



# Communicating Loss: Ice Research, Popular Art and Aesthetics: Introduction

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## COMMUNICATING WITH, AND ABOUT, ICE

Water, in its various states of aggregation—such as ice—connects us humans with our environment. Thinking with, and about, ice forces reflection on the essence of nature-human relationships; not in a demarcation of nature and culture, but in their mutual interpenetration and dependence. In its frozen state and when it melts, ice has both a form-assuming and a form-dissolving quality; as a shape-shifter, it becomes a metaphor for the entanglements of humans with nature as a dynamic system that is deeply troubled. In this regard, the increasing loss of ice—at the polar regions and elsewhere—mirrors our own physical and immediate

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endangerment by climate change. This is why ice is commonly used as a means of communicating the need to change our behaviour by fundamentally reflecting on our perception of, and attitude towards, nature in its current and historic dimensions.

In times of climate change, scientists are faced with the challenge of making their knowledge and data accessible to wider audiences and reaching different people through different avenues and media. This is why scientists turn to artists, to give the abstract contexts of climate change a sensual and tangible form—for example, by immersive effects or emotional address. But artistic work with ice is far more than an instrument of knowledge communication in a linear sense, that is, as a one-way street.

For example, Astrida Neimanis’s observation of the wateriness of the human body underlines that humans are inseparable from “pressing ecological questions” (2019, 1). Thinking with, and about, water in its various states enables insight into the fluid boundaries between the human, the non-human and the more-than-human. The author uses a materialist philosophical approach to outline an alternative to the Anthropocene worldview that has put humans and our needs in its centre (Neimanis 2019, 2).

Countering an abstract and white European universalism, Neimanis proposes an encounter between humans and nature which fosters insights into our own physical connection to, and entanglement with, this planet. Our dependency on the surrounding world has fostered a development in the arts in which the artistic material (here ice) does not serve as a meta-reflection on the nature of art—rather, it communicates that in the end, everything is nature.

In Western culture, we also encounter ice in its different forms in various types of science-related visual media, including films, cartoons and science shows. The sensual quality of ice—its coldness, its glow and its changeability—makes it a popular medium of communication in a climate-related context. More so, ice (melt) “carries a potent material politics” (Randerson 2018, 137). Melting polar ice is causing sea levels to rise sharply, threatening islands and coastal regions in particular. Each reef, each lake, each glacier has produced its own set of scientific experts who are now faced with the challenge of bringing together the various knowledge gains and communicating them as an interwoven system (Randerson 2018, 138). Ice can generate this sense of entanglements when used in scientific and aesthetic discourses. A “vital task” for ice art, ice shows or ice films is “to stir up an affective response to the rapidly shifting ecological

conditions” (Randerson 2018, 139). Personal relationships to climate change are brought about by an emotional encounter with ice as an active counterpart, evoking a range of effects, from overwhelm to identification and self-reflection. Ice art opens up a space of sensual experience in which ice appears as an active agent of knowledge production and reflection: Crucially, the reception of ice in art promotes reflection on one’s own relationship to the environment, the history of one’s own perception and one’s own agency.

### ENVIRONMENTAL ACTIVISM AND THE SUBLIME

Our imagination of ice is shaped by masculine and colonial fantasies that have remained unquestioned until recently. In particular, the so-called eternal ice—as a polar phenomenon and our associated emotions—draws from the nineteenth-century colonial period, which focused on conquests of the North and South Pole. These events lead to numerous science-related publications on heroic deeds. The ice was generally imagined as an empty stage on which heroic deeds could be acted out, following the narrative of man-against-nature (Bloom 1993). The hidden violence within these imaginaries can be traced to modern day; particularly, the silencing of women and animals within the (Ant)Arctic journeys, the denial of knowledge from the Inuit for the so-called heroes’ success and the local communities’ ongoing suffering (Bloom 2022). Today, Ant(Arctic) tourism and the warming of the poles make it possible for almost everyone—who has profited from the wealth of Western societies—to step into the footsteps of former polar heroes and heroines, inflicting further hidden violence. As Elena Glasberg noted, “the more people track the poles, the more they empty the ice of its own materiality or liveliness” (Glasberg 2011, 222).

Today, the irreversible loss of ice, measured and conveyed by scientists and broadcasted in the news, has slowly led to a shift within the perception of ice and its cultural meaning. Understood as a natural archive, ice expresses cultural injustices and environmental changes, while addressing us emotionally and stressing the need to act. Artists react to this by giving voice to the ice itself and paying homage to its liveliness. They let the ice speak and communicate its hidden knowledge. This development led to a shoulder-to-shoulder of arts, science and activism.

