

“Back to the Future”: Imagining Climate Change Futures in US American Literature

Antonia Mehnert

Abstract

Our very understanding and experience of climate change has been shaped by an all-encompassing scientific interpretation of the weather. However, the statistical graphs of emission scenarios and other data diagrams have not only enforced a division between the scientific and the human realm—increased levels of data and abstraction coupled with the lack of a representational means of seeing ourselves as actors within these data—but has for a long time suppressed other perceptions of this unprecedented phenomenon. In order to understand global warming we need to consider it within a broader context of discourses and narratives, which implies an awareness of social and cultural spheres through which climatic changes are brought to the fore. Literature and the imaginary realm are thus of importance to the project of communicating the complexity of climate change, evoking feelings about it and of raising questions about the ethical and socio-political ramifications of climate change. This article aims to make a contribution to the only recently emerging discourse on climate change fiction. After a general discussion and contextualisation of literature and climate change, this article analyses two climate change fictions, T.C. Boyle’s novel *A Friend of the Earth* and Kim Stanley Robinson’s *Science in the Capital Trilogy*, in order to discuss how literature deals with the representational challenges of climate change, focusing on the issue of time and the communication of risks and uncertainties.

1 Introduction

The national news aired hallucinatory images of flooded New York. A traffic light bent like a cheap spoon [...]. A Gramercy Park brownstone had caught on fire [...]. And finally the watery outlines of bodies floating like lily pads on Second Avenue.¹

¹ Rich, Nathaniel, *Odds Against Tomorrow* (New York: Farrar, Straus & Giroux, 2013), 202.

When Hurricane Sandy hit New York on its destructive path in 2012, writer Nathaniel Rich was just in the final editing process of his latest novel *Odds Against Tomorrow* from which the introductory lines of this article are taken. All of a sudden, the near-future events that he had described in his book were no longer solely fictional. Carolyn Korman, literary critic for the *New Yorker*, also notes that “novels that would once have been called science fiction can be read as social realism” in times of climate change.² Moreover, the overlapping of near-future fictional and present-day real events here notably shows that climate change is not something happening in the far-off future but instead underscores its intricate relation to the present. Over the course of his novel, Rich also reminds readers that the flooding of New York is not a one-time event but that the weather will become increasingly erratic. More important than the parallels between fiction and reality in this context is Rich’s detailed description of his protagonist’s response to climate risks because he thereby provides insight into the personal and emotional dimension of the “intricacies of planetary collapse”.³

Rich’s novel thus offers a point of departure in examining cultural practices and their imaginaries about this otherwise elusive and abstract phenomenon called climate change. Instead of reducing contemporary global environmental problems, such as climate change, solely to managerial issues which can be solved by techno-scientific correction, cultural artefacts such as films and literature become part of a kind of political aesthetics that intervenes in current debates by addressing not only what could be changed today but also by showing how we might adapt to future changes.⁴ Too often, as Timothy Luke elaborates, “the facts of life’ pass into fields of control for disciplines of eco-knowledge and spheres of intervention for their management as geo-power at various

2 Korman, Carolyn, “Scenes from a Melting Planet: On the Climate Change Novel,” *The New Yorker*, July 3, 2013, accessed December 12, 2013. <http://www.newyorker.com/online/blogs/books/2013/07/scenes-from-a-melting-planet.html>. It needs to be mentioned at this point, however, that singular weather events such as Superstorm Sandy cannot be traced back to a long-term phenomenon like climate change. However, scientists point out that global warming has led to conditions in which the intensity and frequency of tropical storms is likely to increase. Cf. Intergovernmental Panel on Climate Change (IPCC), “Summary for Policy Makers,” in *Climate Change 2013: The Physical Science Basis: Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. T.F. Stocker et al. Cambridge (New York: Cambridge University Press, 2013), accessed May 14, 2014, 5. http://www.climatechange2013.org/images/report/WG1AR5_SPM_FINAL.pdf, 5).

3 Rich, *Odds Against Tomorrow*, 254.

4 See also Gabrys, Jennifer, and Kathryn Yusoff, “Arts, Sciences and Climate Change: Practices and Politics at the Threshold,” *Science as Culture* 21.1 (2012): 17.

institutional sites.”⁵ Countering this tendency, there is a need for other means of representation of this unprecedented global crisis. Authors and artists alike provide creative works that serve as alternative communications of environmental problems and risks, and thereby provide valuable insights on formerly neglected aspects of this crisis.

