Antuco volcano, dissected by glacial valleys (Figure 4A).

An apprentice of Thomas Somerscale, the Chilean painter Alfredo Helsby (1862-1933) is referred to as an artist who “turned a country into a landscape” (Muñoz Méndez, 2014). He made careful observations of the landscape to extract some of its qualities

for representation, through detailed studies of the environment Helsby was able to define specific elements such as soil morphology and visual characteristics of leaves and plants. These careful observations can be seen in the foreground of the painting *Volcán Osorno* [Osorno volcano] (1925) exhibited in the National Library.

Two decades later, Luis Strozzi (1891-1966), a self-taught Chilean painter, created the work *Volcán del Cajón del Maipo* [Cajón del Maipo volcano] (1946), available in the O'Higginian and Fine Arts Museum of Talca. In this painting, a complex-shaped and snow-capped mountain can be seen between hillsides (Figure 4B). This mountain probably corresponds to San José volcano, near Santiago. Channel structures resembling viscous lava flows or moraines can be seen on the front slope of the volcano in the background.

Roberto Matta (1911-2002) was a Chilean painter, architect, and poet whose work explored the themes of time and space, as well as nature and death. In this sense, part of Matta's work is dedicated to the power of nature and its exuberance through his attention to volcanic violence and the energy of Earth. In 1941 he spent time in Mexico where Earth and volcanoes became protagonists of his artistic inspiration and exploration of consciousness. As he recalled "I saw everything in flames, but from a metaphysical point of view. I was talking beyond the volcano. The light was not superficial but an inner fire…I painted what was burning inside me, and the best image of my fire was the volcano". French poet Alain Jouffroy defined this phase in Matta's art as "geomorphological" and "geopoetic", and the founder of surrealism, André Breton, also referred to his art as one that "has Earth as food" (Del-Pino Salas, 2015).

His paints of volcanoes, which culminated magnificent work of art *La Tierra es un hombre"* [The Earth is Man] (1942), present the viewer with surrealistic images that broke away from traditional artistic language (Figure 5A), an encounter between humans and the cosmos as the main imaginary act, as he points out: “we are led to believe that the real is seen through a window. One is here and the real is there; this deformation has been transferred to painting. But we are at the center of what is happening: from above, from the front, from the right, from the left, from below, from behind, reality bombards us. To be in four dimensions it is necessary to perform an imaginary act, like that of perspective, which consists in perceiving the events that are at the center of the scene” (Matta, 1991). It is believed that Matta wanted to evoke sensations and images related to the birth of the Paricutín volcano (Vargas, 2011), whose precursory activity began with earthquakes in 1941 and started to form the volcanic edifice in 1943 (Yokoyama and de la Cruz-Reyna, 1990).

Mario Carreño (1913-1999); was born in Cuba but became a Chilean citizen in 1985. In the 1960s his painting shifted to reflect an anguished vision in the face of the devastating forces that threatened the world. Carreño appropriates the Chilean landscape and incorporates it quite naturally into his works; his volcanoes are silent but active, they are neither wild nor provocative, they are a contained force, telluric recipients of the mystery of creation. The autochthonous is manifested in its own right (MNBA, 2015). Volcanoes appear in three of his artworks, forming part of the landscape behind human representations (Figure 5B to 5D).

Nemesio Antúnez Zañartu (1918-1993), a Chilean architect, painter and engraver, dedicated part of his work to painting the Chilean geography and its cultural identity.

In his words (Antúnez, 1988): “Since then (referring to his return to Chile from New York), I have painted mountain ranges, volcanoes, where a piece of blue sky is reflected in the water. I painted the North and the South, a vision of what Chile is. Section of the Andes where *lapislazuli* (a rock composed of lazurite, sodalite, calcite and pyrite) appears”.

In *Cráter* [Crater] (1959), Antúnez painted a series of nearly rounded volcanic edifices with their eruptive vents aligned (Figure 6A), while in the 1961 version (Figure 6B) he painted part of a crater, blue inside and with small black rounded geometries which could be related to the strewn field of eruptions. As in the work of Matta, Antúnez broke with forms and printed emotions through a distinctly abstract style. This perception of volcanoes was deepened in *Siete volcanes* [Seven volcanoes] (1963), where volcanic edifices, lava flows, and volcanic bombs are represented (Figure 6C). In this work, volcanic edifices are again painted as nearly rounded forms which are cross-cut to show the inside of volcanoes, full of *lapislazuli*. The apparition of this blue rock in Antunez’ work is probably related to its designation as the “Chilean rock”. What is particularly interesting in this work is the connection that Antunez makes between this rock and the interior of volcanoes, because the origin of *lapislazuli* is related to the interaction between magma and calcium-rich rocks in the Earth’s crust. Something similar seems to have been represented in his works *Cordillera adentro* [Cordillera inside] (1962) and *Corazón de Los Andes* [Heart of the Andes] (1966). The former appears to be an aerial view of several craters (Figure 6D). In the second, he painted a clear representation of a solidifying river of lava flowing down from the slope of an erupting volcano, in an atmosphere surrounded by volcanic gases and/or ash and blueish pieces of rock (Figure 6E).

Another clear representation of volcanic processes can be appreciated in *El volcán* [The volcano] (n.d.), a painting in which hot volcanic particles of different sizes fall from an erupting volcano (Figure 6F). This work is associated with the Casa del Arte José Clemente Orozco, more commonly known as the "Pinacoteca", a museum of pictorial and artistic treasures located within the University of Concepción.

José Venturelli Eade (1924-1988) was an Italian-Chilean painter, engraver, stage designer and muralist, whose work was concerned with sociopolitical issues. Despite this, he often incorporated the presence of geological and biological features in his paintings. Volcanoes are present in his work, for example, in *Niña y volcán* [Girl and volcano] (1962), where a young girl sits with her back to an erupting volcano, with her head resting on her legs, expressing sorrow but calm (Figure 7A). In this painting the erupting volcano does not look like a threat to the girl but seems to accompany her. The volcanic eruption represented is explosive, with a huge column of ash and smaller spatters of lava or incandescent material. At the National Institute for Professional Training (INACAP), Venturelli painted a mural in 1969 in which an erupting volcano is represented between workers, machines, and technologies (Figure 7B). In *Volcán encendido* [Burning volcano] (1972), hot glowing lava erupts from a dark colored volcanic edifice with almost vertical slopes (Figure 7C). In his mural, *Chile* [Chile] (1972), at the Centro Cultural Gabriela Mistral (GAM), in Santiago, an explosive eruption is painted, with a wind-dispersed eruptive column and a dark lava river flowing from the volcano slope, which is channeled close to the crater and then spilled out when it reaches the base of the volcano (Figure 7D).

These murals share a common characteristic: they were created to be viewed by a wide audience, and their monumental scale suggests a direct engagement with the viewer's own physical presence. To fully appreciate them, viewers must traverse the artwork, gradually discovering its intricate details. In *Derrumbe* [Landslide] (1977), Venturelli painted lava flowing down a steep slope of an erupting volcano (Figure 7E). In this painting, it is possible to note how the lava flow cools, forming blocky fragments typical of andesitic-basaltic to andesitic compositions, which are surrounded by earlier solidified blocky lava flows that are susceptible to collapse. In the background, a quiet snow-capped volcanic edifice can be observed, also with large blocks of old solidified lava flows. A year later, in *El aliento de la tierra* [The breath of Earth] (1978), there is a serene landscape of a sunset, or a sunrise is depicted, with a reddish relief (Figure 7F). To the left side of the painting there is a rocky and fractured volcano, probably representing blocky ancient solidified lava flows, with a subtle fumarole rising from its crater, which gives the work its name.

Santos Chávez (1934-2001) was a Mapuche artist who depicted this culture in his work. This is evident through representative vignettes of this culture, capturing its religious aspects, worldview, and the indigenous people's connection with nature (Martínez, 2015). For example, the presence of volcanoes can be seen in two woodcuts: *Flores en el volcán* [Flowers on the Volcano] (1987) and *Volcán y luna* [Volcano and Moon] (n.d.). The first one shows a lava lake in a conic-shaped volcanic edifice from which a lava river flows down, losing its reddish color in the darkness of the volcano, which may be due to the cooling and solidification of the lava flow as it descends the slope, or to the formation of a lava tube (Figure 7G).