Thus, in contrast to its increasing loss, ice in our everyday culture seems omnipresent and available. For example, in June 2016, musician Ludovico

Einaudi posted a video on his YouTube channel called “Elegy for the Arctic”. In the video, Einaudi calls for the protection of glaciers by playing his sad composition on a grand piano on an artificially created, floating platform in front of a glacier in the Arctic Ocean (Fig. 1). The performance emerged from an initiative by Greenpeace and resulted in an online petition—seen by more than eight million subscribers—to save the Arctic (Einaudi 2016).

This Greenpeace campaign brought together activism, science communication and art. Einaudi travelled to the north aboard the Greenpeace ship *Arctic Sunrise* on the eve of a significant event: the meeting of the OSPAR Commission, an association under international law for the protection of the North Sea and the North-East Atlantic. In the video, he performs his elegy against the backdrop of the Wahlenbergbreen glacier in Svalbard, Norway. At the very moment of the elegy’s climax, part of the glacier breaks off and falls into the water. The effect is fascinating and confusing at the same time. Is it the strong connection between the music and the powerful images of nature that briefly creates a miraculous unity



**Fig. 1** Ludovico Einaudi (Pianist/Composer): Performance in the Arctic Ocean, 2016 © Pedro Armeste, Greenpeace

between humanity and the environment? Or is it the music (and thus culture) itself that leads to the catastrophic effect, hinting at the vulnerability of the ecosystem in the far North? This uneasiness makes us pause in awe and wonder.

Appreciating ice as an aesthetic means of sensual appeal, engagement and communication has its origins in the history and visual representation of natural disasters. The 1755 Lisbon earthquake is considered the first natural catastrophe whose images were widely disseminated in the media of the time (Weber 2018). In the visual discourse surrounding this event, documentary aspirations and aesthetic fiction unified in their goal for both representative effects and narrative structures (Scholz 2021). The visual circulation of this catastrophe caused consternation across Europe, and incited interest in aesthetic reception of all kinds of catastrophes, including ship disasters. One of the most popular and unique paintings of ship disasters in the Romantic period is Caspar David Friedrich's famous *Sea of Ice* (1823/24), which has been associated with the beginning of ecological thinking in art (Grawe 2001; Rautmann 1991). It is thus no coincidence that Friedrich's *Sea of Ice* became a reference for climate-critical activism and activist art of the 1980s and 1990s. Today, this famous painting is the iconographic role model for the majority of spectacular ice art—including Einaudi's performance, which positions the viewer on an (artificial) ice-floe alongside the artist.

The reference to Romantic aesthetics addresses how human subjects are physically affected by overwhelming, indescribable and awe-inspiring natural phenomena that dignify, excel or frighten us. The vulnerability of Einaudi's icy environment, however, turns this effect on its head and imparts a troubling message: not only are humans threatened by invisible forces made manifest (e.g. in breaking icebergs), but entire habitats are subject to drastic, threatening changes. In these contexts, nostalgia—a wistful, sentimental yearning for a past time, irretrievable state or irrecoverable condition—evokes the feeling, if not experience, of loss; in this case, the loss of the ice. By referring to, and evoking, these complex aesthetics, Einaudi's performance taps into a fascinating cultural reservoir of aesthetic and emotional experience: It is a conversation between the past, present and future. His performance is impressive and alarming, enjoyable and thought-provoking—and, by using art and aesthetics, it communicates a powerful environmental message about urgency and, ultimately, human responsibility. Using (artificial) ice as a platform to tell a story about the catastrophe of ice melt, Einaudi's enticing (video) performance is

explicitly staged as a show for an international, remote audience. The soundscape created by the piano and the crashing iceberg builds a bridge between the viewers of the video (however distant they may be) and the Arctic by interweaving nature and culture. Einaudi's artistic comment on environmental change and exigency is conveyed through staging, setting and visual and audible effects. Artistically interacting with the breaking iceberg, Einaudi literally plays with sublime aesthetics and, more precisely, the environmental sublime. The sublime is a cultural concept and an artistic means of confronting a subject with boundless (natural) forces. As a threshold experience, the sublime mediates between the visible and the invisible, between the form and the formless—which is why ice, as a shape-shifter, is used for its evocation. The sublime is based in the philosophy of enlightenment by Immanuel Kant and Edmund Burke and means an overwhelming experience; it is now connected with the ungraspable horror of climate change (Horn and Bergthaller 2019). Artists inspired by Kant's and Burke's philosophy are attracted by the sublime as sensual experiences and use it to highlight humans' physical dependence on the planet (Morgan 2016, 4).

