Chapter 8
Iconographies of Climate Catastrophe: The Representation of Climate Change in Art and Film

Charles Green, Belinda Smaill, and Seán Cubitt

Abstract This chapter reviews visual representations of climate in art and film across the last few decades, exploring shifting artistic, cinematic, televisual and narrative practices that have more recently shaped the communication of the climate emergency. It explores the iconographies that artists and filmmakers have used in the shift from representing contemporaneous and local environmental challenges to depicting the future consequences of climate warming, including widespread biospheric change. The authors sketch the shifting screen media formulations that imagine climate catastrophes, observing how both documentary film, television and contemporary art draw on popular and professional media practices, including news formats and visual effects.

Keywords Cinematic · Climate change · Climate warming · Contemporary art · Data visualisation · Documentary · Film · Imaging · Screen media · Video installation

8.1 Introduction

The subject of this chapter is the visual representation in art and film of climates and the biosphere across the last six decades. The chapter locates the iconographies that artists and filmmakers used in the shift from representing environmental threats to

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Climate Disaster Preparedness

Reimagining Extreme Events through Art and Technology

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Creativity in general and the arts in particular are increasingly recognized as drivers of cultural, economic, political, social, and scientific innovation and development. In Art and Research, some of the principal questions to be explored by the ARIS project, are outlined: • Could and should Artists be Researchers? • How are the systems of the Arts and the Sciences connected and /or disconnected? • What is the position and status of the Arts in defining the terms “progress” and “development”? The Springer ARIS series explores - at the macro, meso and micro levels and in terms of qualitative as well as quantitative studies - theories, policies and practices about the contributions of artistic research and innovations towards defining new forms of knowledge, knowledge production as well as knowledge diffusion, absorption and use. Artistic research, artistic innovations and arts-based innovations have been major transformers as well as disruptors of the ways in which societies, economies, and political systems perform. Ramifications here refer to the epistemic socio-economic, socio-political and socio-technical base and aesthetic considerations on the one hand, as well as to strategies, policies, and practices on the other, including sustainable enterprise excellence considerations in the context of knowledge economies, societies and democracies. The series features research monographs, edited volumes, proceedings, Briefs, and textbooks, and may also include handbooks and reference works, and in-print as well on-line rich media encapsulations of ideas and insights, representing cutting-edge research and the synthesis of a body of work in the field.

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Foreword

It is well established that climate change, caused by the burning of coal, oil and gas, has supercharged extreme weather events, including heatwaves, fires, floods and storms. In Australia, the unprecedented Black Summer bushfires of 2019–20 devastated communities across the country and were then followed by three years of record floods. In 2023, the Northern Hemisphere was hit by record heatwaves and wildfires, while massive floods killed thousands.

In the past, Australians would have expected catastrophic events to happen irregularly, with long peaceful periods in between. Today, extreme, compounding events are occurring with a constancy that leaves little time for recovery to communities or emergency responders. Our capacity to prepare and respond has also been substantially compromised. Windows for fuel reduction burning have dramatically shortened, and overlapping fire seasons between states and countries have reduced our ability to share personnel and major equipment, such as aerial water bombers.

As the risk of climate-fuelled disasters worsens, governments, communities and even emergency services are struggling to comprehend the nature of the rapidly changing threat environment. Most scientific simulations that assist in modelling fires and floods usually show predictions on maps. This means that communities, unable to easily access or interpret technical models, lack a framework to preview and visualise unpredictable dynamics and impact of extreme fires and floods in their locality. Therefore, they struggle to realistically rehearse a suitable response. History is no longer a reliable indicator of what to expect, as shown when flooding in the northern NSW town of Lismore peaked more than two metres over the previous historic high, and during Black Summer, when the number of homes destroyed by fires in New South Wales exceeded previous records by more than 11 times.

The ability to visualise and viscerally understand what disasters look and feel like is critical in helping people increase preparedness, so there is an urgent need to work with emergency services, industry, researchers and community members to develop new capabilities using latest advances in the arts, AI and sciences. Tools that enable communities to previsualise threats; see how they are likely to unfold; then, acting on this knowledge, rehearse effective response strategies tailored to their particular circumstances will become more and more essential as risks intensify and change.

In September 2023, the Australian Bureau of Meteorology officially declared the Pacific to be swinging from three years of La Niña into El Niño, as a positive Indian Ocean Dipole developed to Australia's northwest. This puts Australia squarely on track for prolonged dry and intensely hot weather patterns that could put coming bushfire seasons on steroids. A rare triple La Niña event drenched soils and supported prolific forest and grass growth, as well as regrowth in areas hit by Black Summer. While this provided much-needed reprieve for both the land and fire-affected communities, the increased fuel loads have rapidly dried out in much of Australia during the 2022 winter, the warmest winter on record.

This year's scorching Northern Hemisphere summer paints a sobering picture confirming the most-dire predictions of climate scientists. More sobering still, companies, industries and nations continue to burn massive amounts of coal, oil and gas. Extreme summer heatwaves affected the United States, Africa, China, Japan and Europe, with Canada suffering through its own version of Black Summer. It is important to note that the experience of the Northern Hemisphere was not exacerbated by an El Niño, which is a Southern Hemisphere phenomenon. Words such as 'unprecedented' in combination with these disasters start to ring hollow as record after record is toppled in the wake of ever greater extremes. Anyone tempted to feel a degree of assurance of a peaceful summer should remember that it only took three weeks of extremely dry conditions to set the scene for the devastating Maui wildfire in August that killed at least 100 people and wiped out the town of Lahaina—becoming 'the worst natural disaster in the history of Hawaii'. Another record that led to immense ecological and human suffering.