The imaginative realm—and most importantly for this article, literature—thus plays a vital role in the climate change debate by translating hypothetical situations so that the reader can emotionally relate to and critically reflect upon them. As Sylvia Mayer has pointed out,

texts [...] direct our perception, they suggest categories of interpretation and evaluation, they function as premises for subject and identity formation, for the creation of ethical systems, and for the establishment of laws that in turn regulate social and economic practices.⁶

In this sense, cultural artefacts are not only aesthetically but also politically relevant. Furthermore, by illustrating the connection between a possibly disastrous future and our present actions, they engage in a “poetics of responsibility”—that is, in a debate about the responsibility that we as humans have towards our own actions.⁷ Even though some of the literary scenarios may be apocalyptic, it is not the end of the planet that is portrayed, but rather the end of our Westernised lifestyles that centre on unbounded growth and consumption. But destruction is never complete in these worst-case scenarios. Instead, the dystopian stories seem to function as moments of “involuntary enlightenment,”⁸ or moments of realisation, aiming to ignite action in order to avert crisis, since, as Greg Garrard pointedly explains, “only if we imagine that the planet has a future, after all, are we likely to take responsibility for it.”⁹

Reading climate change novels not only within their aesthetic realm but also for their contribution to, and critical intervention in, climate risk

5 Luke, Timothy W., *Ecocritique: Contesting the Politics of Nature, Economy, and Culture* (Minneapolis: University of Minnesota Press, 1997), 91.

6 Mayer, Sylvia, “Literary Studies, Ecofeminism, and the Relevance of Environmentalist Knowledge Production in the Humanities,” in *Nature in Literary and Cultural Studies: Transatlantic Conversations on Ecocriticism*, ed. Catrin Gersdorf and Sylvia Mayer (New York: Rodopi, 2006), 112.

7 Heise, Ursula, “Teaching Ecocritical Theory,” in *Teaching North American Environmental Literature*, ed. Laird Christensen (New York: MLA, 2008), 53.

8 Ulrich Beck in Amsler, Sarah, “Bringing Hope to Crisis,” in *Future Ethics: Climate Change and Apocalyptic Imagination*, ed. Stefan Skrimshire (London: Continuum, 2010), 135.

9 Garrard, Greg, *Ecocriticism* (London, New York: Routledge, 2004), 107.

communication, their authors could be considered artistic whistle-blowers in and on a society that increasingly “dwells in crisis”.¹⁰ Whereas doomsayers once

sought to reveal awful truths to ignorant people and urged immediate action to avoid disaster, now voices [whistle-blowers] need to ask people to acknowledge what they already suspect and what their society, even when denying environmental crisis, is still preoccupied with.¹¹

The authors thereby question our prior understanding of right or wrong predictions, of apocalypse or paradise, and challenge society’s complacent acceptance of crisis. As writers become increasingly aware of a world at risk, they critically engage with humanity’s position within this network of changing ecologies. Climate change fiction thus provides the cultural space to participate both in the communication and the mitigation of this complex, unparalleled environmental crisis.

The importance of cultural narratives for the communication of climate change has, however, for a long time been neglected and is only recently starting to be discussed.¹² The historically entrenched division of nature and culture and its concomitant justification of a human dominion over nature have so far determined who possesses the legitimate power to address issues related to nature.¹³ Consequently, this narrow authority has ensured the long-lasting dominance of scientific factuality in environmental and thus also climate change discourses.

2 Re-imagining Science and Climate Change

In his inaugural address, the 44th President of the United States, Barack Obama, proclaimed that his administration would restore science to its rightful

10 Buell, Frederick, *From Apocalypse to Way of Life: Environmental Crisis in the American Century* (New York: Routledge, 2004), 173. He has most notably described a society which gets accustomed to increasing environmental threats but nevertheless ‘dwells in this state of crisis’.

11 *Ibid.*, 202.

12 In his latest introduction to literature and the environment, Timothy Clark still laments the absence of a literary criticism which directly addresses the issue of climate change in interpreting literature and culture. However, he also acknowledges that this is largely due to the novelty, scope and scale of the problem. See Clark, Timothy, *The Cambridge Introduction to Literature and the Environment* (Cambridge University Press, 2011), 11.