Francisco Smythe Treuer (1952-1998) was a renowned Chilean artist whose work underwent a transformation from formal and material exploration to a return to painting, characterized by gestural qualities closely associated with abstract expressionism. In 1983, Nemesio Antúnez described his work, full of expressive, free, and synthetic gestures, as "...the spontaneous graphics of a child with the knowledge of a teacher" (Galería Arte Actual, 1986).

According to Garfias (2006), Smythe believed in the relationship between human beings and nature, and in his work, this relationship was manifested through clear symbols and signs. In line with this concept, the presence of volcanoes can be observed in his work *Vía Láctea* [Milky Way] (1998), a sculptural mural located in the Baquedano metro station in Santiago, which is viewed by thousands of people every day (Figure 8A). In this work, volcanoes are intertwined with stars, palm trees and both real and fictional constellations. Conical and somewhat rounded shapes represent at least two volcanic edifices in this piece, one of which is erupting a reddish column of ash and lava spatter.

4.3. Volcanoes in Chilean sculpture and art installations

In the field of sculpture, notable works have been created, such as *Ojos del Tupungato* [Eyes of Tupungato] (1980) by Chilean sculptor Samuel Román (1907-1990), who was recognized with the National Art Prize in 1964. This abstract sculpture, carved in granite, a rock formed by the slow cooling of magma deep inside the Earth, seeks to evoke a volcano that shares its name and has dimensions of 77 x 60 x 36 cm (Figure 8B).

In the sculptural playground of Plaza Brasil, in the center of Santiago, there is a concrete volcano slide. This work was created in 1993 by French-Chilean artist Federica Matta (1955-) and contains clear representations of a series of lava flows erupting from the central vent of a conical volcanic edifice (Figure 8C). This work also contains a gray stripe with sinuous edges that can be interpreted as a representation of eruption-related flows or deposits (e.g., lahars, pyroclastic density currents). It is accompanied in the center of the square by several other sculptures of her own design, which serve as play elements for children and draw inspiration from various themes related to national identity, such as the mountain range, the Cerro Santa Lucía hill, and volcanoes.

In addition, sculptor and academic Sergio Castillo (1925-2010), recipient of the National Arts Prize in 1997, created the work *Erupción* [Eruption] (1998). This sculpture is composed of painted iron tubes and stainless steel tips, with dimensions of 6 x 9 x 1.70 m. Its design suggests a burst of fire representing the volcanic activity of the country (Figure 8D).

Similarly, in 2009, Hugo Marín (1929-2018) created a series of seven small, diverse, and experimental sculptures titled *Volcanes* [Volcanoes] (Figure 8E). Constructed using wood, clay, fiber, and pigment, each sculpture measures 35 x 25 x 25 cm. This series was first shown in the exhibition *Los Andes: columna vertebral de América* [The Andes: spine of America] at the Sala Gasto, Arte Contemporáneo, Santiago, in 2010, and later at the 13th Biennial of Media Arts titled *Temblor* [Quake] at the National Museum of Fine Arts of Chile in 2017.

Notably, the works of Chilean sculptor Francisco Gazitúa Costabal (1944-) also stand out. He has explored the Andean volcanic universe on numerous occasions, not only from a symbolic perspective but also by utilizing materials derived from volcanic eruptions. Among his noteworthy works are those created in 2015, representing the Peruvian volcanoes *Volcán Misti*, in Figure 9A (58 x 139 x 40 cm) and *Volcán Hualca*, in Figure 9B (60 x 114 x 49 cm) and *Volcán Maipo*, located in Chile and Argentina, in Figure 9C (80 x 120 x 80 cm), among others.

Cecilia Vicuña (1948-) is a Chilean painter, poetess, and feminist activist who also has defended nature through various of her interventions in public spaces. Her art has been a response to the threat to the planet or its devastation. She uses multiple procedures: happening, performance, *povera* and environmental art (Galindo, 2013), highlighting the healing and ritual dimension of art to impulse changes in social and affective structures (López, 2019). Her work constantly summons the *quipus*[1] (Figure 10A). remembering by connecting the body to the Cosmos at the same time". In this way, her art connects with Andean memories and other ways of being in the world in mutual coexistence.

Through this relational imprint with the Cosmos, different versions of the *quipu* have traveled the world, one of them is *Quipu de Lava.* At the Sculpture Park of Mexico near the University Museum of Contemporary Art, Cecilia Vicuña spread red *quipus* with views to Iztaccíhuatl and Popocatépetl volcanoes*.* The park is "composed of 64 triangular prisms over a plain of petrified lava and tezontle (red volcanic rock), a

[1] An ancient Andean system of "writing" or notation using knotted strings, used for keeping accounts and statistics, as well as for telling stories, singing oral poems and/or recording communal rights and responsibilities (http://www.quipumenstrual.cl/).

monumental work created by Manuel Felguérez, Helen Escobedo and Mathias Goertiz, among other Mexican artists, sculptors and architects" (Hinojosa, 2020). The importance of the park is that it created a geological experience that merges with a cosmological indigenous world. A perfect space for Cecilia Vicuña's performance ritual to begin. All started with a ceremony to call the geological consciousness of the place and the volcanic pulse, being the *quipu* an offering to the volcanoes to encourage the social protests in Chile that started in October 2019, as well to connect with deep time wisdom.

The artist Ignacio Bahna (1980-) has explored the realm of science and technology through his artistic work, focusing on natural phenomena and human intervention in them. He uses a wide range of materials as expressive mediums, interacting with rocks, burnt wood, salt, resin, LED lights, among others. In 2007, he presented his artwork *Volver a suspender* [Back to suspension] (2017) during the 13th Media Arts Biennial titled "Temblor". This piece involved suspending 3000 volcanic stones with transparent nylon thread, accompanied by an audio system (Figure 10B). According to the exhibition catalog, "the volcanic debris present in his work evokes a direct connection to tectonic layers, orogenesis, and the constant process that takes place within a geological time that is very different from the brief anthropocentric chronology in which humanity lives" (BAM, 2019).

Finally, the artistic work of Fernando Prats (1967-) is focused on territory, geography, and landscape to reflect on its fractures and traumas. In this regard, his work pays special attention to disasters at different scales, such as volcanic eruptions, geyser bursts or earthquakes. His novel method is to recover traces left by the events. The

artist does not intervene directly on the surface of the art piece but leaves to climate and natural events to print surface. This has to do with the idea of bringing back authority to matter and extracting from them the inner sense confined (Blanch, 2011). He first worked with dirty matter before moving on to hot matter, as illustrated by his installation *Acción Chaitén* [Chaitén action] (2009) which uses volcanic ash (Figure 10C). It is important to mention that he recognizes the Earth, as a body that charges and discharges violent energies and whose tectonic liberations are accompanied by destruction, in that vein his artistic work talks about the excess of Earth where Earth's ground is not a safe place because matter always overflows.

4.4. Volcanoes in the poetry of Mistral, Neruda and Chihuailaf

In the context of literature, it is imperative to acknowledge one of the most significant poets of Chile and the world, who was awarded with the Nobel Prize in Literature in 1945: Gabriela Mistral (1889-1957). Throughout her work, Mistral geographically traverses the national territory, paying special attention to two imposing volcanoes: Villarrica and Osorno. These evocative poetic descriptions can be appreciated in her iconic book *Poema de Chile* [Poem of Chile], published posthumously in 1967 in Barcelona, Spain. In these poems, Mistral not only constructs a unique vision of the majesty and power of these volcanoes, but also intertwines them with mythological and ancestral cultural deities associated with the Mapuche universe, who serve as guides or advisers to the territories. In *Volcán Osorno* [Osorno volcano] (1938), Mistral describes a calm snow-covered volcano surrounded by Lake Llanquihue, and she asks the volcano to leave its state of rest, with whose "fire" she identifies herself, the inhabitants of the area and the fertility or abundance of the land: "*¡Boyero blanco, tu*

yugo blanco, / dobla cebadas, provoca trigos! / Da a tu imagen la abundancia, / rebana el hambre con gemido. / ¡Despeña las voluntades, / Hazte carne, vuélvete vivo, / quémanos nuestras derrotas / y apresura lo que no vino! / [White herdsman, your white yoke, / bend barley, provoke wheat! / Give your image abundance, / cut hunger with a groan. / Cast down the wills, / become flesh, come alive, / burn our defeats / and hasten what did not come!]