As Australia entered into spring, 'Extreme' and 'Catastrophic' fire danger warnings were issued in the Northern Territory, Western Australia, Queensland, New South Wales and Victoria. Western Australia declared its fire season two months early, with a blaze taking hold in November at the urban/bushland interface north of Perth growing to over 1,500 hectares overnight, destroying 18 homes. In Queensland, dry thunderstorms sparked hundreds of bushfires that claimed five lives and 65 homes before the end of October. By then, a singe fire in the Northern Territory had already burnt over one million hectares. The consensus among scientists and fire services is that despite some November rains in the east, the 2023–24 fire season is likely to be extensive and volatile. Yet, the coming years are of chief concern, due to increasingly unpredictable dynamics and the likelihood of a return to drought.

During an El Niño phase, unpredictability is what keeps responders and scientists awake at night. With seasonal rhythms thrown into disarray, on-the-ground conditions can change rapidly, from moist and cool to dry and hot, challenging our predictive models and firefighting strategies. In early December, after weeks of storms and rains, most of Australia was affected by severe heatwaves and the return of 'Catastrophic' and 'Extreme' fire dangers.

Climate change reinforces such effects. For example, on the NSW South Coast, winter rainfall has reduced by 12% over the last 20 years, creating drier forests and grasslands, and in the south-west of Western Australia, by 20%. Drier fuels lead to more violent and erratic fire behaviour, including pyro-convective (i.e. fire-generated) storms or fire tornados. Fires burning in hot, dry conditions can create

extreme heat that generates local weather systems, giving rise to towering pyrocumulonimbus clouds that trigger intense wind downbursts and dry lightning and drive fire fronts at frightening speeds. Between 1978 and 2018, there were 60 recorded pyro-convective storms across Australia. In a six-month period in 2019–20, there were a staggering 29 pyro-convective events.

Another worrying change is that fires now often burn as intensely through the night as they do during the day in periods of extreme heat and low humidity, giving little relief and robbing firefighters of opportunities to put in place previously reliable containment strategies. For decades, our chief mitigation strategy has been to conduct hazard-reduction burns, i.e. lighting controlled fires during cooler weather to reduce fuel levels that could feed fires in hotter months. Climate change is increasingly reducing time windows of safe weather to conduct these burns—during La Niña it was too wet to burn, and in spring 2023 it rapidly became too hot, windy and dangerous to burn safely. After decades of confronting and battling devastating fires, we know these observations to be indicators of a dangerously transforming climate, something that fire historian and author Stephen Pyne has termed the 'Pyrocene'—the era of fire. Increased greenhouse gas concentrations have made the weather wilder and more dangerous than humans have ever experienced before.

History only provides limited instruction on what to expect as we venture into the unchartered territory that our future holds. Among scientists, the abnormally high sea temperatures over recent months have triggered a red alert, warning that we are speeding towards dangerous terrain of impending compound crises and climate tipping points. Emergency services and those communities who have already been at the frontline of ever worsening floods and fires have seen their devastation, smelt their acrid stench and felt the terror in their bones. Many will grapple with the horrors of these events for a lifetime.

Unfortunately, we know that even if the world starts to rapidly reduce greenhouse gas pollution, we are progressing into a warmer and more volatile world. The shape of our world in decades and centuries to come is being determined by our actions today. On the current trajectory, temperatures will keep going up. Heatwaves, fires, storms and floods will continue to worsen. The solution is to rapidly reduce the pollution that is driving the problem—the burning of coal, oil and gas. The goal right now must be to stabilise and eventually lower global temperatures. We now have an Australian government that accepts the science of climate change and is progressing some effective policies. However, fossil-fuel companies are still attempting to open more polluting projects and are highly resistant to change. In the 2023/24 financial year alone, projected fossil-fuel industry subsidies outweigh the federal Disaster Relief Fund at a ratio of 55:1. We urgently need to divert this money from polluting industries to communities across Australia so that we can more effectively safeguard them against heatwaves, fires, floods, cyclones and droughts.

As climate change is here with us today, we must both tackle the root cause, fossil fuels, and prepare for the consequences we cannot avoid. A fundamental question is how we can be better prepared to address extreme fires and floods. Due to their unforeseen and escalating dynamics, communities need to have the ability to simulate events in advance, previewing and actually seeing how they could evolve

in their specific geographic locations, then rehearse what they will do in response. In short, communities need to be able to deeply envision what could come their way so that they have a head start in getting ready.

The research presented in this book offers a compelling vision of how we might help to build such preparedness. It draws together advances from disciplines as varied as artificial intelligence, creative arts and climate science to map cutting-edge capabilities that can pilot novel approaches to visualising and rehearsing plausible and probable extreme climate scenarios. This is crucial as we prepare Australian communities for an increasingly challenging future.

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Chapter 8
Iconographies of Climate Catastrophe: The Representation of Climate Change in Art and Film

Charles Green, Belinda Smaill, and Seán Cubitt

Abstract This chapter reviews visual representations of climate in art and film across the last few decades, exploring shifting artistic, cinematic, televisual and narrative practices that have more recently shaped the communication of the climate emergency. It explores the iconographies that artists and filmmakers have used in the shift from representing contemporaneous and local environmental challenges to depicting the future consequences of climate warming, including widespread biospheric change. The authors sketch the shifting screen media formulations that imagine climate catastrophes, observing how both documentary film, television and contemporary art draw on popular and professional media practices, including news formats and visual effects.