13 This division was most notably emphasised by Descartes’ ideas on mind/body dualism.

place.¹⁴ Referring to his predecessor's widespread discrediting of the scientific community, Obama's statement also affirmed an acceptance of the climate change science that Bush's administration so ferociously disputed. Furthermore, as Daniel Sarewitz has convincingly argued, in times of environmental crisis, policymakers tend to call for more scientific research because of the belief "that by introducing science, and the objective information that science can produce, into an environmental controversy, rational policy solutions will be facilitated."¹⁵ He continues to explain that this "mental model of how science can contribute to environmental policy-making is consistent with the norms of a culture that places great faith in science and the rationality that science can deliver."¹⁶ However, rather than producing absolute truths, scientific research often raises more questions as well as a confusingly wide variety of scientific data. Sarewitz then points to some key obstacles that impede a closer intersection between science and politics—above all, that science and politics have different goals and working hypotheses. While politics in Western democracies aims to form a consensus for action based on a preceding democratic debate, science engages in a process of continuous questioning and hypothesising that may be contrary to reaching a consensus. Furthermore, the kind of 'nature' that science is trying to investigate—and for that matter environmental problems today—are together so complex and multifaceted that it is almost impossible to arrive at any absolute certainty about it. Politics cannot derive clear-cut answers for policy decisions from science because the complexity of scientific data can support any kind of decision making. All of these factors lead Sarewitz to the conclusion that instead of a lack of objectivity, we are actually suffering from an excess of it. Thus we need to acknowledge that there is no 'right' or 'wrong' scientific statement, but that the 'truth' in the resolution of an environmental problem lies within the negotiation of a spectrum of positions.¹⁷

Nevertheless, the central battleground around which discussions of climate change have evolved has addressed the accuracy of science and the assertion that the climate science is settled. While the Intergovernmental Panel on Climate Change (IPCC) states in its 2007 Synthesis Report that "the warming of

14 Obama, Barack, "Inaugural Address," (Washington, D.C., January 20, 2009), accessed February 27, 2012. <http://www.whitehouse.gov/blog/inaugural-address>.

15 Sarewitz, Daniel, "Science and Environmental Policy: An Excess of Objectivity," in *Earth Matters*, ed. Robert Frodeman (Upper Saddle River, NJ: Prentice Hall, 2000), 81.

16 Sarewitz, "Science and Environmental Policy," 83.

17 *Ibid.*, 90.

the climate system is unequivocal”,¹⁸ it refrains from using any wording that implies absolute certainty throughout the entire paper. In order to make knowledge claims, the IPCC uses a variety of epistemic modifiers such as very likely (>90 per cent), unlikely (<33 per cent), high/medium confidence etc.¹⁹ This loophole of uncertainty has been extremely frustrating for climate change activists and politicians alike because it has directed the general discussion about global warming towards the accuracy of data rather than the meanings and consequences derived from those findings. In contrast, this focus on science has helped climate change denialists promote their own political agendas by declaring that as long as the science was not settled—i.e. facts presented with 100 percent certainty—there was no reason to reduce anthropogenic greenhouse gas emissions. Hence, powerful anti-climate change lobbies managed to produce an image of a scientific controversy where one does not truly exist, emphasising uncertainty and calling for ever more research.²⁰

The emphasis on the accuracy of scientific data in climate change discourse is enforced by the prevailing representation of climate change through graphs and simulations. This visualisation through abstraction, however, makes these expert images epistemologically fragile, especially when they are used outside the *viscourse*—the scientific visual discourse.²¹ The so-called ‘hockey stick’ graph, which portrays the rise in global average temperature, is the iconic image in climate change discussions, and it predominates many people’s conception and very idea of global warming. And even though the knowledge claims that science is offering through this graph and other simulations—particularly the peak at the end of the timeline—are raising concerns about the future, this particular kind of visualisation also enforces a division between the scientific and the human realm: increased levels of data and abstraction coupled with the lack of a representational means of seeing ourselves as actors within these data. The statistical grid work of diagrams and signs has, according to Ralf Konersmann, banned other perceptions (symbolic, aesthetic, mythological,

18 Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2007: Synthesis Report* (Geneva: IPCC, 2007), 30.

19 For a strong analysis of the linguistic elements and techniques that are used to express polyphony and (un)certainly in climate change documents see Flottum, Kjersti, “A Linguistic and Discursive View on Climate Change Discourse,” *Anglais de spécialité* 58 (2010): 19–37.

20 See Boykoff, Maxwell T., and Jules Boykoff, “Balance as Bias: Global Warming and the US Prestige Press,” *Global Environmental Change* 14.2 (2004): 125–136.