The sublime as a tool for communicating climate change has been hotly debated in relation to its roots, intensity and effect, especially when it comes to art. Some authors criticise evoking ecological awareness through sublime aesthetics (Brady 2013, 119). They point to the roots of the sublime in European Universalism: the idea of a white and male-orientated domestication of nature. This is why representing climate change by sublime aesthetics often risks overwriting ecological awareness with latent colonial fantasies of finality—the extinction of species, the end of Indigenous people and their knowledge (Plumwood 1993). As Val Plumwood argues, the rationality of 'Western' culture and its aesthetic offspring (such as the sublime) have been systematically unable to acknowledge humans' dependence on nature and those defined as inferior 'others'. Birgit Schneider similarly points to the connection of the sublime to the history of spectacle and political propaganda, emphasising the danger of sublime aesthetics in climate art to immobilise climate action and produce fake news (2021). In contrast, others defend the use of the sublime in polar art, stressing its potential to evoke feelings of connectedness (Boetzkes 2020, 40–41). As Amanda Boetzkes points out, (climate-) science-related art can use the sublime to yield a sense of the earth's excess and the limit of representational form (2010, 110). According to Boetzkes, the environmental sublime can communicate the abstract interrelations of climate

change phenomena, and also lead to a conscious encounter between humans and the dynamic, e.g. invisible, forces of nature. A recognition of these forces allows nature to be imagined as something connected to humans as a counterpart. The potential of the sublime, which transcends the imagination, thus combines aesthetic experience and ethical significance.

In Einaudi's performance, the sublime arctic is more than a passive stage or scenic background. The ice shapes the music and interacts with the performer on an emotional level. It thus becomes a vital agent in communicating environmental urgency. The musician and performance—although coming from a white and Western cultural context, using an artificial ice stage and playing a music format (elegy) deeply rooted in Western culture that somehow repeats the colonial fantasies of the poles—open up space for a change in perception. Thus, Einaudi's Elegy seems to be a more sensitive approach to the topic of icy imaginaries by using the sublime as something ideologically "contaminated" (Bloom 2022, 54). Understanding the sublime as something contaminated means dealing with it in a self-critical way; as a questioning of Romantic aesthetics and their ideological heritage, rather than their mere replication. As a form of trauma work, the new, contaminated or environmental sublimity of ice approaches the world's cyrosphere as deeply shaped by an interrelated network of science and cultural perception (Bloom 2022, 75).

Today, icescapes do not fit into the narrative of regions untouched by humans. Instead, they are "irrevocably altered by remote human action and [...] will irrevocably change the course of human lives all over the globe" (Leane and McGee 2020, 1). The cyrosphere of the planet is touched by mankind, and touches our emotions when represented as disappearing phenomena in arts and media culture. In the era of the Anthropocene—a "period in which human activity [...] has become a key driving force of planetary environmental change" (Leane and McGee 2020, 3)—icy regions have moved from the margins of our imagination into the centre of our attention. Thus, it becomes crucial to examine how the emotional effects of ice are deployed, transformed and refracted in art to provide lively reflection on the complex connections between humans and nature. While Einaudi's artistic comment on environmental change and exigency is conveyed through staging, setting and visual and audible narration, it is, of course, not the only example of the power of art and aesthetics in communicating the urgency of climate action. A less overwhelming but equally effective aesthetic strategy and cultural example that

conveys a message about the ongoing ice melt—thus raising awareness of its ecological processes and effects—is the story and visual history of the ‘iceman’, Ötzi.

### COMMUNICATING ICE AND URGENCY IN POPULAR FICTION

On 19 September 1991, a couple walking in the mountains on the border between Austria and Italy found a now-famous mummy, frozen in ice. The discovery—only possible due to the increasing ice melt in European mountains—quickly went viral because of his great age (more than 5000 years) and well-preserved condition. Today, scientists continue to provide new insights into Ötzi’s life, appearance and death, which are then disseminated by popular media, such as magazines, television series or stamps and graphic narratives. The museum shop in Bolzano (Italy), for example, sells comics aimed at adults and children alike, in which Ötzi becomes the tragic hero of an adventurous criminal story as well as an action figure of media hype. The shop also sells a picture book for children—*Oetzi: The Iceman* in which Ötzi travels forward in time and is confronted with today’s industrial society, which makes it impossible for him to lead his former life as a hunter (Bovo and Barducci 2018). In the end, Ötzi experiences many humorous events that accustom him to modern everyday life and make him aware of the similarities between today’s society and his own Neolithic time period. The power of this story lies in the suspenseful narration, its sense of presence and the acute need for action, painting the picture of an individual threat that is connected to the reality of our own lives. Reflecting on the mysteries of ice, its archival function and long history, and its crucial significance for life on our planet, cultural products of this kind playfully embed complex scientific knowledge in comic book aesthetics (sequential art) and visual fiction to reach a large and diverse readership.