Pablo Neruda (1904-1973) was a Chilean writer and poet who won the Nobel Prize in Literature in 1971. In one of his poems *El Libro de las Preguntas* [The Book of Questions] (1974), he asks the reader twice about volcanoes without referring to a specific one: "*¿Qué cosa irrita a los volcanes que escupen fuego, frío y furia?* [What irritates volcanoes that spew fire, cold and fury?], attributing to them a distant and irascible character. Later in the same book he continues to ask, but now with pain or melancholy: "*¿Caen pensamientos de amor en los volcanes extinguidos? ¿Es un cráter una venganza o es un castigo de la tierra?*" [Do thoughts of love fall on extinct volcanoes? Is a crater a revenge or is it a punishment from the Earth?]. In "Oda a los trenes del Sur" [Ode to the southern trains] (1959) he vividly mentions volcanoes as prominent topographical features: "*Trenes del Sur, pequeños entre los volcanes*…" [Southern trains, small among volcanoes…].

Elicura Chihuailaf (1952-), a Mapuche poet who was awarded with the National Prize for Literature in 2020, is mindful of volcanoes in his work. Chihuailaf was born and raised in Quechurehue, near Llaima volcano, which is third in the volcanoes specific risk ranking of Chile (SERNAGEOMIN, 2023). Among his writings it is possible to exemplify the permanent presence of volcanoes, home of the "pillanes" and the

geological as living beings as in *Los signos de la naturaleza* [The signs of nature] (2008), where, during the last eruption of Llaima, the author says, between other mentions to this volcano: "*Mientras transito por la carretera veo levantarse la humareda del Llaima. Parece despertar el volcán, pero ha estado siempre alerta, dialogando con los ríos, con el aire que sostiene sus fumarolas, con las nubes que como botes sobre el cráter nos anuncia la lluvia. Desde mi infancia escucho su diálogo sonoro con el cerro Rucapillan*" [First day of 2008. As I pass along the road, I see the smoke of the Llaima rising. The volcano seems to be waking up, but it has always been alert, in dialogue with the rivers, with the air that holds its fumaroles, with the clouds that announce rain like boats over the crater. Since my childhood I have listened to its sonorous dialogue with the Rucapillan]. Rucapillan in mapudungun, the language of the Mapuche, means "house of the guardians" or "home of the ancestral spirits", and is the local name for the Villarrica volcano, the first in the volcanoes specific risk ranking of Chile (SERNAGEOMIN, 2023).

4.5. Volcanoes in Chilean Traditional Music and Culture

As examples of Chilean popular music, one can find fascinating stories like that of Patricio Manns (1937-2021), who ventures into the mountain range near Antuco volcano in search of inspiration for his creations. In his own words, "In my songs as in my novels, volcanoes naturally appear as elements of the landscape I am describing…". In his song *Cuando me acuerdo de mi país* [When I remember my country], he said, "*Me sangra un volcán*" [A volcano bleeds within me] (Manns and Salinas, 2021).

In addition, in the Archive of Oral Literature and Popular Traditions, the Popular Poetry Booklets, and the Songbooks of the National Digital Library of Chile [Biblioteca Nacional de Chile], there is a song related to a volcano that is mentioned, with slight modifications, in four compilations of popular musical expressions: *La Alegría del hogar*, series I and II (Gallardo, 1913), *Penas del Alma* (Torres, 1913), and *Cancionero amoroso* (1911). In these publications, volcanoes become direct symbols of passionate love: "*Tú encendiste, tú encendiste en mi pecho, un volcán, un volcán que amor se llama*" [You ignited, you ignited in my chest / a volcano, a volcano called love]. Almost a hundred years after these publications, Margot Loyola (1918-2015), a folklorist, composer, guitarist, pianist, collector, and researcher of Chilean folklore, includes it in her musical album *Otras voces en mi voz* [Other voices in my voice] (2010) under the record label Oveja Negra. Eight years later, the national artist Gepe (Daniel Riveros Sepúlveda, 1981-) pays tribute to this artist in his album *Folclor Imaginario* [Imaginary folklore] (2018), in which this song is included.

4.6. Volcanoes in Film and Audiovisual in Chile

In the field of Chilean cinematography, to date, there have been six film and/or audiovisual works produced that explore the world of volcanoes. These works, which include both short and feature films, have focused primarily on the documentary genre. Their objective has been to reveal the relationship between humans and volcanoes, highlighting both their aesthetic beauty and their tourist potential, while addressing the complexities, risks and potential catastrophes associated with this coexistence.

Of these, five are *actualidades* (newsreels), Chilean film records that proliferated in the first decade of the 20th century and represent the oldest local precursors of documentary cinema (Mouesca, 2005). Thanks to the exhaustive research presented in the book *Sucesos recobrados* [Recovered events] (Vergara et al., 2021), we can present details of these five works in chronological order:

1. *Chile, futuro país del turismo* [Chile, the future country of tourism] (1926), a production by Andes Film and Chilean photographer and documentarian Gustavo Bussenius (1885-1932). This film was made as part of the centennial celebrations of Chiloé. It is considered a lost film.
2. *La Suiza Sudamericana* [South American Switzerland] (1926), produced by Imperio Film. This film, with a propaganda focus on tourism in southern Chile, highlights the Osorno volcano through images of rivers and harbors. It is also considered a lost film.
3. *Expedición al volcán Quizapu* [Expedition to Quizapu volcano] (1928), produced by Andes Film, is a newsreel from the newspaper La Nación. This work focuses on an expedition to Quizapu volcano, located in the Maule region. With a length of approximately twelve minutes, the film includes explanatory graphics, images of the expedition members, and narration through intertitles that tell the story and route of the expedition.
4. *Ascensión al volcán Aconcagua* [Aconcagua volcano ascent] (1930), produced by Andes Film, is a special edition of the newsreel of the newspaper La Nación, dedicated to the ascent of the highest mountain of the Andes located in Argentina. As mentioned above, the Aconcagua was active more than 20 million years ago (Godoy et al., 1988). The movie is also considered a lost film.

5. *La erupción del volcán Quizapu* [Quizapu volcano eruption] (1932), produced by Andes Film, depicts the massive eruption of Quizapu Volcano that occurred on April 10, 1932. This volcanic eruption is considered one of the largest of the 20th century, and the largest between Andean volcanoes (Tilling, 2009; Rovere et al., 2012). The film includes aerial views of the crater, as well as images of nearby towns affected by the ashfall (Vergara et al., 2021).

Eighty-one years later, *Vecinos del volcán* [Neighbors of the volcano] (2013) emerges, a feature-length documentary directed by Bulgarian filmmaker Iván Tziboulka. The film aims to capture the complexity of the disaster caused by the eruption of Chaitén volcano, which occurred in the late hours of May 1, 2008 (Castro and Dingwell, 2009). For nearly five years, the documentary follows three families from Chaitén who were forced to leave their town due to the volcanic eruption and subsequent lahar that covered the city. Through personal dialogues, the film explores the intricacies of what has been called a "double catastrophe": "...the initial one, caused in 2008 by the eruption of Chaitén volcano on the urban center of the same name, and the subsequent one caused by political and technical decisions to mitigate the natural phenomenon, which involved the evacuation of the population and a drastic demographic decline of the town (Mandujano et al., 2015).

4.7. Museum response: the first on-site museum about a socio-natural disaster in Chile

Thirteen years after the eruption of Chaitén volcano, an interpretative center was inaugurated amidst the ruins of the disaster. This center, constituted as the first on-

site museum of a socio-natural disaster in Chile, was designed with the aim of providing a testimony of the volcanic crisis and the effects of the attempts to relocate the city, through volcano science and the emotional perception of the inhabitants, using art as part of the strategy (Holmberg et al., 2023).