21 See Schneider, Birgit, “Ein Darstellungsproblem klimatischen Wandels? Zur Analyse und Kritik wissenschaftlicher Expertenbilder und ihren Grenzen,” *Kritische Berichte* 3 (2010), 83.

metaphysical) of climate.²² Hence our very understanding and experience of climate change has been shaped by that all-encompassing scientific interpretation of the weather.

One important category in these statistical and graphic representations of climate change are the so-called emission scenarios that calculate future data—a practice which, not surprisingly, spurs the climate change denials' debate because it involves an even higher factor of uncertainty.²³ Combining biophysical models with assumed social and political trends, these scenarios are commonly defined as “plausible, challenging and relevant stories about how the future might unfold.”²⁴ As such, they provide important empirical data on the possible greenhouse gas trends for the future. However, scientists themselves constantly explain that—contrary to the public's assumption—they cannot predict the climatically changed future; they can only model scenarios which may help to think about a variety of possible futures. As climatologists furthermore point out,

climate models are our crystal balls to get a glimpse of the future, an age-old dream of humanity. But what they offer is not a prediction—rather, it comes as a bundle of scenarios [...]. Natural scientists can in principle

-
- 22 Konersmann, Ralf, “Unbehagen der Natur. Veränderungen des Klimas und der Klimasemantik” in 2°. *Das Wetter, der Mensch und sein Klima*, ed. Thomas Macho and Petra Lutz (Göttingen: Wallstein, 2008), 32.
- 23 The SRES (Special Report on Global Emissions Scenarios) scenarios represent the most prominent future simulations in climate change research. They were published by the Intergovernmental Panel on Climate Change (IPCC), *Emission Scenarios: Summary for Policy Makers. Special Report* (Geneva: IPCC, 2000), and consist of forty different scenarios projecting future greenhouse gas emissions based on different underlying storylines (driving forces). The storylines vary according to economic development, technical advance, land use, political situation (global or local actions), population growth etc.
- 24 Pulver, Simone, and Stacy VanDeever, “Thinking About Tomorrows: Scenarios, Global Environmental Politics, and Social Science Scholarship,” *Global Environmental Politics* 9.2 (May 2009): 1. As the authors elaborate, “futurising” and scenario projection have become increasingly popular tools in environmental politics and science over the past decade, particularly in discourses on climate change. These calculations correspond with an increase of hazardous processes whose consequences will materialise at a later point in time. The environmental preoccupation with the future most notably entered public discourse in the beginning of the 1970s with the following publication: Meadows, Dennis et al., *The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind* (New York: Universe Pub., 1972). Interesting in this context is the acknowledgment of the invisibility and latency of environmental risks and, at the same time, the focus and dependence on measuring those risks.

not predict the future of climate, because it depends on human actions [...]. That is a matter of choice, not a pre-determined future that can be calculated today. What we can do, however, is calculate scenarios in 'what if' style.²⁵

There is a very overt notion of uncertainty and probability in these statements, which is mainly due to the inclusion of the human factor in the equations. Ultimately, neither natural scientists nor anyone else knows exactly

how such a planetary transformation [as climate change] might affect particular places and individuals, therefore, [imagining it] amounts to a paradigmatic exercise in 'secondhand nonexperience,' [*sic*] envisioning a kind of change that has not occurred before.²⁶

An overtly prognostic dimension is thus inherent in scientific texts. Even though hypothesis is a very valuable approach in forming these scientific scenarios, because it allows a reflection on what kind of futures may be possible and desirable or not, these scenarios work under a problematic premise. Birgit Schneider pointedly explains this controversial status:

[In climate scenarios,] the probable takes on a fictional status since probability theory constructs coherent worlds based on explicitly imaginary premises [...] In public discussions, however, scenarios are challenged by the problem that it is unusual to think about the future in terms of scenarios. Instead, there is the tendency to confuse these fictions with reality. The great task concerning climate change, then, is to nevertheless take the geological anticipations, so ultimately the fictions, seriously even though nobody really knows what the future will look like.²⁷

25 Archer, David, and Stefan Rahmstorf, *The Climate Crisis: An Introductory Guide to Climate Change*, (Cambridge University Press, 2009), 126.

26 Heise, Ursula, *Sense of Place and Sense of Planet: The Environmental Imagination of the Global* (Oxford, New York: Oxford University Press, 2008), 206. See also my elaborations on the imagination of the global in literary representations of climate change: Mehnert, Antonia, "Climate Change Futures and the Imagination of the Global in *Maeva!* by Dirk C. Fleck," *Ecozon@* 3.2 (2012): 27–41.