Keywords Cinematic · Climate change · Climate warming · Contemporary art · Data visualisation · Documentary · Film · Imaging · Screen media · Video installation

8.1 Introduction

The subject of this chapter is the visual representation in art and film of climates and the biosphere across the last six decades. The chapter locates the iconographies that artists and filmmakers used in the shift from representing environmental threats to

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depicting the future consequences of climate warming and, specifically, of widespread biospheric change. Our proposition is that there has been a distinct change in the representation of climates and the natural environment shaped by artists' intentions to depict the climate emergency.

Visual art produces new models of the world with the aim of gaining public currency. An emerging literature on art and climate warming (e.g. Fowkes & Fowkes, 2022) has already focused on establishing a typology of iconographies of climate warming. We sidestep definitions and think historically, focusing on a succession of visual artists and film practitioners, identifying their ideas about those issues rather than imagining that they have been invariant or, even more reductively, imagining that eco-critique would only appear in climate-themed works. For instead, we find the climate crisis coded across a kaleidoscope of art and film, including in works within which no actual representation of climate warming is foregrounded. But the climate emergency is still there. In this respect, we chart the history and immediate pre-history of climate awareness in art, film and television.

In other words, we will suggest that the iconography of environmentalism was substantially superseded by the iconography of climate warming. The duration of this shift coincides with the period of contemporaneity (i.e. since the 1960s), which Terry Smith (2009) comprehensively defined in art. The period has now been long enough to periodise representations and iconologies of climate.

So, we sketch here a history of climate change art in the period of contemporaneity, a period of transition from imaging environmental loss to imaging climate warming when artists and filmmakers approached climate and environment with similarly changing forms and visualisations—similar reimagining—on their minds, if not in their intentions.

As a result, a newer iconology of climate warming was imagined between the 1960s and the 2020s that often plundered and retrofitted the technologies and forms that the directly preceding generation had taken up on account of the affective and technological immediacy of new media and film. Early in this period, we see the hegemony of colour photography and video (and, off to the side, niche innovations such as Cinerama, the 1960s precursor to IMAX cinemas) and the efflorescence of then new genres such as broadcast television's environmentalist documentaries. Both faded and at the same time were transformed into signifiers of the now-lost past. To track these changes across three sub-periods, we have borrowed descriptions of the stages of grieving to mark 1960–1980 as a period of denial and bargaining, 1980–2000 as grief and anger and 2000 to now as depression and—perhaps optimistically—understanding (Kübler-Ross, 1973).

Our account draws on prior insights: art theorist John Berger (1972) read the whole political economy of enclosure and looming industrialisation in the eighteenth-century England into Gainsborough's *Portrait of Mr and Mrs Andrews* (c.1750). Nicholas Mirzoeff's 2016 essay on the Anthropocene sublime in Turner and Monet's London paintings was in turn preceded by Michel Serres's famous early 1990s lectures (1997) on volcano-tinted sunsets in the same nineteenth-century paintings. The long history of climate change, artistic responses and critical acknowledgement is implicit in what follows.

8.2 Period 1 (1960–1980): Science Aesthetics—Denial and Bargaining

A new aesthetics of science, environment and landscape emerges in the 1960s, helped by illustrated books like Gyorgy Kepes's *The New Landscape in Art and Science*. Like Kepes, Charles and Ray Eames's film *Powers of Ten* (1968–1977), commissioned by IBM, was a fruit of a wider practice they referred to as "a natural overlap with several governmental agencies" (Lipstadt, 2005) and drew on postwar cybernetics and then-emerging Earth systems science. The peak of systems theory coincided with global transitions from modernism to contemporaneity centred around the year 1962, which also saw the publication of US environmentalist Rachel Carson's groundbreaking book, *Silent Spring*, and Australian environmentalist novelist Nancy Cato's visionary *But Still the Stream: A Novel of the Murray River*. The positivist, glossy, blue-chip amplitude of American nature documentaries—the "*National Geographic* aesthetic"—was taken up as a recognisable set of tropes in Hollywood genre films such as *How the West Was Won* (1962), produced as feature-length spectaculars in Cinerama, a short-lived immersive format requiring its own cinemas (in Melbourne, the remodelled Regent Theatre) kitted out with multiple projectors. A predecessor of IMAX, Cinerama encouraged elegiac but positive environmentalism: the poetic paradigm of pristine nature even when endangered by rapacious capitalism. The same *National Geographic* environmentalism was embodied in Australia in Olegas Truchanas's 1971 colour photographs of the about-to-be-dammed Lake Pedder in Tasmania, all-white sands and crystal clear waters. Many countercultural versions of this Walden-like, spiritually elevating vision of nature appeared at the time, including Stan Brakhage's well-known alternative films such as his psychedelic *Dog Star Man* (1961–64).