5. Discussion: Framing art to unveil the intrinsic connection between volcanoes and human social life

As we have seen in this interdisciplinary study, which examines artistic and cultural manifestations in Chilean art history between 1818 and 2021, volcanoes have been a source of inspiration and experimentation for many artists since the early founding of the Republic. Volcanoes have accompanied different historical and political processes from naturalistic views of the territory to contemporary political interventions in public spaces. We acknowledge the indescribable capacity of art and artists to frame the chaos of the Earth by extracting volcanic qualities. These are qualities that are otherwise invisible. We discuss how the arts have the potential to reveal the relationship between volcanoes and human social life by showing: (1) the indomitable character of volcanoes, (2) volcanic materials, (3) volcanic imagination, and (4) the catastrophic experiences generated by volcanoes.

First, the indomitable character of volcanoes is represented in national symbols and was used to empower the new nation during the formation of the nation state. This character shows a view of nature as something that can be overwhelming and is beyond human control. If people do not live near a volcano or there is no warning of an eruption, volcanoes tend to disappear from practical consciousness. On the other

hand, when volcanoes are present as figures in everyday objects, they could become benchmarks of artistic works and popular imagination, expanding the opportunities of enhancing citizen knowledge about volcanic risk using the arts as a tool (e.g., Rouwet et al., 2013; Sevilla et al., 2023). This is important because low levels of volcanic risk perception are common since volcanic eruptions occur less frequently than other natural hazards (Carlino et al., 2008). In addition, volcanoes are often located in tourist areas, where visitors may lack risk awareness and perception (Bird et al., 2010), which can be a significant problem in crisis management (De la Cruz-Ryna et al., 2000).

Second, art installations and sculptures used volcanic materials or emulated volcanic forms in their production. This visible gesture of bringing volcanic materials into public spaces close to citizens is a literal act of bringing volcanic qualities closer to social life. They also offer the possibility of grasping the conceptual categories of volcanology, and through and with the right didactic scaffolding, education about volcanoes could be provided. In this regard, the works of Fernando Prats (Blanch, 2011) and Cecilia Vicuña (Ariz Castillo, 2013) highlight their ability to bring volcanic material and comovisionary qualities to society. The first quality uses the language of matter imprinted in surfaces and the second, through ritual performance brings us the opportunity to connect with the wisdom of Earth.

Third, volcanoes have been used as inspiration for paintings, music and poetry, teaching us a kind of volcanic imagination. By means of imagination and sensations, these arts translate volcanic evocations into representations using colors, figures, and words, conforming another language to express volcanic qualities that emerge from human experience of sensible interaction with volcanoes. This language does not

correspond to the scientific language but an imagined aesthetic language that captures multiple subjective ways of volcanic presence in human experience (Dixon and Beech, 2018; Soldati and Illingworth, 2020, Calvache and Sánchez, 2021), perhaps not so different from the visions of volcanoes, and of nature in general, in pre-modern times in different cultures (e.g., Mariscotti de Görlitz, 1978; Grebe et al., 1972; Schlehe, 2008; Holmberg, 2023).

Fourth, audiovisual arts, and specifically the genre of documentaries, exhibit disastrous experiences as a volcanic quality with striking realism but also as touristic attractions and geological heritage. Although we presented only six cases, historical films of eruptions and expeditions have the potential to be scientific evidence in order to understand volcano behavior and anthropogenic causes of disasters and also, can be keys to intervene in disaster risk reduction, with internationally renowned examples, such as “Fire of Love” (Dosa, 2022). The particular case of Chaitén presented both in the documentary *Vecinos del Volcán* [Neighbours of the volcano] and with the construction of the on-site museum, provides the opportunity to observe and analyze the complexity of public policies on socio-natural disasters and the importance of their adequate design to reduce vulnerability, considering the importance of social, affective, and territorial ties (Mandujano et al., 2015; Maldonado et al., 2020).

6. Conclusions

This is the first attempt to explore the diverse artistic representations of volcanoes in Chile and has revealed a remarkable diversity of expressions that reflect the deep connection between Chilean society and volcanoes throughout the history of the

country. Our findings provide the basis for an in-depth analysis, exploring the temporal and spatial contexts that have shaped the emergence and evolution of these volcanic representations, and the human perception of geological phenomena. The wide variety of artistic expressions presented in this study serves not only as evidence of the diversity of volcanic processes, landforms, and eruptive styles, but also as a testimony that volcanoes, as geological phenomena, are intricately intertwined with human social dynamics in ways that go beyond the immediate physical consequences of a volcanic eruption (Holmberg, 2007). We acknowledge that artistic representation of volcanoes in Chile can go further, through the exploration in other arts, such as photography and theater, among others. This study not only presents artistic representations of volcanoes throughout Chilean history, but also highlights the central role of art and interdisciplinary approaches in illuminating the profound influence of volcanoes on the cultural and social fabric of Chile. We have shown that this entanglement is continuous throughout time and has not been truncated despite separations between nature and society in modern times. These insights have remained largely hidden until this research.

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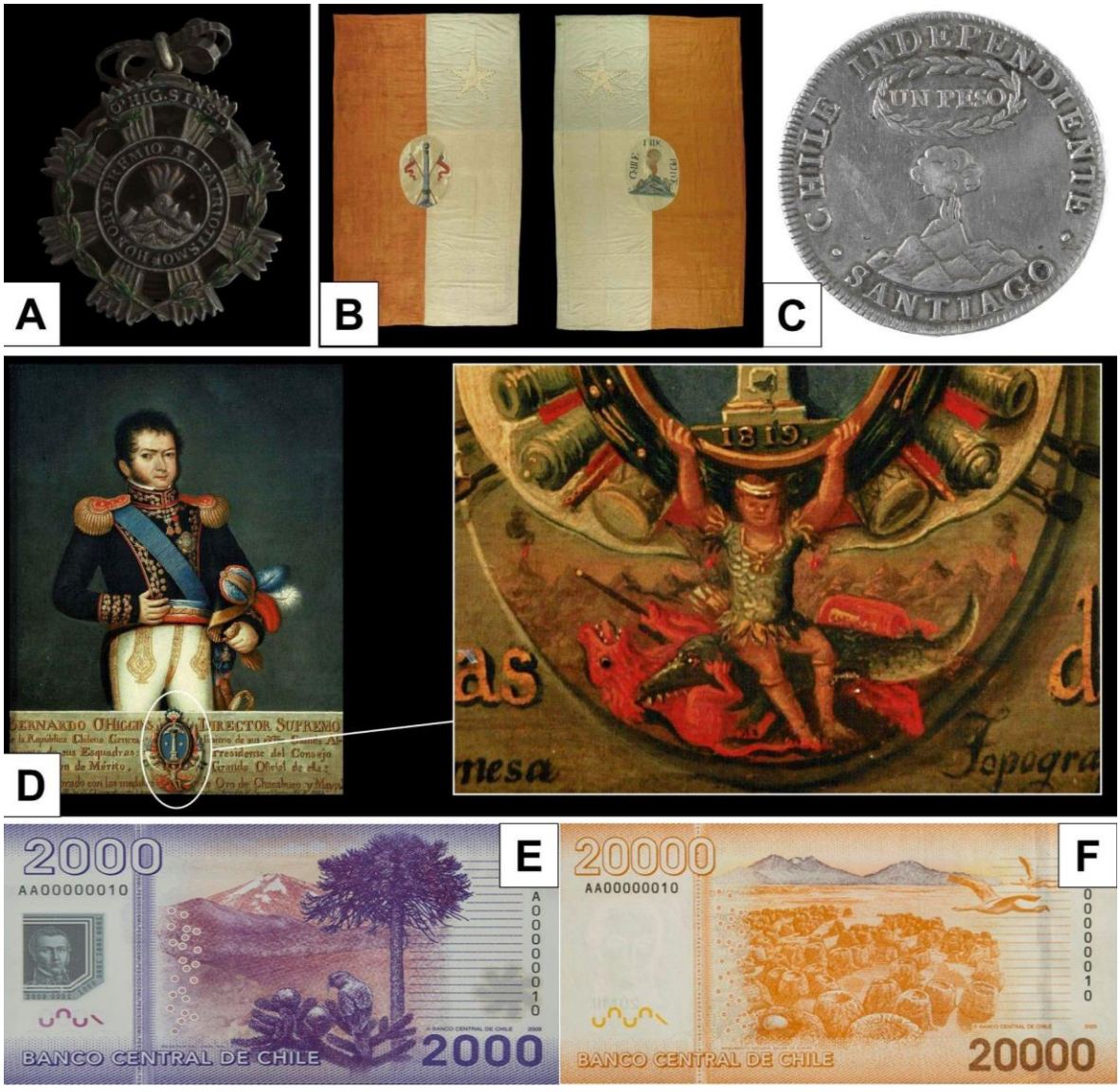

Figure 1. A) Manuel Esquivel. *Legion of Merit decoration* (1817). National History Museum of Chile (MHN). ID 3-4406. B) Antonio Arcos. *Flag of the Oath of the Independence of Chile* (1817). National History Museum of Chile (MHN). ID 3-35215.