27 Schneider, "Darstellungsproblem," 86, emphasis added, my translation. The original reads: "Jedoch hat das Wahrscheinliche den Status des Fiktionalen, weil die Theorie der Wahrscheinlichkeit "eine kohärente Welt auf der Grundlage ausdrücklich imaginärer Prämissen" konstruiert [...] In der Diskussion der breiten Öffentlichkeit jedoch stoßen derartige Grafiken auf das Problem, dass es ungewohnt ist, über die Zukunft in Form von

While these scenarios aim at facilitating an intervention and at giving plausible insights on what the future could look like, they are caught within a system of assumptions particular to their discipline. The fictions developed are then discussed in terms of their truthfulness, and are thus contested even though their importance lies in the seriousness of these fictional realities.

It seems that due to problems of credibility and abstraction, simulations by climatologists have so far not successfully illustrated the problem in a way that could be grasped by the general population and translated into everyday life. How do you make something as global, abstract, and associated with such a long-term perspective as climate change experienceable, when people usually only perceive their own daily weather changes? How do you portray slow incremental change? Is it even possible to transport the message through statistics-based illustrations? So far it seems that instead of calling for action, the complexity of the issue and its discussion almost solely in scientific terms, as well as the great variety of possible scenarios, have only led to an intricate network of confusion and uncertainty.

This is a question of describing climate change not only in terms of its transformations of the terrestrial system, nor solely as an abstractly modelled phenomenon, but also as the object of projection for all kinds of socio-political projects, in the context of the various meanings that are ascribed to it.²⁸ Instead of causing more confusion, climate change may then also serve as a point of crystallisation: an assumed nodal point in history, in which climate change acts as a magnifying glass for the long-term implications of our short-term choices, and as a mirror to reconsider what we really want to achieve for ourselves.²⁹ Thus, in order to understand global warming, we should not only consider its scientific explanations; we also need to consider it within a broader

Szenarien nachzudenken. Stattdessen gibt es die Tendenz, die Fiktionen mit Realität zu verwechseln. Die große Herausforderung beim Problemfeld des Klimawandels ist, dass es gilt die erdgeschichtlichen Antizipationen—dies heißt jedoch letztlich die Fiktionen—der möglichen Zukünfte ernst zu nehmen, auch wenn niemand wissen kann, wie der Wandel genau aussehen wird.”

28 See also Mike Hulme's distinction in *Why We Disagree About Climate Change: Understanding Controversy, Inaction and Opportunity* (New York: Cambridge University Press, 2009) between “climate change” and “Climate Change”, the former representing the physical phenomenon and the latter referring to the assumptions and ideologies attached to it. In his analysis he then goes on to elaborate on four underlying myths which, according to him, dominate climate change discourse. These include: lamenting Eden, presaging apocalypse, constructing Babel and celebrating jubilee.

29 Hulme, *Why We Disagree*, xxiii.

context of discourses and narratives, which implies an awareness of the social and cultural spheres through which climatic changes are brought to the fore.

3 Literature and Climate Change

In 2005 Robert Macfarlane, writer and literary critic, asked “The Burning Question” in the culture section of *The Guardian*: “Where are the novels, the plays, the poems, the songs, the libretti, of this massive contemporary anxiety?”³⁰ Throughout the article he further laments the absence of cultural works engaged in this “most severe problem faced by the world” and proclaims that the so far prevalent bulk of “invisible literature”—a term coined by J.G. Ballard which summarises “the data buried in company reports, specialist journals, technical manuals, newsletters, market research reports, internal memoranda”³¹—is not enough to communicate the most pressing issue of our times, and needs to be supplemented by cultural imaginaries. This imaginary repertoire is essential to the project of communicating the magnitude of climate change, evoking emotions about it and igniting a debate over actions against its devastating effects. Indeed, authors, filmmakers and artists alike have for a long time been affected by the ‘crisis of the imagination’ induced by climate change, and have only recently started to find ways to grapple with this issue. While there are several prominent non-fiction works that deal explicitly with anthropogenic climate change—such as Tim Flannery’s *The Weather Makers*, James Hansen’s *Storms of my Grandchildren*, and notably Al Gore’s prominent documentary *An Inconvenient Truth* which was the first work of art to raise such a wide public awareness for the issue—there still is a dearth of fictional (more specifically ‘canonical’) texts or films (apart from the blockbuster *The Day After Tomorrow*) that engage with anthropogenic climate change overtly and in a straightforward manner.