Climate-related popular fiction, for example in the form of comic book stories, is not only a versatile frame for interpreting our relationship with scientific themes and discourses, but also a vehicle for science communication. In other words, pop cultural media exploring science topics highlight that the public interest in science, and its perception and understanding, are embedded in a matrix of complex socio-cultural processes that give science meaning in our daily lives (Boykoff and Osnes 2019, 155). Visual science fiction reflects ideas about science and “construct[s] perceptions for both the public and scientists in a mutual shaping of science and



culture” (Kirby 2008, 44); these cultural perceptions or ‘cultural meanings of science’ are studied in the field of science communication (among other topics). Science communicator David A Kirby clarifies: “Several studies of science popularization demonstrate that its cultural meanings, and not its knowledge, may be the most significant element contributing to public attitudes toward science” (2017, 11). Unsurprisingly, popular media and audience identification with their protagonists have been studied as a source of audience influence and as variables that can affect perceptions of (behavioural) norms and changes (Rhodes and Ellithorpe 2016, 362). Popular fiction, for example, can “reduce various forms of resistance to persuasion” by making sense of “science’s nature, role, and potential” (Davies et al. 2019, 9). Provoking emotional responses in audiences can increase engagement with scientific concepts and perceptions of their usefulness or meaningfulness (Bilandzic et al. 2020), and popular fiction can raise awareness of science-related issues such as climate change (Morris et al. 2019). By creating an immersive “melding of attention, imagery and feelings” (Davies et al. 2019, 8), and fostering identification and empathy, narrative and visual fiction can influence audiences’ perceptions of their own worlds (Mathies 2020; Stroud 2008). This is the ‘cultural stream’ of science communication in which we position *Communicating Ice through Popular Art and Aesthetics* when we reflect on science *in* and *as* culture.

## ABOUT THIS BOOK

Ötzi’s graphic life story and Einaudi’s ‘ice-breaking performance’ are striking contemporary examples of the power of (popular) art, aesthetics and visual fiction to communicate environmental awareness about the loss of ice and, thus, the urgency to act—to save our planet before it is too late. Visual fiction and sublime aesthetics—two examples of artistic strategies—convey climate change in very different ways and can be both appreciated and criticised for their appropriateness and effectiveness. In this context, *Communicating Ice Through Popular Art and Aesthetics* addresses the following questions:

What artistic and aesthetic strategies are used to communicate research on ice and its crucial importance for our planet? For example, what role do heroic narratives, explorer myths and their aesthetics (the Arctic Sublime) play in our cultural imagination around ice, and how are they

used to communicate the need for action in the face of climate change today?

What kind of cultural work do (popular) art and visual fiction do in the context of ice research and science communication about it?

What aesthetic achievements and social benefits are produced through the collaboration of scientists and artists exploring the urgency of ice, and in what contexts?

What role does science actually play in, and for, our cultural ideas or imaginaries of ice?

The authors of this book answer these questions by combining the individual voices of leading scientists who collaborate with artists, distinguished artists who collaborate with scientists, science communication scholars, art and cultural historians, film and media researchers and scholars from the fields of comics studies and popular entertainment studies. Removing the traditional boundaries that separate these disciplines, they produce an understanding of the cultural work—and the aesthetic and societal achievements—that emerges from the interplay between ice research, art and aesthetics and the cultural power of artistically communicated science. In so doing, *Communicating Ice Through Popular Art and Aesthetics* traces the links between broadly defined visual art forms and science (in various historical and contemporary contexts), and innovative popular visual artworks (such as cutting-edge graphic fiction and animated film) and more ‘traditional’ art genres (such as landscape painting/ice panoramas). It also clarifies the role of ‘ice science’ as a driver for (new) artistic expressions and styles, the impact of artists on new science collaborations and science communication projects, and the contribution of science communication to innovation, which is central to new understandings of cultural history. Exploring both the strategies employed in (popular) art and aesthetics to convey meaning and awareness, and how they can be made fruitful for science communication, this edited collection introduces new perspectives on how our collective environmental responsibility can be addressed and communicated across disciplines. With its focus on ice—its investigation, representation and interpretation—*Communicating Ice Through Popular Art and Aesthetics* nudges and engenders a fruitful dialogue between science, science communication, art, art history and pop cultural studies exploring visual fictions.