C) Francisco Borja Venega. *A peso. The first coin minted in independent Chile* (1817). National History Museum of Chile (MHN). ID 3-4447. D) José Gil de Castro y Morales. *Painting of Don Bernardo O'Higgins, Supreme Director*, and detail. (1821). National Museum of Fine Arts (MNBA). ID 2-12. E) Reverse of the 2,000 Chilean peso banknote. Polymer. 127 x 70 mm. F) Reverse of the 20,000 Chilean peso banknote. Cotton paper. 148 x 70 mm.

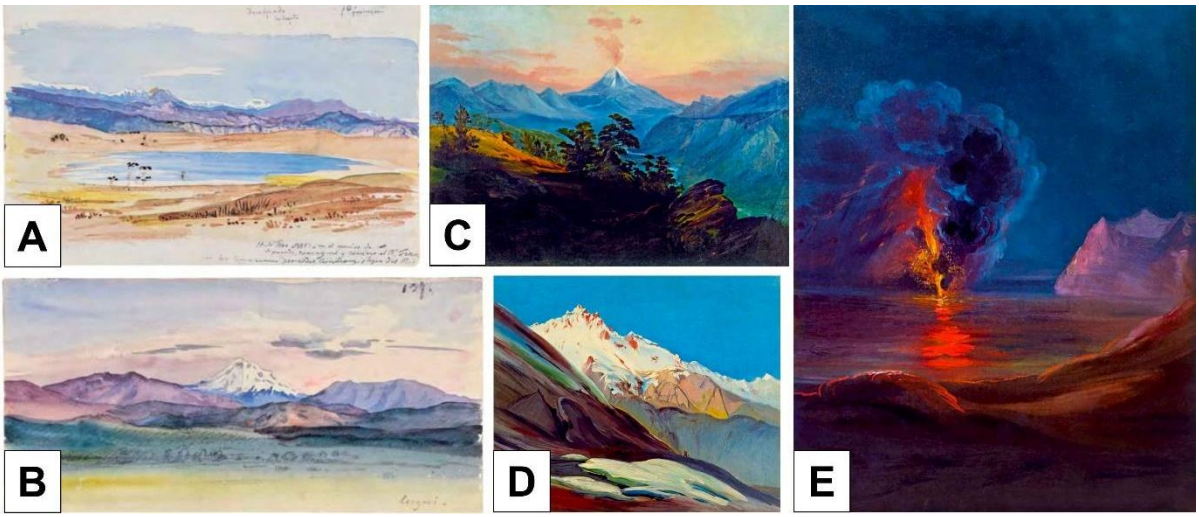

Figure 2. A) Johann Moritz Rugendas. *Vista del volcán El Descabezado desde las colinas de Teno [View of Descabezado Volcano from the hills of Teno*] (1835). B) Johann Moritz Rugendas. *El Nevado de Longaví* [The Nevado de Longaví] (1835). C) Johann Moritz Rugendas. *Volcán Antuco* [Antuco volcano] (1835). D) Johann Moritz Rugendas. *Las cimas de la Sierra Velluda* [The Peaks of Sierra Velluda] (1835). E) Johann Moritz Rugendas. *Erupción volcánica en el Archipiélago de Juan Fernández* [Volcanic Eruption in the Juan Fernández Archipelago] (ca. 1836).

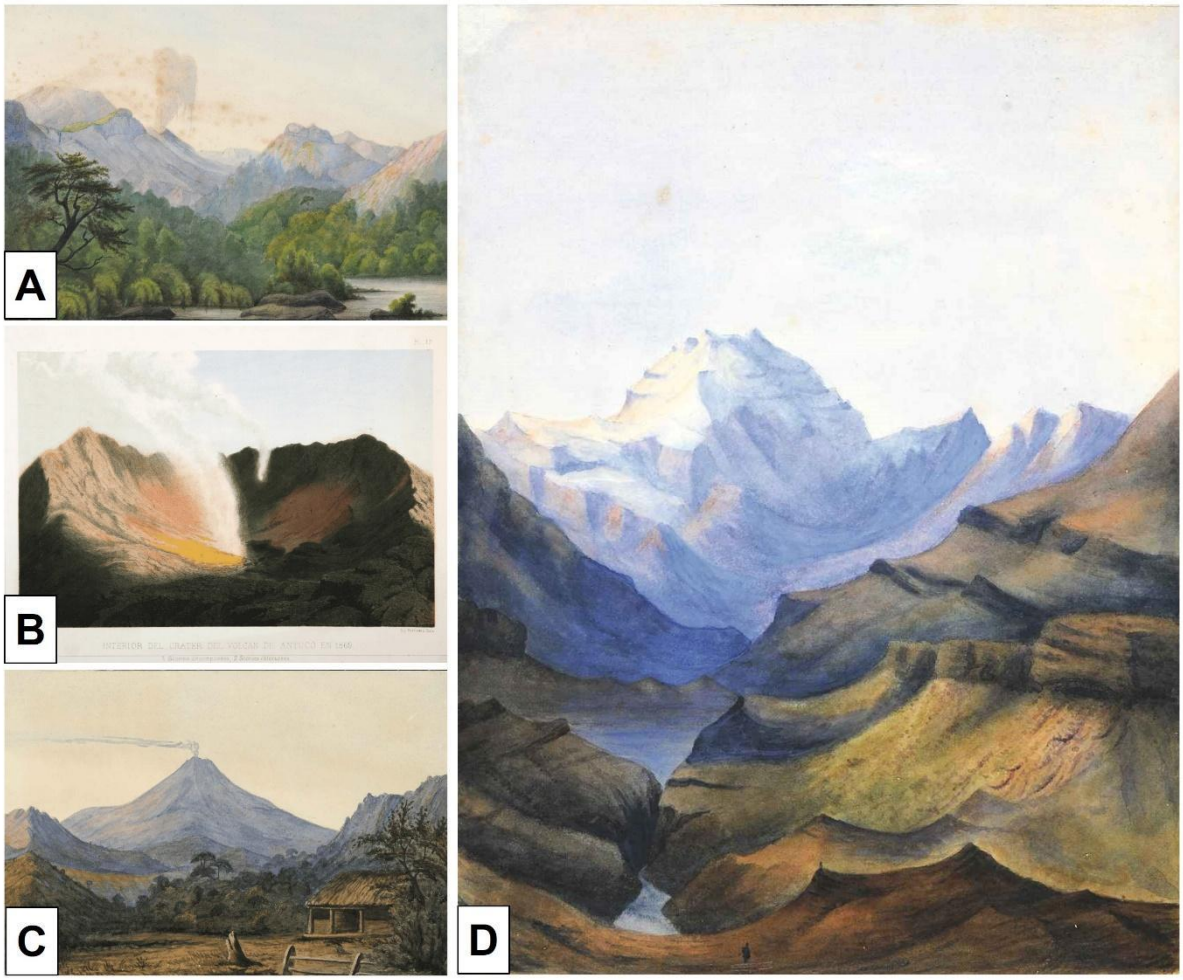

Figure 3. A) Pedro José Amado Pissis. *Volcán de Chillán* [Chillán volcano] (1863). National History Museum of Chile (MHN). ID 3-34550. B) Pedro José Amado Pissis. *Interior del cráter del volcán Antuco* [Interior of Antuco volcano crater] (1869). National History Museum of Chile (MHN). ID 3-38590. C) Pedro José Amado Pissis. *Volcán de Antuco* [Antuco Volcano] (n.d.). National History Museum of Chile (MHN). ID 3-34549. D) Pedro José Amado Pissis. *Volcán de Aconcagua* [Aconcagua Volcano] (n.d.). National History Museum of Chile (MHN). ID 3-34545.