The 1970s brought an intensification in environmental activism within art. While there were differences in emphasis across international locations, the 1960s environmentalism emphasised wilderness preservation. Now, there was a growing fight against air and water pollution and pesticides. The 1970s artists linked environmentalism to the end of the modernism that had dominated art since the 1860s. This was the period of minimalist sculptor Carl André's *Scatter Piece* (1967), one of the many exhibitions of waste and detritus thrown across art gallery floors as conceptualist art, and of Robert Smithson's *Spiral Jetty* (1970), land art of rock and earth bulldozed out from Rozel Point in the north arm of the Great Salt Lake in Utah. Artists saw environmental decay as an artistic trope as well as a cause. Robert Smithson (1968) equated environmental decay with the undermining of representation and felt sheer excitement at seeing entropy and environmental decay in action. He was not necessarily the friend of environmental campaigners, and they reviled him for *Island of Broken Glass*, his never-realised 1970 attempt to cover an island off the coast of Vancouver in 100 tons of glass shards. He disfigured photographs of wilderness and made arrangements in art galleries of shattered glass, rock and sand, opening his works (and their viewers) to imagining geological force. Rather than depicting environmental damage, he saw local landscapes in global contexts and in

Fig. 8.1 Robert Smithson's *Spiral Jetty*. (Image by Netherzone)

geological durations. Other 1970s art collaged together images in which environmental loss was one part of an unstable mix of subjects, experiences and forms: wild tourism, science fiction, alternative film, the counterculture, ecological theory, different spiritualities and cosmologies. Early computing and jet flight organised artists' experiences of all these (Fig. 8.1).

By 1970, a collective environmental politics induced a shift from an idea of environment as the local effect of elemental forces to the realisation of a planetary and future-oriented problem whose scale and urgency demanded a new episteme of representation. Environmentalist sense of global connection saw the establishment of Earth Day in the United States and was visualised in the famous "Blue Marble" photograph taken by the Apollo 17 mission in 1972. A related illustration featured on the cover of Stewart Brand's *Whole Earth Catalog* (1968–1972), another systems-inspired publication, as important for its era as Kepes's book two decades earlier, and an important starting point for the emerging countercultural "green" consumerism. Ursula Heise (2008) notes that this photograph contributed to the promotion of a "holistic understanding of ecological connectedness", which built not only on new thinking about the environment and earth systems but also suggested "a unified and balanced world" in the face of the divisions of Cold War politics and the counterculture's alternative institution-building of the 1960s. It took another decade, however, to connect planetary consciousness to the problem of climate change. While the issue of global warming was included in the UN environmental framework by the early 1970s (Warde et al., 2021), the same period as the formation of the US Environmental Protection Agency, scientific consensus was

only just forming, and public opinion was slower to mobilise than either artists or activists.

The connection between global and local established in the 1970s, not least due to activism against nuclear power and testing, was taken up by artists as a problem of communication that cinematic aesthetics could solve. Paul Ehrlich's influential book *The Population Bomb* (1968) and its Malthusian prediction marked art house films such as Michelangelo Antonioni's *Zabriskie Point* (1970), with its naked hippies wandering in unexplained post-catastrophic desert landscapes, while a sleek, Buckminster Fuller–like residence explodes in slow motion to the white-noise crescendo of Pink Floyd. Its tremors spread to popular films such as *Soylent Green* (1973; see Murray & Heumann, 2009), which ends with the film's hero in tears at the spectacle of green forests and wild spaces, screened to soothe his euthanised mentor in a scene whose pathos arises from both the loss of nature and the inadequacy of film to capture it. The theme of media's inadequate affect would reappear in postmodern artist Richard Prince's series *Untitled Cowboys* (1980–1992), pastiches of rural machismo and wild horses appropriated from US advertising. Like their sources, Prince's mural-sized photographs reduced landscape to the backdrops of an elegiac dream. Population anxiety and anti-nuclear activism were leading image makers to nihilism and the limits of visualisation. Even greater problems of invisibility plagued attempts to move climate change beyond the realm of science communication. Unlike weather, which everyone experiences every day, climate change is an abstraction from the collection and comparison of data. In a symptomatic statement, land artist Walter de Maria (1980) wrote of his 1977 high-desert installation, *Lightning Field*, that "The invisible is real".

At the same time, non-narrative documentaries, including feature-length films, appeared, which aestheticised and narrated but also doubted and destabilised science, for instance, Bay Area artist Bruce Connor's hallucinatory repurposing and re-editing of found US Government nuclear test documentation *Crossroads* (1976) and Michael Glasheen's avant-garde video *Uluru: Mythology of the Dreamtime* (1978). Another work influenced by US architectural theorist Buckminster Fuller, *Uluru*, used "time-lapse photography, superimpositions, [early-generation video editing] and rapid montage" (Barker & Green, 2010) to portray the central Australian rock monolith. As a marker of the currency of such depictions, *Uluru* was screened to sizeable audiences in Melbourne and Sydney.

By the late 1970s, science reporting was bringing climate change to mainstream audiences. But the causes and effects of climate change remained in the realm of scientific research and communication. Science television was an early site for grappling with the challenge of this new episteme. A rare example was the television documentary *A Change of Climate* (1977), a collaboration between a national public broadcaster, the Australian Broadcasting Corporation (ABC), and Australia's peak scientific research organisation, the Commonwealth Scientific and Industrial Research Organisation (CSIRO). This 46-minute film, based on the 1977 Australasian Climatology Conference, was a surprisingly comprehensive snapshot of climate science at that moment in time. It brought the established lexicon of science films to the new problem of climate change: improvised, opportunistic

interviews and scientists in dialogue with one another, clips of scientists in the field collecting earth and ice cores, launching weather balloons and working on space stations. Most significantly for our discussion, the presentation of data was crucial.