## RESEARCH CONTEXT AND FRAME: ICE IN ARTS, SCIENCE AND POPULAR AESTHETICS

Scholarship on the political and economic interests associated with melting ice in times of climate change has flourished in recent years. While some scholars recognise the links between ice melt and cultural heritage/imagination (Dodds 2018; Wilson 2003), most publications focus on interests and conflicts in either the far North or South (Nord 2021; Evengård et al. 2015). Scholars analyse ice explorations in terms of hidden power structures in minorities and/or gender studies and discuss the role of art and artists in this context (Tennberg et al. 2022; Thisted and Gremaud 2020). However, there is a dearth of research on the possibilities and responsibilities of aesthetics and visual fiction as methods *and* results in climate change research—especially with a focus on ice melt in polar regions and other icy areas of the world, which make up the world’s cryosphere.

Publications have addressed the colonial history of arctic explorations and their image policies/communication strategies in which the male and European-orientated version of the polar sublime play a major role (Kaalund 2021; McCorristine 2018). Hester Blum has examined the rich archive of polar voyages and shed light to the connection between the experiences of the Arctic and Antarctic in comparison to the increasingly extreme weather phenomena of climate change (Blum 2019). In this context, the role of ice as an active agent in environmental arts is increasingly acknowledged and examined for its historical polar exploration roots (Gould 2020). Researchers have looked at the origins, social dimensions and perceptions of ecological thinking in empirical research (Huber and Wessely 2019) and have also taken Indigenous ice knowledge and its relevance for polar films into account (McKenzie and Westerståhl Stenport 2016). Taking this as a starting point, this book offers a panoramic view and an in-depth analysis of ice as an agent not only in the context of aesthetic climate communication, but also in the context of aesthetic knowledge production.

Important publications have shed light on the relationship between the humanities and science by introducing the field of Environmental Humanities (Adamson and Davis 2017; Emmet and Nye 2017; Schmidt and Zapf 2021)—which is now divided into subcategories, including Ice Humanities. A recent publication by Klaus Dodds and Sverker Sörlin on Ice Humanities recommends a non-earth-bound perspective to foster

ecological thinking, with a special emphasis on ice as metaphor for the interrelations of nature, culture and identities (2022). “As an emerging and interdisciplinary field”, scholars of Ice Humanities examine “the multiple ways ice enters human and more-than-human life” (Dodds and Sörlin 2022, 1–2). Thinking about, and with, ice connects past and future; it communicates the vulnerability of our planet and the invisible forces of nature, as well as imperial endeavours and post-Anthropocene approaches. This book addresses the need for interdisciplinary research on ice by bringing together scientific contributions from the natural sciences and the humanities. We foster transdisciplinary research and shed light to the non-human agency of ice and the cultural imaginaries connected with it.

*Communicating Ice through Popular Art and Aesthetics* engages with publications from exhibition, performance and film studies that (implicitly) understand (Ant)Arctic ice to be a dynamic stage for visualising and communicating non-anthropocentric worldviews, and as a vital metaphor for the relationship between humankind and nature (Gough 2013; Hannah 2018; Philpott et al. 2020). Most of the authors in this volume draw from research on climate change, science communication, culture and art history, and, in so doing, tacitly agree that ‘science’ and ‘culture’ are not distinct, well-defined entities. Surprisingly little attention has been paid to this idea in the context of ice-related climate change discussions—that is, the use of ice as an aesthetic communication practice not only in visual culture, but with a special focus on art and popular culture. We address this significant gap in our understanding by considering the various shapes science takes on in an array of cultural and artistic stages, from the early times of ecological awareness to today’s climate threat. Against this background, this book pioneers exploring human engagement with ice—its (re)presentation and communication—by working with ice and ice-related environmental urgency in science and science-related art, aesthetics, performance and visual fiction.

## CHAPTER OVERVIEW

This book considers a range of perspectives, woven together to form illuminating new insights into cultural meanings of ice-related sciences and our ecological ice crisis, and their aesthetic (re)presentation and interpretation in (popular) arts. It presents a mosaic of interconnected analyses and discussions that offer a colourful and suggestive—but by no means exhaustive—picture of the interplay between scientific knowledge,

aesthetic imagination and environmental communication strategies. Rather than delivering a comprehensive taxonomy of the links between *ice art* and *ice sciences*, this book zooms in on some of the spectra of their cultural halo, based on chapters that inherently ‘narrate’ the diversification and dynamics of ice phenomena; they inform modern sensibilities, and predate and unfold in contemporary, transhistorical, discursive, cultural continuums.