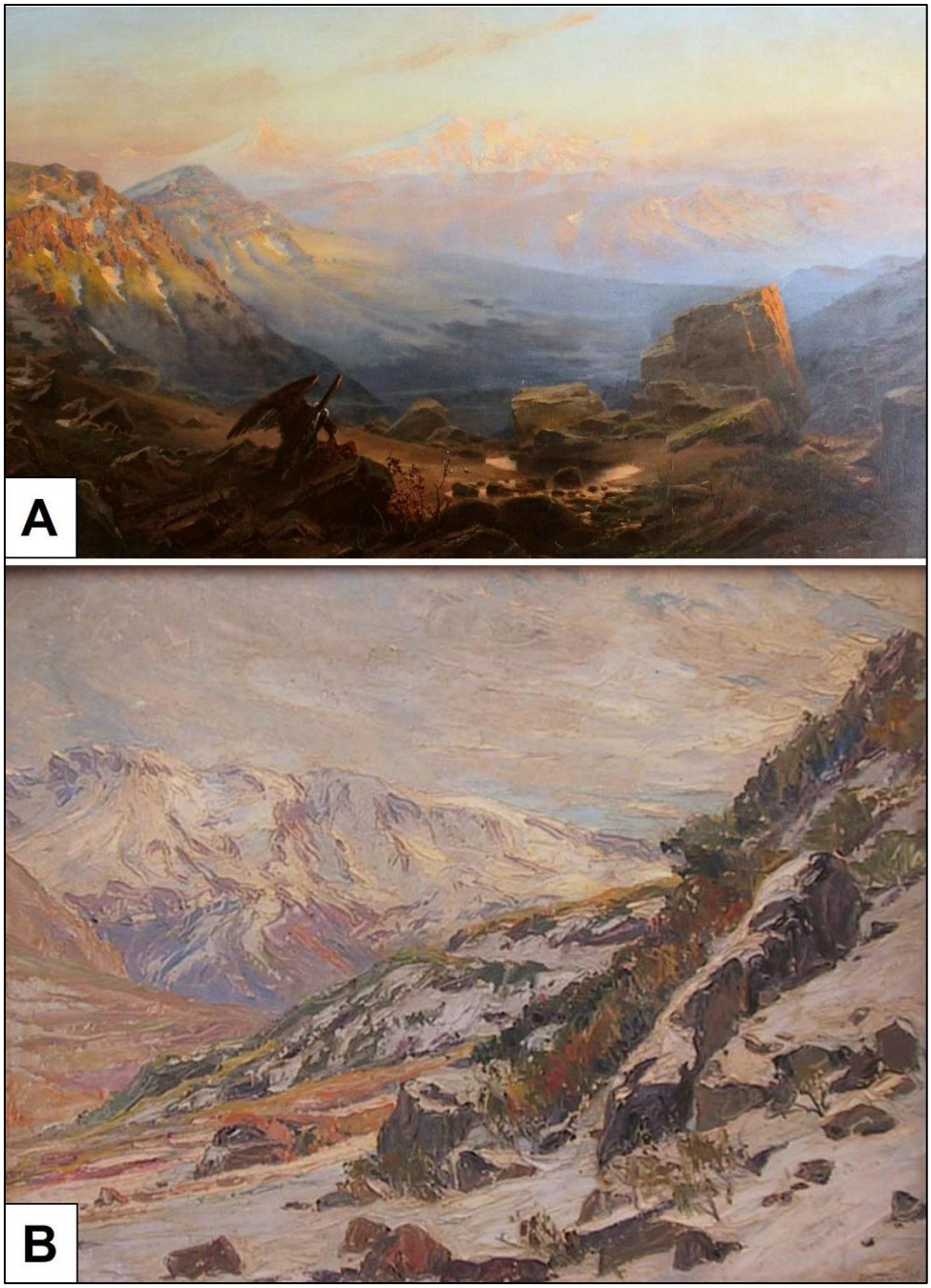

Figure 4. A) Thomas Somerscales. *Vista del volcán Antuco* [View of the Antuco volcano] (n.d.). Oil on canvas. 72,5 x 125,5 cm. Museo Municipal de Bellas Artes de Valparaíso. ID 51-208. B) Luis Strozzi. *Volcán del Cajón del Maipo* [Cajón del Maipo volcano] (n.d.). Oil on canvas. 39.2 x 50 cm. Museo O'Higginiano y de Bellas Artes de Talca. ID 7-324.

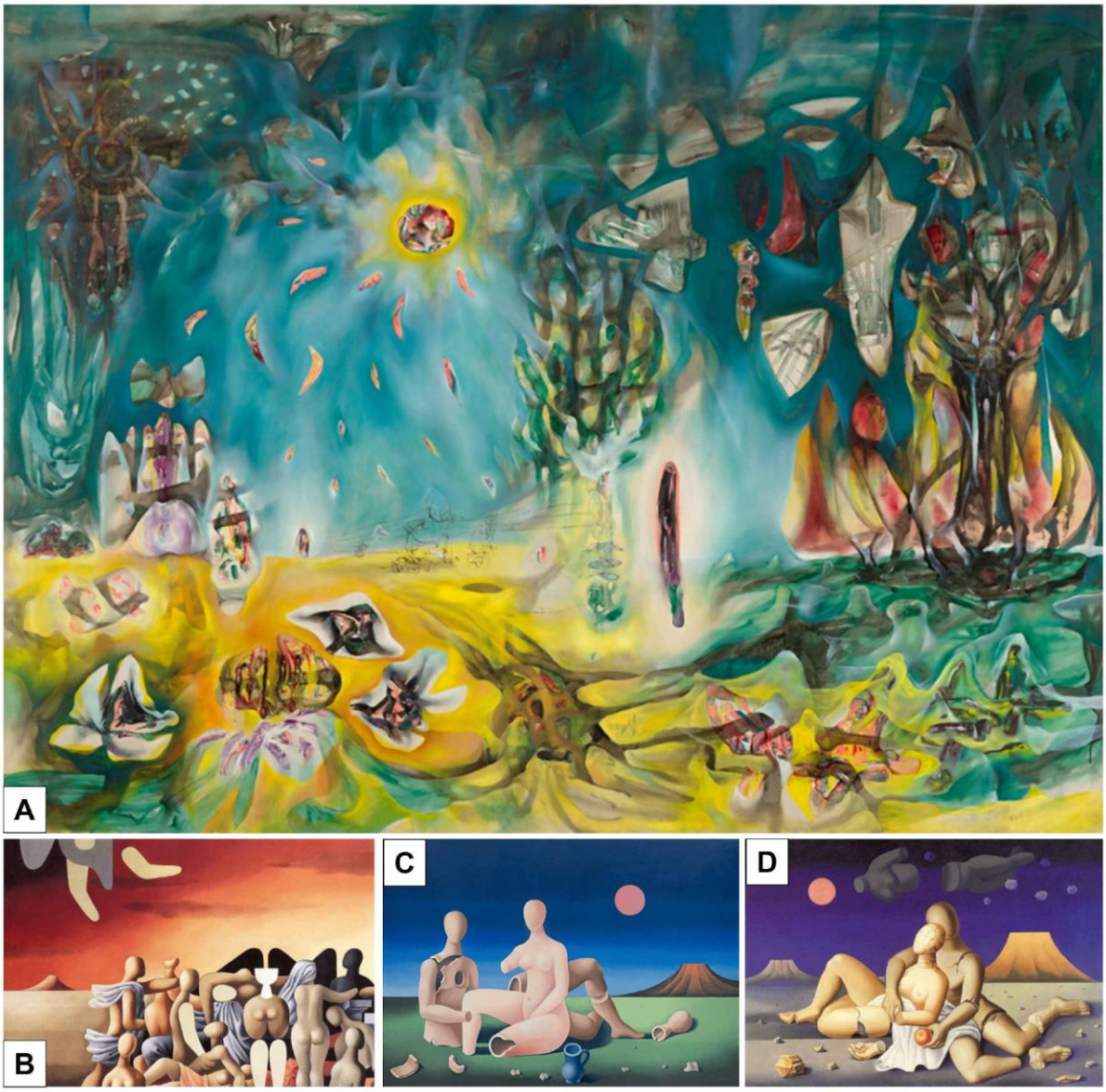

Figure 5. A) Roberto Matta. *La Tierra es un hombre* [The Earth is a Man] (1942). Oil on canvas. 182.9 x 243.8 cm. Art Institute of Chicago. ID 1.992.168. B) Mario Carreño. *Tierra de volcanes* [Land of volcanoes] (1974). Oil on canvas. 85 x 120 cm. Private collection. C) Mario Carreño. *Pareja en el desierto* [Couple in the desert] (1974). Oil on canvas. 85 x 120 cm. Private collection. D) Mario Carreño. *Sueño Fragmento* [Dream fragment] (1975). Oil on canvas. 85 x 120 cm. Private collection.