Though there is an argument to be made that numerous literary works as well as films engage with phenomena related to global warming (i.e. floods, rising sea levels, desert lands), climate change is often employed only as a setting against which the plot of the novel develops, as in Paolo Bacigalupi’s celebrated *The Windup Girl*, Cormac McCarthy’s *The Road* or Jennifer Egan’s *A Visit from the Goon Squad*. While these works and a variety of others may be

30 Macfarlane, Robert, “The Burning Question,” *The Guardian*, September 24, 2005, accessed March 26, 2012. <http://www.guardian.co.uk/books/2005/sep/24/featuresreviews.guardianreview29>.

31 Ibid.

interpreted as part of climate change literature, they differ from other literary texts that fully engage with the issue (and were in part chosen for this article) because in these latter texts, climate change significantly alters and is a prevalent issue for characters, plot and setting alike.³² Climate change fiction fitting the more narrow definition has yet to make it onto bestseller lists (Ian McEwan's *Solar* and Michael Crichton's *State of Fear* being prominent exceptions). However, there are several fairly recently published works that are of importance for their contribution to the imaginary realm of future scenarios of climate change. In this context it is worth looking beyond generic definitions and presupposed categorisations of 'high' and 'low' literature, as climate change risk scenarios do not only influence the content but also transform the form of the literary realm. Science fiction, thriller, novel, scientific scenario, risk scenario, environmentalist pamphlet—all these categories begin to blur and converge in climate change fictions.³³ In the challenging quest for means of representing climate change, new hybridised forms of the novel may then emerge as the medium best suited to engage with this gradual, individual yet (at the same time) global phenomenon. In a US-American context, this becomes most obvious when one looks at climate fiction works such as Kim Stanley Robinson's *Science in the Capital Trilogy*,³⁴ T.C. Boyle's *A Friend of the Earth*, Barbara Kingsolver's *Flight Behavior*, or Steven Amsterdam's *Things We Didn't See Coming*.

Analysing these contemporary novels and reading them as cultural-political attempts to grapple not only with the future outcomes of global warming but also with the narrative challenges of dealing with such an unprecedented phenomenon such as climate change provides new perspectives and, as such,

32 For a thorough and extensive overview of climate change (in its various interpretations) in Anglophone literature, see Trexler, Adam, and Adeline Johns-Putra, "Climate Change in Literature and Literary Criticism," *Wiley Interdisciplinary Reviews: Climate Change* 2 (2011): 185–200. For the purpose of orienting this article toward the national focus of this volume, I have limited my discussion here to mainly US-American novels, although there are several novels from other national (mainly Anglophone, though) contexts, which powerfully engage with topic of climate change.

33 The term "cli-fi", coined and being promoted most prominently by PR expert, Dan Bloom, is increasingly being used in online articles and fora in order to describe the growing number of films and books dealing with climate change. While "cli-fi" bears a reductive connotation because of its close phonetic resemblance with sci-fi, it has helped to draw attention to the importance of cultural means of portraying climate change. Yet, even if it can be called a new genre, it still remains to be discussed.

34 Robinson, Kim Stanley, *Forty Signs of Rain* (New York: Bantam, 2005); *Fifty Degrees Below* (New York: Bantam, 2007); *Sixty Days and Counting* (New York: Bantam, 2007).

valuable contributions to the discussions evolving around global warming. The narratives not only pose a “threat to received notions of the self, nature and culture”; they also

might force us to develop alternatives [...] to established ways of presenting and containing environmental crisis. These would have to cope with indeterminacy, long timescales, complex problems of agency and responsibility and the postmodern problem of the unseen, unquantifiable cyborg risk.³⁵

Grappling with these manifold representational challenges makes the novels particularly interesting for ecocritics and environmentalists alike because by engaging with the cosmopolitan character of climate change, the literary texts ultimately go beyond the dominant environmental elegiac rhetoric and imagine a world in which the return to a former state of pristine and ‘untouched’ nature will never be possible.³⁶ This does not mean that literary texts do not advocate mitigation measures for climate change, but they do so acknowledging the hybrid ecologies we are already immersed in. The novels then participate in new and innovative ways in the discussion of environmental risks after “the end of nature”.³⁷ In the following, a brief analysis of two exemplary works of climate change fiction aims to show in depth how these works deal with the representational challenges of climate change. First, I will focus on Boyle’s novel *A Friend of the Earth* and the ways in which Boyle draws the necessary cognitive connections between today’s crises and future catastrophes, thereby bridging the gap between past, present and future and making environmental time, otherwise so elusive with respect to climate change, visible again. In a

35 Garrard, *Ecocriticism*, 149. Though Garrard originally refers here to an analysis by Richard Kerridge of the narrative challenges of BSE narratives, the discussed aspects can also very well be applicable to climate change narratives, or more broadly speaking can be considered as characteristics of narratives about postmodern mega hazards.