In 1977, scientists were debating the question of whether the planet was on track for another ice age or for a warming climate. *A Change of Climate* offered information, combining authoritative expert voices with graphic visual representations, both lined up into a narrative. This is not as obvious as it looks: for instance, the data itself remained as indecipherable as the technology, both commonly shared signifiers of benevolent expertise. The objects of technological progress loaned *A Change of Climate*'s narrative its legitimacy rather than specific meaning. Scientists pointed to maps and satellite photographs. Computer screens flickered, and large, cumbersome printers churned out reams of paper. With a focus on Australian research projects, the scientists at the conference offered the veneer of internationalism even though a planetary perspective was still minimised. The film oscillated between a possible ice age thousands of years hence and predicting climate warming, worrying whether it should be communicated given the current evidence and, if so, how. One prescient meteorologist predicted that the climate would warm by half a degree centigrade by the end of the century, noting that the ramifications of this would be immense. In sum, *A Change of Climate* shows us a wide range of representational devices from this first period of representing climate change, many of which, such as the tropes of ice cores and polar regions, can still be seen in contemporary climate documentaries or art.

8.3 Period 2 (1980–2000): Environmental Ruin and Nuclear Decay—Anger and Grief

Soviet film director Andrei Tarkovsky's feature *Stalker* (1979) attacked settled assumptions about scientific positivism and a global world order that had come before, alienating Soviet-era cultural bureaucrats and depicting environmental and spiritual ruin. By contrast, the uncannily similar plot in Steven Spielberg's *Close Encounters of the Third Kind* (1977) initially portrayed the kaleidoscopic global interconnection of vast new mysterious phenomena but quickly retreated into scientism, the respectful portrayal of dedicated scientists and their well-intentioned but over-secretive government and military. *Stalker* presaged a shift into the second phase of imagining climate change, a phase in which the tropes of nuclear annihilation and ruin were imported into environmentalist art and film. An agonisingly slow, science fiction film shot in subtle, shifting monochrome tones, *Stalker* documents the painful, illegal trek of a group of amateur explorers, including The Scientist and The Writer, led by a young boy, The Stalker, across a mysterious and dangerous ruined post-industrial Zone. Its images of irredeemable ecological decay indelibly changed many environmentalist artists' sensibilities. Composed of telling pauses where the camera focuses on the actors' tormented faces, nested within long

sequences raking slowly across decaying underwater collages, *Stalker* offered a panoramic view of environmental decay akin to Minimalism in its strict refusal of narrative exposition. At the same time, it proliferated suggestive environmental allegories, akin to the Land Art we outlined earlier. It was not alone: in the United States, Godfrey Reggio's feature-length experimental film, *Koyaanisqatsi: Life Out of Balance* (1982, scored by minimalist composer Philip Glass), was wildly successful, attracting large art house cinema crowds to gape at its spectacular, slow tracking shots and time-lapse photography of vast landscapes alternating with accelerated static camera sequences of crowds swarming across cities. Reggio repeatedly punctuated these sequences with an enigmatic, slow-motion collage of explosions gathered, like Connor's *Crossroads* a few years before, from found footage, manipulated and slowed down on the editing desk: the superimposed shapes of falling buildings, a failed rocket launch, nuclear tests.

Neither *Koyaanisqatsi* nor *Stalker* ended with an environmentalist punchline nor with a discernible anti-nuclear message. *Stalker*'*s* little band of illicit explorers repeatedly hint that the Zone appeared just after a mysterious visit from outer space. Tarkovsky's tortured wanderers did not arrive at redemption though they did arrive at their destination: an innermost room, the ruined repository of immanent truth. *Stalker* did not move beyond this simple plot nor offer any character development, focused instead on intricate details of terrible ruin. Tarkovsky's profoundly anachronistic dystopic film remains an underground cult among contemporary artists, predicting the aesthetic of the third wave of climate change art.

Nuclear proliferation and the threat of nuclear war dominated the imagery of climate issues, shaping the 1980s science communication but also avant-garde experimentation. In Australia, artist Bonita Ely presented *Jabiluka* UO_2 (1979), a ritualistic anti-uranium performance inspired by campaigns for Indigenous land rights and by her visit to the edge of the Jabiluka uranium mine, which had been excised from the Kakadu National Park against the wishes of its traditional Aboriginal stewards. *Jabiluka* UO_2 was performed in Melbourne in 1979 and then at the halcyon 1980 performance festival, ACT 2, in Canberra. Ely, dressed in a white boilersuit, erected an elaborate sandcastle from coloured earths and then arranged a spiral of flammable straw across the adjacent lawn. Her male assistant traced a rigid, straight path in white lime across the field towards her, eventually scattering the sand construction. Simultaneously, Ely set fire to the straw, etching a primal spiral design onto the grass field.

By the early 1980s, the CSIRO's Film Unit had produced more educational science films either mentioning or fully highlighting the threat of climate change. For example, *The Coal Question* (1982), directed by Russell Porter, looked directly at coal processing and social responsibility, paying brief attention to explaining the problem of the "greenhouse effect". Then, in 1984 for the same unit, Porter directed *What to do about* CO_2*?* It was not until this period that the greenhouse effect became part of the popular cultural imagination. The broadcast lexicon of science and technology as signifiers of authority and expertise persisted. However, they were

surpassed in the early 2000s by data visualisation, which gave the impression of direct presentation of meanings, as opposed to appearances.