Part I of this book—“Staging Ice and Ice Stages in Science, Science Communication and Aesthetic Experience”—investigates crucial influences and interrelations between the sciences, science communication and humanities/arts, with ice as a unifying core element. The last decade has seen an upsurge in research in the arts and humanities on ice, frost, frozen ground and snow, as **Klaus Dodds** points out in his chapter on “[Ice Stages and Staging Ice](#)”. In part, this reflects a determination to steer public and academic attention away from the dominant epistemologies and practices associated with the natural and life sciences. Indigenous writers have long noted that the cryosphere is an integral part of the homelands and knowledge of cold and mountainous Arctic communities. Thus, this chapter ‘stages’ an encounter with ice to explore and interrogate how ice and snow are enmeshed in power relations, nationalisms, heroism and heritage, settler colonialism and militarism, and how it serves as a stage for aesthetic debates, environmental activism, cultural imaginaries and Indigenous experiences. As Klaus Dodds stresses, a humanities approach to ice invites new ways of thinking and living in a world disrupted by fossil fuel capitalism and unstoppable climate change.

To minimise future harm, our societies urgently need to respond to the accelerating climate crisis, as **Craig Stevens** and **Gabby O’Connor** show in their chapter “[Movies on Ice: An ArtSci Perspective on Communicating Antarctic Ice in the Climate Emergency](#)”. Despite clear evidence of a changing planet, the response across the socio-political spectrum is not fast enough. The future of the polar ice caps is a highly visible theme in this evidence-response path, both in terms of climate mechanics and in the public’s awareness of ‘climate science’. Much of the public imagination of ice is conveyed through media, often through images and videos that connect with the mental context of viewers. As future climate extremes are beyond our current experience, fictional films offer a connection. The authors describe an art-science collaboration around Antarctic ice-ocean field research, viewed through the lens of (experiencing) polar field camp film nights.

In his chapter “[Here Be Science Show Dragons: Ice, Icons and Metaphoric Approaches to Climate Change Communication](#)”, **Graham J. Walker** explores ‘science shows’—a medium that combines live science demonstrations with theatrical presentation—and their potential to communicate, entertain and transform meaning around climate change, particularly using ice, fire and other iconic representations. The author considers climate icons, such as melting ice, as entities or representations through which individuals relate to, and find meaning about, climate change. The author looks at science shows as a genre, unpacking their origins and connections to affect and motivation—including the use of ice within shows—before discussing case studies of climate change shows. He introduces considerations for climate change science shows, including empowering narratives that balance climate impacts with possible solutions; the use of icons such as ice, fire, flatulence and mangroves; and how culture and relevance shape effective iconography. The chapter questions the shortcomings and possible extensions of these shows—in particular, the potential for metaphor as a narrative device—to transform meaning and illuminate paths to positive, sustainable futures; and the risks of metaphors that fuel climate anxiety and disengage individuals.

Part II of this volume—“Ice Exploration: Heroism, Art and Imaginaries”—traces the historic roots of the heroic and the imagination of ice as an ‘empty’ stage in its connection to today’s climate. It brings together different perspectives on the importance of ice as a geological and cultural repository and on the difficulties of understanding and communicating climate change as a processual catastrophe. The authors also examine the use of ice as a topic, performative agent, enticing metaphor and active protagonist in theatre productions and performance formats, and the ways in which they can engage different audiences with environmental messages.

In her chapter “[Ethnography as Radicalised Womanhood in the Arctic Writings of Josephine Diebitsch-Peary](#)” **Nanna Katrine Lüders Kaalund** unpacks the complex interactions between gender, race and environment in the colonial ‘contact zone’ of literature. In the history of polar exploration, Josephine Diebitsch-Peary is best known for accompanying her husband, Robert, in his attempts to reach the North Pole and for giving birth to their daughter while in the high Arctic. In several books such as *My Arctic Journal* (1893), *The Snow Baby* (1901) and *Children of the North* (1903) Josephine Peary described her experiences and shaped American (children’s) ideas about the Arctic and the Indigenous peoples of the

Arctic. Kaalund shows that in her writings, Peary mobilised her embodied difference to the orthodox persona of the heroic male explorer as a way of garnering attention for her lecture tours and publications. By taking Peary's books as serious, significant ethnographic texts, Kaalund shows how popular literature influenced perceptions and imaginaries of extra-European peoples and environments within the context of white imperialistic expansionism.