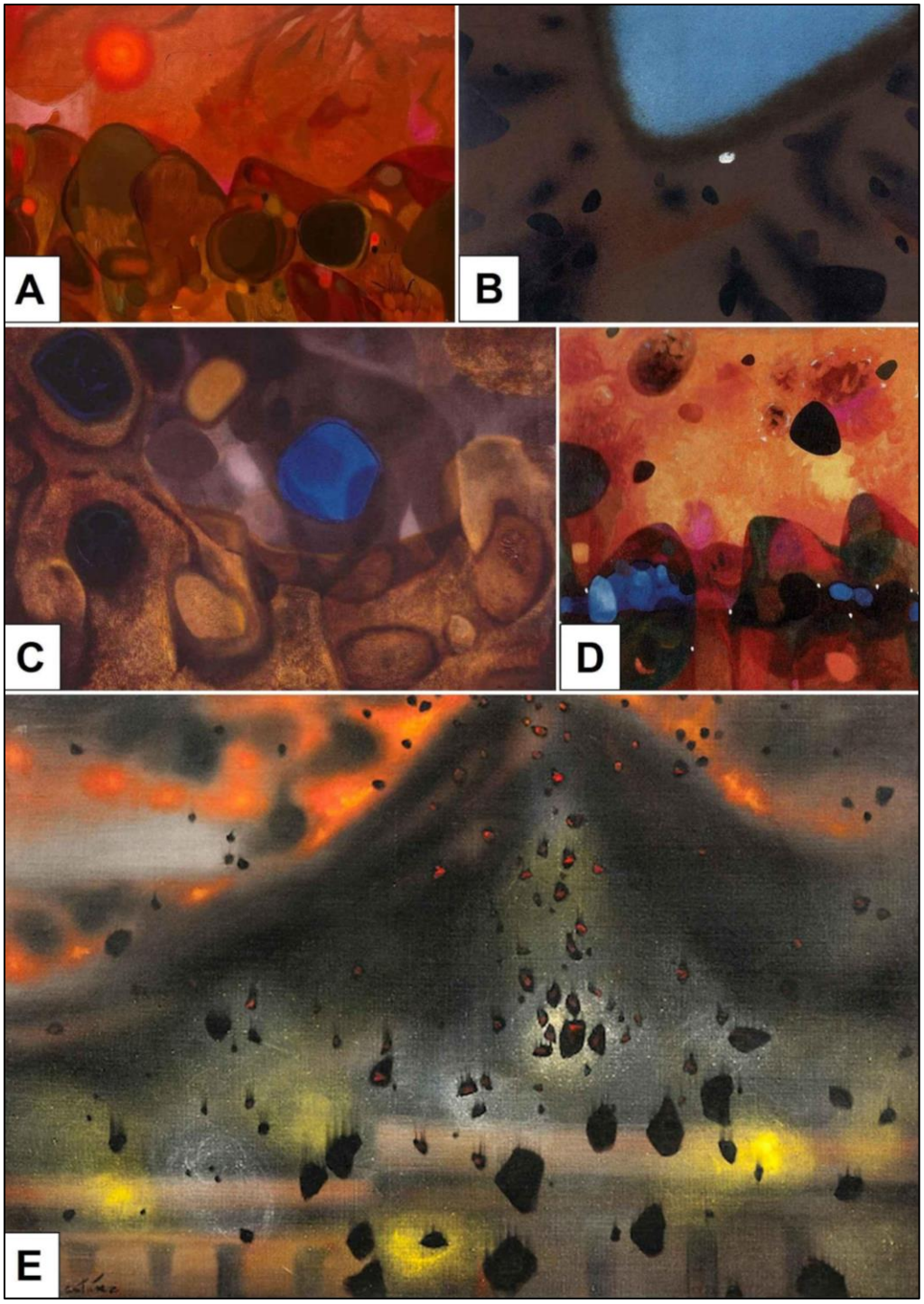

Figure 6. A) Nemesio Antúnez. *Cráter* [Crater] (1959). Oil on canvas. 81 x 116 cm. B) Nemesio Antúnez. *Cráter* [Crater] (1961). Lithograph. 34,3 x 50,8 cm. National Museum of Fine Arts (MNBA). ID 2-2919. C) Nemesio Antúnez. *Siete volcanes* [Seven volcanoes] (1963). Oil on canvas. 121 x 121 cm. MAC Collection, Faculty of Arts, University of Chile. ID 1075667-7. D) Nemesio *Antúnez. Cordillera Adentro* [Cordillera

inside] (1962). E) Nemesio Antúnez. *Corazón de Los Andes* [Heart of the Andes] (1966). Oil on canvas. 197 x 378 cm. F) Nemesio Antúnez. *El volcán* [The volcano] (n.d.). Oil on canvas. 66 x 100 cm. Pinacoteca de Concepción Collection.