By the mid-1980s, as awareness of climate science was growing in Australia, nuclear power, testing and uranium mining were well established as primary concerns in the environmental movement and preoccupied the attention of image makers and artists to an even greater extent. This must be remembered since it is at odds with artists' climate priorities today. The feature-length documentary film *Half Life: A Parable for the Nuclear Age* (1985) was a landmark exploration of the impact of nuclear testing in the Pacific. At the same time, the Indigenous communities of the areas surrounding the testing sites, in the APY homelands, began their ascent to art stardom, often incorporating into paintings and sculptures their experiences of dispossession through nuclear tests and sickness from radiation.

In the late 1980s, the problem of the greenhouse effect and the depletion of the Earth's ozone layer (a problem first discovered in 1983) came to the forefront of public debate and media attention as combined threats to the planetary ecosystem. A headline in *Time Magazine* in October 1987 read: "The Heat is on: Chemical Wastes Spewed into the Air Threaten the Earth's Climate". In 1988, the Intergovernmental Panel on Climate Change (IPCC) was established. In 1990, Earth Day became an international event, and the Earth Summit (also known as the UN Conference on Environment and Development) took place in 1992. The 1990s, which also witnessed the emergence of the Internet, was an optimistic decade for environmental action. The new policy infrastructure recognised the full range of environmental issues and the urgent need for solutions. Documentary filmmakers produced films on environmental issues, and environmental film festivals germinated around the world. The first of these was the Tokyo Global Environmental Film Festival, which began in 1992. As Charles Musser writes, these festivals "played a crucial role in the construction of the genre's identity" (2014) bringing a new, high public profile environmental role for documentary film. In a pivotal combination of environmental governance and art, UNESCO commissioned Yann Arthus-Bertrand in 1994 to create an unprecedented work of documentary photography from the air. From a journey across 5 continents and 60 nations, Arthus-Bertrand produced an inventory of landscape images that elicited grief and a sense of what was being lost in the face of environmental degradation, including climate warming. By the early 2000s, the exhibition, book and film that resulted from Arthus-Bertrand's project had reached an audience of millions. On the heels of the 1990s reinvigoration of the documentary form abetted by new light portable digital cameras and high-quality digital editing software, there was widespread public acclaim for films like Agnes Varda's *The Gleaners and I* (2000) documenting gleaners (i.e. the collectors of remainders from harvests and refuse collections) and *Darwin's Nightmare* (2004, dir. Hubert Sauper) on the destruction caused by the Nile perch, introduced to Lake Victoria by humans.

8.4 Period 3 (2000–2023): Climate Warming—Depression and Understanding

One of the most notable shifts in the early 2000s was the inclusion of environmental messaging in the media's most visible television presentations about the natural world. The BBC's Natural History Unit's distinctive, high-budget, landmark style was first developed by Sir David Attenborough in the 1970s with *Life on Earth* (1979). His commercial model for presenting natural history on television, even publicly funded television, evolved more slowly and more cautiously than we might remember. Both high-cost and highly successful in gaining audience reach, Attenborough's documentaries took a critical role in offering an international visual imaginary for nature, but BBC investment in "prestige productions" came with guidance against political controversy, and his numerous series avoided discussion of anthropogenic environmental impacts until well into the 2000s. Morgan Richards's assessment of the "greening" of natural history documentary placed Attenborough's first unequivocal statement about the veracity of climate warming in 2006 (2013). In 2000, the BBC Natural History Unit allowed Attenborough to present *State of the Planet* (2000), a three-part series that described a series of threats to habitat and ecosystems. The series had less investment and reached smaller audiences than Attenborough's blockbuster prestige series. Nor did it foreground climate change. The final episode ends with a call to action but eschewed directly naming the elephant in the room, catastrophic climate warming:

> The future of life on earth depends on our ability to take action. Many individuals are doing what they can, but real success can only come if there's a change in our societies and our economics and in our politics. I've been lucky in my lifetime to see some of the greatest spectacles that the natural world has to offer. Surely, we have a responsibility to leave for future generations a planet that is healthy, inhabitable by all species. (Attenborough, 2000)

The series failed, like almost all mainstream film, to link climate warming to the global diaspora of refugees and displaced peoples or to wars and conflicts around the planet.

By the time *Frozen Planet* was released in 2011, a profound shift had occurred to the degree that the final episode in the series was now directly devoted to the problem of climate change and its impact on sea ice, glaciers, ice shelves and polar habitats. Though broadcast in the United Kingdom, controversy erupted when that last episode was made optional for syndication for the United States. US Discovery Channel eventually added the seventh episode to their broadcast schedule.

At the same moment, contemporary artists were reintroducing the nature documentary into the art world but were quoting, exploding and shattering that genre's images and its self-conscious narrative continuity. Prominent LA artist Doug Aitken's multi-channel immersive video installations had been influenced by earlier periods of environmentalist cinema, including multi-screen world exposition technology, not least Cinerama—both in terms of technology and hybridity of genre and narrative. Aitken's work implies that he was intensely aware of the successive phases of those early documentaries about both environmental majesty and

environmental decay. His video, *New Ocean* (2001), consisted of joined images, right-way-up and upside-down, in kaleidoscopic reconstructions of watery landscapes from Brazil, Alaska and California. Across an array of scrim-covered projection screens, water flowed upwards, and cliffs were split and recombined like Rorschach tests in an IMAX delirium. "Aitken himself was so concerned to emphasise precisely this hyperactive non-linearity that he interviewed other artists and film directors on the subject, publishing the resulting collage of voices as…a book, *Broken Screen*" in 2006 (Green, 2008). His works resembled unfolding explosions and their aftermaths, in many ways building on images evoked in the 1970s cinema with films such as *Zabriskie Point* and *Soylent Green.* Aitken, like other high-profile artists participating in biennials, triennials and large survey exhibitions around the globe that had come to define the vast industry of contemporary art, excluded data visualisation and didactic exposition from his art. Yet, the next generation of artists would explore its aesthetic possibilities.