**Birgit Schneider** explores the iconic status of ice within climate change communication in her chapter "[Materiality of Time: Polar Ice as a Medium for Ecological Art for the Tempered Zones](#)". Following the idea of ice as a real-time system, she offers a panorama of different artists working with ice in the critical reflection of polar explorations and polar travelling. In terms of an ecologically motivated aesthetic, these artworks allow the recipients to delve into ice as a medium. Ice allows to sensualise and imagine, but also to problematise the fragile aesthetics and artistic modes of sublimity in times of global warming.

In her chapter on "[Sensing Polar Ice Bodies](#)", **Stephanie von Spreter** investigates how contemporary artist Himali Singh Soin's long-term project *we are opposite like that* (2017–2022) engages with posthuman feminist concepts within an Arctic discourse. The author focuses on the effects of climatic changes leading to the melting of the polar ice caps and asks what the gradual disappearance of ice which had dominated the landscape and mythologies over time means. The chapter examines the disappearance of planetary history through melting polar ice, and with it the disappearance of ice as a natural archive. It discusses Astrida Neimanis's 'figuration' of bodies of water; the mythologies, ghosts and monsters left behind that remain interlocutors for our future; and the omnipresence of colonialism in the Arctic. The author asks how the relics of historical Arctic exploration still haunt us today, and how our situatedness points to our differences and distances from one another—but can also be used as a common feminist and transformative ground for creating other possible worlds.

Although Antarctica is far away, imagined versions of this place can make it accessible from afar. In their chapter "[Antarctic Science on the Musical Stage](#)" **Hanne E. F. Nielsen, Elizabeth Leane, Dana M. Bergstrom** and **Carolyn Philpott** show that Antarctica has been variously associated with heroes, extremes, purity, fragility and science. Focusing on *Antarctica—A New Musical* (2016), the authors explore how a popular stage musical work can make global science challenges accessible to a wide

public and help create a connection to the ice continent for those who live far away from it. The authors analyse Antarctica's depiction on stage and the musical as a form of science communication, paying particular attention to its engagement with scientific characters and concepts. This chapter traces the evolution of the musical from a stage production to a podcast and considers how this shift speaks to both scientific and human questions around our relationship with Antarctica, and with the more-than-human world more broadly.

In “[Icy Love: Performing Affect and Emotion Feeling About Climate Change](#)”, **Peta Tait** discusses the staging of ice as a particularly effective means of engaging audiences with climate change, and how ice in performance—such as *THAW* (2021) by the Australian physical theatre group Legs on the Wall—can exert a sensory appeal that encourages affects of attention. By inciting emotional feeling, performance with ice has the power to enhance viewer participation and awareness of place, while also evoking fears about the future of our planet and our environmental responsibility. By working with spectacular aesthetics, elements of visual storytelling and ice as an agent (rather than merely a stage), climate-related performance arts invite moments of encounter and stir a feeling of connection.

Part III of this edited collection—“Pop Cultural Meanings of Ice in Visual Fiction and Film”—focuses on visual science spectacles in the medium of film and comic book stories, exploring knowledge transfer and aesthetic strategies of audience activation in ecological cultural contexts.

In her chapter “[Frozen Balloons: Aeronautic Heroism and Scientific Knowledge Production](#)” **Anne Hemkendreis** examines the 2019 film *Aeronauts*, directed by Tom Harper. Here, ice and snow function as poetic storytelling tools, strategies of emotionalisation and, above all, key elements of meteorological research. The biopic of pioneering meteorologist James Glashier includes a modern fictional heroine, aeronaut Amelia Wren, who highlights the ignorance of women's roles in ice research and history. In doing so, the film draws attention to the gaps in understanding, researching and communicating environmental conditions. Contrasting science and show business, the film draws attention to humans' entanglement with nature's visible and invisible forces. This chapter explores the role of ice as an element within, and evidence of, scientific knowledge production. It shows how ice is used in popular culture to challenge our understanding of science, to communicate environmental knowledge and to question our relationship with nature in times of climate change.