36 While the term ‘cosmopolitan’ has been widely discussed in literary and cultural studies, by using it in this context I am drawing on: Hulme, Mike, “Cosmopolitan Climates: Hybridity, Foresight and Meaning,” *Theory, Culture & Society* 27.2–3 (May 2010): 267–276. In this essay, he emphasises the hybrid nature of climate change, building on Ulrich Beck’s concept of cosmopolitanism and claiming that the cosmopolitan—in the sense of boundary-dissolving—character of climate change challenges the predominant Western binary distinctions of natural–cultural, future–present, global–local. The term “hybrid ecologies” is then used in order to describe nature, acknowledging its dynamics and constant changing but also humans’ influence on it.

37 McKibben, Bill, *The End of Nature* (New York: Random House, 2006).

second analysis, I use Kim Stanley Robinson's work to illustrate how authors of literature participate in the communication of risks and uncertainties and the ways in which they conceptualise the endangerment that climate change poses.

3.1 *Re-imagining Time*

As living beings we *are* time, we live time, we *feel* and *perceive* time; as human beings we *know* and *reckon* time, as members of contemporary Western societies we have *externalised* time, *created it in machine form* and now *relate to this time as a resource* to be sold, allocated and controlled.³⁸

One of the crucial challenges of the climate change crisis is to overcome the conflict between our short-term perspectives and the resulting long-term environmental consequences. But how do we think about something as intangible and invisible as climate change, which does not affect our lives immediately, but rather possibly at some future time?³⁹ And if we cannot notice the effects, why should we act on them? These questions describe “Giddens's Paradox”, or what social psychologists have named “future discounting”—that is, the wide knowledge gap between the familiar preoccupations of everyday life and the abstract future of a climatically changed world.⁴⁰ Whereas graphs and statistics may fail to translate this abstract future into individual life stories and to connect actions with impacts, the imaginary realm of literature allows exactly these connections and translations. Jennifer Rose White explains that literature

can project our understanding and appreciation of invisible, slow, and slowly accelerating crisis into the future in a dramatic way that other forms of discourse lack. They [novels] can also legitimately collapse or

38 Adam, Barbara, “Re-vision: The Centrality of Time for an Ecological Social Science Perspective,” *Risk, Environment, and Modernity: Towards a New Ecology*, ed. Scott Lash (London: Sage Publications, 1996), 92 (sic).

39 In referring to “our lives”, I am speaking from a mainly urban European perspective without wanting to neglect the fact that a great part of the world population is already experiencing quite strongly the effects of global warming.

40 Giddens, Anthony, *The Politics of Climate Change* (Cambridge, MA: Polity, 2009), 2.

juxtapose time for maximal impact and understanding in a way that science, biology, and even history cannot.⁴¹

Unlike temporal representation in scientific diagrams, in which the future indicated on the *x*-axis timeline marks the difference between the present of the reader and his future, climate change fiction deliberately blurs this distinction: past, present and future become inseparably intertwined, thereby illustrating that the risks of tomorrow are already present today. As Mike Hulme also argues:

Foresight then—the act of seeing ahead—cannot be limited to the overreaching and hegemonic claims of physical prediction. Instead, a cosmopolitan view of climate change will recognise that our future foresight—and hence our future—is as conditioned by the hopes and fears emerging from the present as it is revealed inside the electronics of a computer model. The climate crisis—if indeed there is a crisis—is a crisis of today even if we would rather depict it as a crisis of tomorrow. The future and the present are interacting in new ways as we tell ourselves the story of climate change.⁴²

While Hulme's argument is vital for climate change discourse because it reveals that future predictions are never independent of value judgments, it lacks an explanation as to how a re-making of the present-future relationship is in fact told, portrayed and made intelligible.

Moreover, apart from the "technological domestication of time"⁴³, prominently represented by climate modelling, which is interested in the future for the purpose of controlling it, it seems that contemporary Western societies increasingly focus on the present—a present that is unbound from past or future. Modern technologies, globalisation and ever-faster chains of consumption and production have led to a shortening of time horizons to the extent that "the present seems to be all there is"⁴⁴. In this state of a permanent present

41 White, Jennifer Rose, "Trouble with Time: Contemporary American Literature and Environmental Crisis" (PhD diss., Columbia University, 2009), 240.