The peak moment for data visualisation in climate change films, emerging from the 1970s and 1980s in documentaries such as *A Change of Climate*, was Al Gore's celebrated and controversial feature, *An Inconvenient Truth* (2006), with its climactic presentation of the famous "hockey stick" graph. *An Inconvenient Truth* was exploring a new aesthetics in which compelling, dramatic images, didactic exposition and Eisensteinian montage were all harnessed together to amplify the importance of global climate change. This issue now superseded all other ecological agendas and stood alone as the foremost problem for the Earth Sciences. The film's willingness to delve into data was about to be taken up by visual artists.

An Inconvenient Truth premiered at the Sundance Film Festival alongside another important documentary: Chris Paine's *Who Killed the Electric Car* (2006). Both films were part of a wider movement documenting the role of corporations and governments in perpetuating powerful, fossil-fuelled capitalism in the face of the climate crisis. Yet more important environmentalist films were released in 2006, Jennifer Baichwal's *Manufactured Landscapes* and HBO's *Too Hot Not to Handle*, which documented the effects of global warming. Filmmaking on environmental issues intensified over the next few years. In 2009, the Sundance Film Festival premiered six environmentalist documentaries that included *The Cove*, *Crude*, *Earth Days* and *The End of the Line*. As Musser (2014) observes, Sundance 2009 was referred to as the "Green Festival", the crest of the wave of environmental filmmaking produced during the last year of the George W. Bush administration. In other nations, including the United Kingdom, where public broadcasting and the commissioning of independent documentary are more tightly linked, philanthropic funding was on the rise. This led to greater investment in social issues and, in turn, in funding for environmentalist documentaries. The "Good Pitch" initiative was started in 2008, piloting a funding infrastructure for private investment. "Good Pitch Australia" followed in 2015 and led to a minor but marked national rise in documentary filmmaking committed to environmental issues. The highest-profile film to emerge from Good Pitch Australia was *2040* (2019).

By the 2010s, neither the news media nor artists could take the weather or nature for granted. At the heart of the coal-themed European biennial of contemporary

visual art, Manifesta 9, held for its 2012 edition in the semi-derelict Belgian lignite-mining town of Genk, was a succession of darkened rooms lined with drawings, film projections and prints curated by a prominent art historian of modernism, Dawn Ades. It traced the entropic history of coal mining in art from the start of the Industrial Revolution through its collapse during the 1980s European deindustrialisation to the emergence of climate warming as a social issue. In film as in art, climate warming's iconography rethought and assimilated older, competing apocalyptic fears (pollution, nuclear holocaust, pandemic) into the fear and dread of climate catastrophe. Ian Cheng's post-apocalyptic *Emissary in the Squat of Gods* (2015) ran in real time on a games engine to portray a world of aimless, broken survivors in a devastated world, while Tabita Rezaire's *Deep Down Tidal* (2017) tracked the traces of lost Black wisdom and history in the deep oceans. Both works emphasised environments as witnesses, guardians and active agents in the making of experience, echoing Walter de Maria's note that "The land is not the setting for the work but a part of the work" (1980).

The same themes reached quite separate culminations and an apotheosis in the immersive video installations of Black British filmmaker John Akomfrah and of Irish photojournalist-turned-filmmaker Richard Mosse. Both have become key figures in international contemporary art. Both emerged from professional documentary backgrounds. Akomfrah was a founding member of British Black Audio Film Collective, launched in 1982, which made socially activist documentary films from an explicitly Black perspective. From the 2010s on, Akomfrah's immersive video installations focused on climate warming. *Vertigo Sea* (2015) reimagined the iconography of the natural world through the lens of memorialisation and grief. In *Vertigo Sea*, the broken narratives are drawn from archival footage, including bloody, gruesome whaling; long slowly drifting aerial sequences of wilderness, wild animals and migrating birds; and performances by actors in period costumes "who gaze silently at landscapes threatened or already blighted by human progress" (O'Hagan, 2017). His next work, *Purple* (2017), was, in his words, "a response to [the] Anthropocene" (qtd. in O'Hagan, 2017). Akomfrah conveys a conception of a bleak colonial past haunting the present by the intertwined history of imperial expansion, slavery, colonisation, war and conflict, all now linked to climate warming. Environmental destruction and historical displacement—the mass mortality of native Americans and the industrialisation of African slavery after Columbus—kickstarted capital and bonded it permanently to climate warming and migration (Baucom, 2020; Mignolo, 2009). The global flow of the decolonised, of refugees and of displaced asylum seekers, driven by climate-related famines, water shortages and wars, only reverse European expansion since the fifteenth century.

Two questions have haunted this chapter. What impact did this art and film practice have? What use were they in communicating climate warming's impact? Initially imagined from scientific and emotional heritage of environmentalism, climate warming was reimagined in relation to human and non-human species' displacement. Data was first visualised as an aesthetic effect but later patiently presented and unpacked to inform and educate. Widescreen cinema first celebrated winning the race to colonise. And then its successor, immersive video, mourned

colonisation's dark articulation with environmental destruction in a grief-driven displacement aesthetics. First Nations peoples and refugees were questioning both the ethics and the efficacy of this reimagining and of how displacement was depicted, no matter what the immersive affect or artistic quality of environmentalism and the emergent displacement aesthetics that linked the loss of landscape to human flows across borders and to climate warming. They were sceptical about environmentalism and about the landscape of contemporary art that largely excluded them. They were sceptical about reimagining the displacement of humanity and non-human species through sweeping panoramic abstractions. That scepticism is encapsulated in the demand, Nothing About Us Without Us.