**Johannes Riquet** concentrates on two other films in his chapter “*Hard Ice, Soft Snow? Transnationalism, Spectatorship and the Arctic Sublime in Chasing Ice (2012) and Silent Snow (2011)*”. His comparative analysis of two environmental films uncovers that *Chasing Ice*, a climate-change documentary, reimagines the Arctic sublime by exploring climate change as a visual spectacle recorded by a photographer-turned-heroic Arctic explorer. In contrast, *Silent Snow* links art and activism in a transnational aesthetic based on relational experience, rooted in the Inuit understanding of snow and ice. Riquet argues that both films are about communicating and visualising environmental issues, dealing with snow and ice both materially and metaphorically. However, they do so in completely different ways, thus making the ignorance within the most dominant and persistent (heroic) imaginations of the poles visible. This chapter shows that Indigenous knowledge about ice—often considered inferior to Western scientific knowledge production—is, in fact, indispensable and extremely profound for a changed and healthier human relationship with the planet.

**Frédéric Bouchard** and **Ylva Sjöberg** take a different approach in their chapter “*Frozen Ground Cartoons—Revealing the Invisible Ice*”, which focuses on permafrost—the frozen ground that occupies more than 20 million square kilometres of the Earth’s high-latitude and high-altitude landscapes. The authors argue that permafrost is not only a key component of our global climate, but the most overlooked invisible component of the cryosphere. However, just like the often-media-depicted ice sheets in Greenland and Antarctica, or mountain glaciers around the world, permafrost regions are extremely sensitive to climate change and human activities, which is why permafrost research is of great scientific and societal importance. The “Frozen-Ground Cartoons” project was born from the need to make permafrost science accessible and fun for the general public, especially for school kids, students and teachers. A booklet of comic strips was the original outcome; however, the project quickly evolved into a series of ‘by-products’, including translations into several languages, augmented reality materials (maps, photos, videos, 3D drawings), a board game, etc.

While scientific data is often seen as the dominant expression of research, including research on ice, public understanding and engagement are embedded in a matrix of complex (cultural) processes that give ice meaning in our daily lives. Popular culture—in the form of comic books and *bande dessinées*—is a versatile frame for interpreting our relationship with scientific and environmental discourses as **Anna-Sophie Jürgens**, **Stefan**

**Buchenberger, Laurence Grove** and **Matteo Farinella** show in their chapter “[On the Visual Narratives of Ice in Popular Culture: Comics on Ice, Icy Villains and Ice Science](#)”. Visual narratives play an important role in shaping our cultural ideas of ice, and this chapter explores their many facets in ‘proto-comics’ of early-modern emblem books, the first modern comics, early twentieth-century sequential art fantasies and contemporary *bande dessinées*. Bringing together perspectives from science communication, comics studies and popular entertainment studies, the authors focus on contemporary examples of ‘comics on ice’ and comic book ice science villains to highlight how the intrinsically hybrid and changing nature of sequential art—and its ability to visually express non-visual emotions—can help us imagine the unimaginable (ecological futures) and define what might be called the ‘visual narratives of ice’.

The melting of the polar ice shields that protect our planet and stabilise vast parts of the Earth’s biosphere has been widely recognised across the planet. This ice crisis—as **Ben Nickl** makes clear in his chapter “[Melt for Me: Communicating Ice Empathy Through the Plasticity of Disney](#)”—has created a cryocritical awareness of the retreat of ice bergs, ice shelves and glaciers as a direct result of human action. By building on concepts of animation and the plasticity of feeling, the chapter presents a case study of ice in Walt Disney’s 2013 feature film *Frozen* as a popular plasmic-affective feel-view language. The author argues that with ice animates such as Olaf the snowman, we are emotionally reshaped, bent and stretched, as we move closer to imagining and intuiting the enormous importance of the ice in our world—and the need for humans to develop a new emotional relationality with it. As Nickl shows, *Frozen* evokes feelings of connections with ice and opens up a room for a changed relationship between humans and the planet.

To bring *Communicating Ice Through Popular Art and Aesthetics* full circle, the last chapter—“[On the Aesthetic Facets of Ice Urgency: Some Final Reflections](#)” by **Anne Hemkendreis, Anna-Sophie Jürgens** and **Karina Judd**—recaps the core themes from this volume and critically reflects on the definition of key concepts, such as ‘communication’, ‘ice art’ and ‘stages’. The final chapter examines the research gaps in our cultural understanding of ice through (popular) arts and aesthetics, and the interdisciplinary breadth added to the discussion by the authors of this collection. In doing so, we reflect on what the voices from various disciplines in this book define as ‘communication with ice’ in science-related arts popular aesthetics. Finally, this book considers the reciprocal influence

and mutually imparted meaning of ice and arts, showing how scholars and artists can inspire the use of ice as an active agent within contemporary and future artworks dealing with climate change.

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