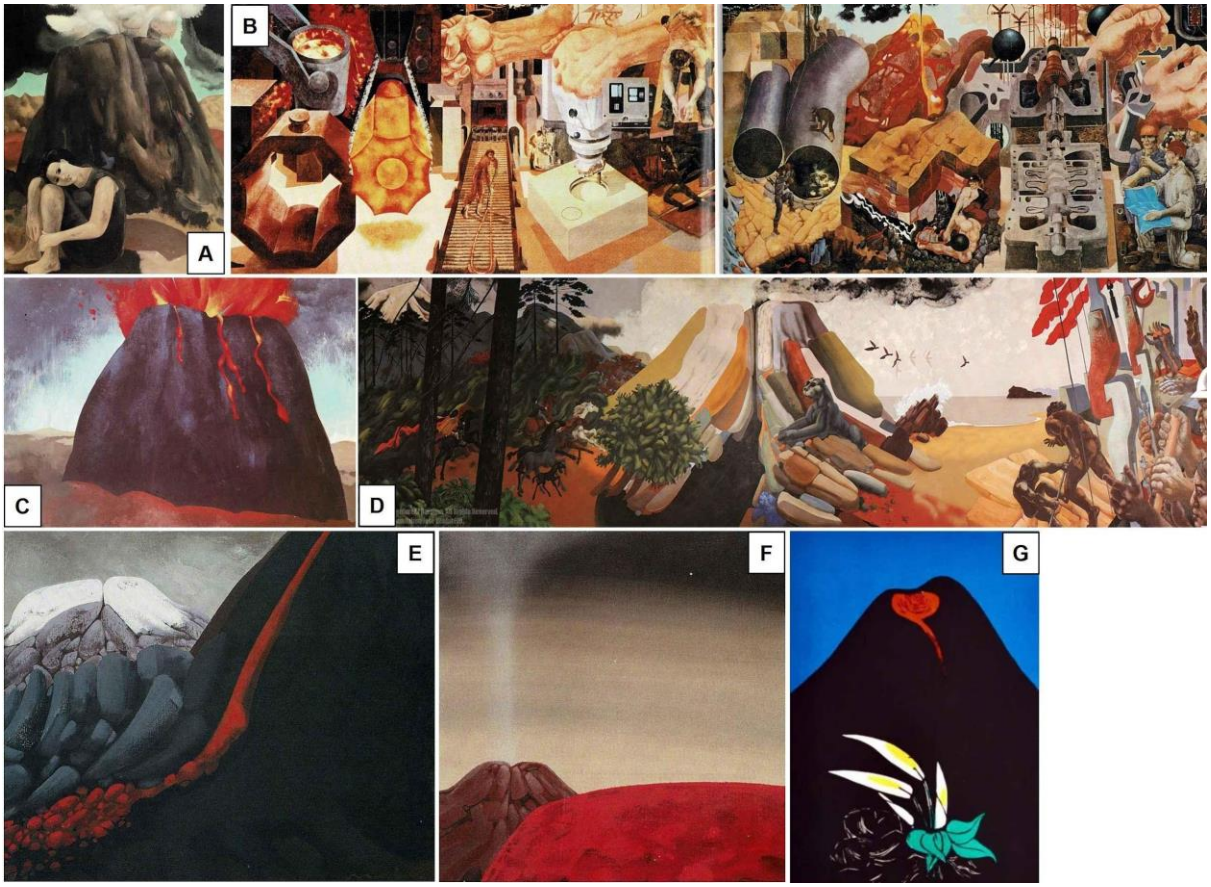

Figure 7. A) José Venturelli. *Niña y volcán* [Girl and volcano] (1962). Acrylic. 119 x 99 cm. B) José Venturelli. Mural at the National Institute for Professional Training (INACAP): *Al transformar la naturaleza el hombre se transforma a sí mismo* [By transforming nature, man transforms himself] (1969). Acrylic. 46 square meters. C) José Venturelli. *Volcán encendido* [Burning volcano] (1972). Mixed technique. 93 x 106 cm. D) José Venturelli. *Chile* [Chile] (1972). Acrylic. 200 x 900 cm. E) José Venturelli. *Derrumbe* [Landslide] (1977). Acrylic. 38 x 46 cm. F) José Venturelli. *El aliento de la tierra* [The breath of Earth] (1978). G) Santos Chávez. *Flores en el volcán* [Flowers on the volcano] (1987).

Figure 8. A) Francisco Smythe Treuer. *Vía Láctea* [Milky Way] (1998). Mural, mixed media. Over 225 square meters of walls in the space connecting with line 5 of the Baquedano metro station, Santiago. B) Samuel Román. *Ojos del Tupungato* [Eyes of Tupungato] (1980). Granite-carved stone. 75 x 60 x 36 cm. C) Federica Matta in collaboration with architect Ana María Rodríguez. Volcano-shaped slide in Plaza Brasil, Santiago (1993). Acrylic-painted cement. 5 x 5 m. D) Sergio Castillo. *Erupción* [Eruption] (1998). Painted iron with stainless steel tips. 6 x 9 x 1.7 m. E) Hugo Marín. *Volcanes* [Volcanoes] (2009). Constructed using wood, clay, fiber, and pigment. Each sculpture measures 35 x 25 x 25 cm.

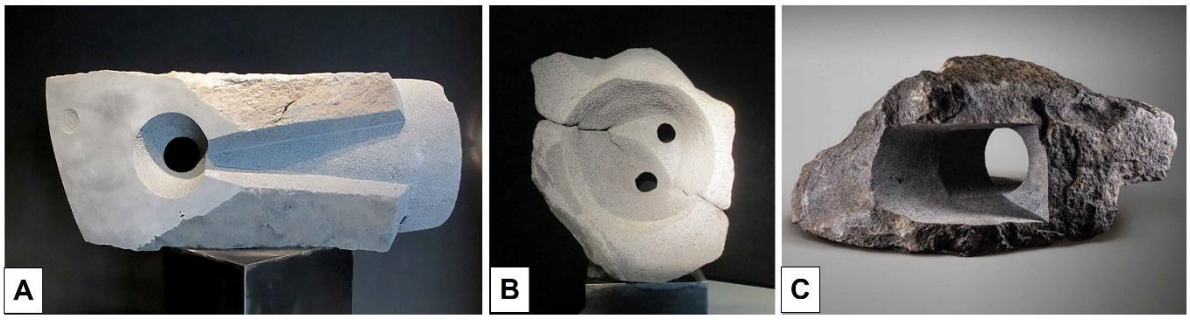

Figure 9. Sculptures by Francisco Gazitúa Costabal: A) *Volcán Misti* [Misti volcano] (2015). Basalt volcanic stone. 58 x 139 x 40 cm. B) *Volcán Hualca* [Hualca volcano] (2015). Basalt volcanic stone. 60 x 114 x 49 cm. C) *Volcán Maipo* [Maipo volcano] (2015). Basaltic andesitic volcanic stone. 80 x 120 x 80 cm.

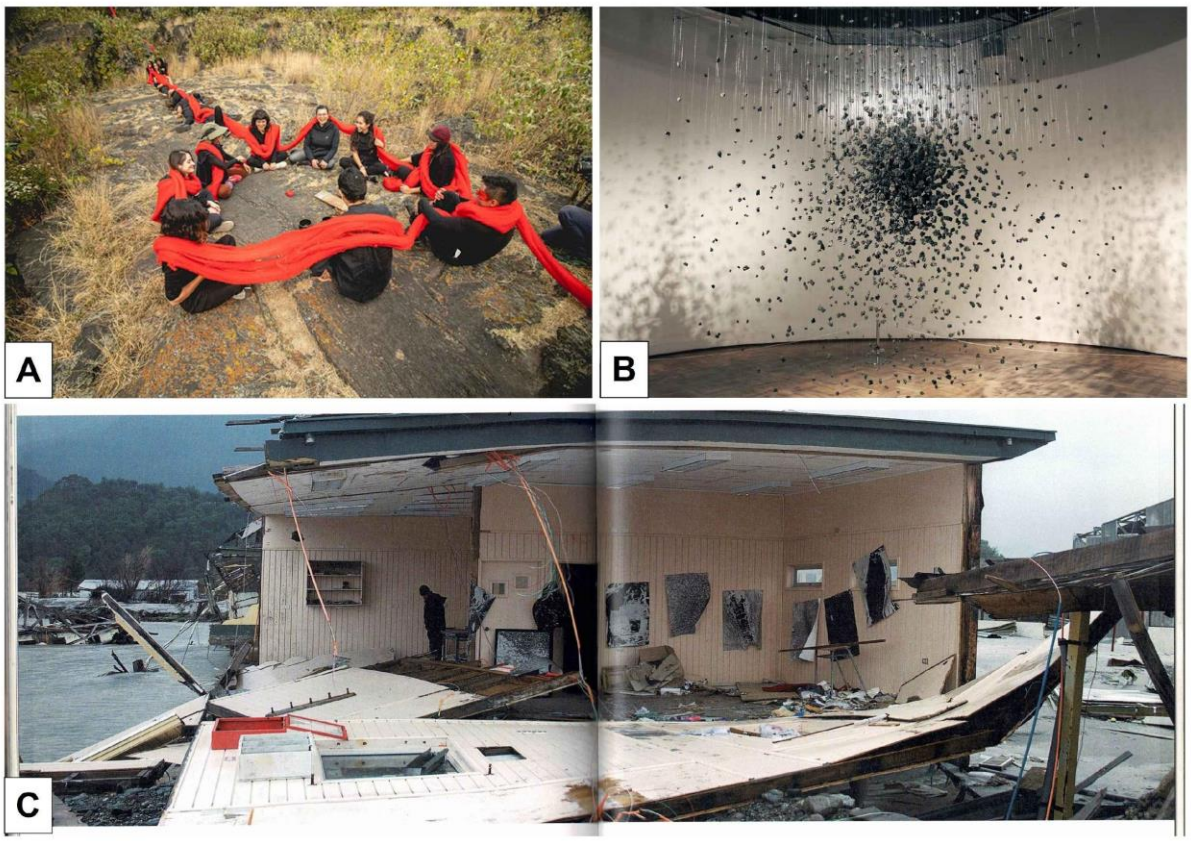

Figure 10. A) Cecilia Vicuña. *Quipus* (2020). University Museum of Contemporary Art (MUAC). B) Ignacio Bahna. *Volver a suspender* [Back to suspension] (2017). 3000 volcanic stones, transparent nylon thread, and an audio system with motion sensors

(sounds of falling stones and footsteps on stones). C) Fernando Prats. *Acción Chaitén* [Chaitén action] (2009). Smoke on paper.