More collaborative practices therefore became increasingly important. In the 1970s, public artists Helen Mayer Harrison and Newton Harrison employed "fieldwork techniques from sociology, such as interviews and community [consultations to gather] vast amounts of information about environmentally threatened sites. From this [information], they made series of collages, photomurals and books combining enlargements of aerial photographs, maps and illustrative drawings with evocative texts, captions, and detailed descriptions of ecological strategies were designed to heal degraded or damaged regions" (Green, 2001).

Forensic Architecture, an artistic method developed by the collective of the same name based at Goldsmiths College in London, continue this tradition, analysing and presenting forensic evidence for legal and political processes, re-presented as art. Forensic Architecture investigate human rights and environmental violations in partnership with grassroots activists, legal teams, international NGOs and media organisations. Their "art" "involves open-source investigations, the construction of digital and physical models, 3D animations, Virtual Reality environments and cartographic platforms" (Lorca Macchiavelli, 2019). Their projects have involved state-of-the-art data visualisations of information gleaned from "photographs, videos, audio files and [verbal] testimonies [to] reconstruct and analyse violent events" (ibid.). In *Ecocide in Indonesia* (2017), Forensic Architecture collaborated with local activists and scientific observers, and they pinpointed responsibility for environmental arson in Kalimantan and Sumatra, with a visual effect poised between horror and cold legal work. They began to demonstrate the potential of reimagining environments through network technologies, in effect criticising the politics of previous climate data visualisations and artistic representations since *An Inconvenient Truth* for avoiding blaming specific economic or political agents and instead portraying the Earth as victim. *Ecocide in Indonesia* may have looked poetic but was in fact unambiguously practical, suggesting concrete, socially viable environmental strategies. Forensic Architecture demonstrated a form of useful art, produced in collaboration with local and Indigenous peoples, freeing systems theory of its subordination to control in the 1960s cybernetics and its legacy and articulating it with ordinary people's pictures, sounds and words. Transforming "found" media also transformed the ordinariness of witnesses. It transformed art's normative and apolitical assumptions into action plans and undercut the inherited authority of expertise (Fig. 8.2).

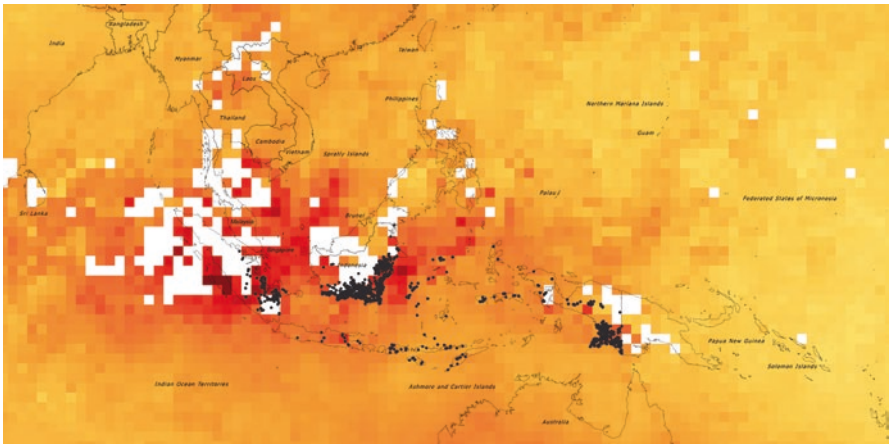

Fig. 8.2 "Carbon Cloud and the sources of fire, 2015." *From Ecocide in Indonesia*, 2017 © Forensic Architecture

8.5 Conclusion

Climate emergency and climate warming are synthetic and cultural concepts. They have an art and film history coincident with the period of globalised contemporaneity. A genealogy of forms through which artists reimagined the climate emergency shows how they dramatised broken narratives and excavated tropes ranging back to Romanticism, including the pathos of victimisation, poetic and elegiac visions of nature and images of dystopic annihilation. Our period was formed by struggles between evocation and communication; dawning realisation of the continuity of colonialism, capitalism, climate and human displacement; and a struggle between dread of unforeseen catastrophes and fear of technocratic attempts to control them. Both art and media historians have a tendency to periodise: so now, in the third decade of the twenty-first century, we should periodise environmentalism.

We have outlined three periods wherein the iconography of nature remained similar, but its denotations shifted profoundly, as did artists' technologies. Once upon a time, the threat of nuclear war and the end of the world might be denoted by an audio recording of Geiger counters. In the 2020s, the same clicking conjures up Fukushima, whose catastrophic flooding and subsequent release of contaminated water evokes not just geological or nuclear crises but also reminded the world of climate warming's coming sea rises. Our chapter showed how climate iconography reimagined and assimilated older, competing fears of apocalypse: of nuclear holocaust, of industrial pollution, of Indigenous dispossession. The connections that artists and filmmakers made to older art and earlier matter-of-fact documentary ways of seeing led inexorably to their engagement with the techniques, ethics and politics of data management and visualisation. The contemporary awareness of ecological impact has become, above all, a very political awareness, largely due to the artists and filmmakers of this period.

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