42 Hulme, "Cosmopolitan Climates," 171–2, emphasis added.

43 Simpson, Lorenzo C., *Technology, Time, and the Conversations of Modernity*, (New York: Routledge, 1994), 5.

44 Harvey in Heise, Ursula K., *Chronoschisms: Time, Narrative, and Postmodernism* (Cambridge University Press, 1997), 26.

individuals and society are no longer able to situate past, present and future in logical coherence.⁴⁵

As the focus on the short-term becomes predominant, ‘environmental time’⁴⁶ is annihilated. However, especially because time has become the “invisible ‘other’ that works outside and beyond the reach of our senses”, we need to rethink the environment in terms of time or as a timescape—and not as often done in environmental discourse solely in terms of place—in order to “see the hazards of an industrial way of life. The invisible [thereby] becomes tangible and we begin to recognise processes that work below the surface until they materialise as symptoms—sometime, somewhere.”⁴⁷ Particularly in the case of climate change, which is so difficult to perceive because of its latency, a more profound engagement with time may open up new perspectives on environmental temporalities, thereby bridging the historical disconnect.

Literature proves to be a very suitable realm in which to explore how timescapes are rendered visible. Climate change fiction, especially, faces the challenge of negotiating between the short and the long term, of creating narrative relationships between present and future, and between human and environment, while exposing the potential dangers that a bifurcation of time otherwise harbours. In the following discussion, a close analysis of the representations of time and temporal narrative techniques in climate change fiction—exemplified in Boyle’s novel in this article—will serve to illustrate the telling of environmental time.

The opening of *A Friend of the Earth* takes the reader to the year 2025. Climate change has significantly altered living conditions in California: vineyards have been transformed into rice paddies, and since “nobody’s insured for weather anymore”,⁴⁸ constant rain, strong winds and hail storms, followed by extreme heat waves, have left people homeless in “Santa Barbara County”, “Los Andiegoles” and “San Jose Francisco”. With the collapse of the biosphere, many animal and plant species are extinct and humans live with the constant threat of yet another deadly epidemic. In this dystopian setting, 75-year old Ty Tierwater, former radical environmentalist, works as an “animal-man”, caring for

45 See Jameson, Fredric, *Postmodernism, or, The Cultural Logic of Late Capitalism* (Duke University Press, 1990), 25.

46 Barbara Adam defines environmental time as “latency and immanence, pace and intensity, contingency and context dependence, time-distanciation and intergenerational impacts, rhythmicity and timescales of change, timing and tempo, transience and transcendence, irreversibility and indeterminacy” in *Timescapes of Modernity: The Environment and Invisible Hazards*, (London, New York: Routledge, 1998), 55.

47 Adam, *Timescapes*, 1.

48 Boyle, T.C., *A Friend of the Earth* (London: Bloomsbury, 2004), 2.

the private zoo of one-hit wonder rock star, Mac, who considers it a “selfless”, “cool” and “brave” task to save those animals that nobody else would have cared for.⁴⁹ While the story starts out in the year 2025, the novel ultimately delineates two narrative chronologies which must be mapped out separately in order to discuss more in depth how environmental time is made visible structurally. While one storyline follows the events from 2025 till 2026 as related to the reader by an autodiegetic narrator, Ty, it is alternated by a heterodiegetic narration, which describes Ty’s radicalisation as an environmental activist as well as the series of events that build up to his daughter’s death from the years 1989 to 1997.

Though the length of the chapters taking place around 2025 compared to chapters taking place after 1989 is fairly balanced, the narrated time of the past (*histoire*) is longer than the story in the future. A great part of the narrative in the future is used to describe California after “everything was poached and encroached out of existence”;⁵⁰ however, the focus of the novel seems to be how past events have led to this state of devastation. Looking back to July 1989, to “the beginning, the real beginning, of everything to come”⁵¹ and then to the following eight years, the novel describes with an ironic tone the various environmentalists’ failures to impede ecological catastrophe. However, as Kerridge explains, the irony used here is not “to discredit the environmentalists but merely emphasises their powerlessness”⁵² in a surrounding in which their protest is not heard. The novel’s emphasis on the past then serves a double purpose: on the one hand, the narrative reconstructs historical coherence in a world which increasingly focuses on the present, and on the other hand functions as a way to preserve memories, knowledge and stories; though the characters’ protest may not be heard, the novel becomes the medium to nevertheless make their claims public.

In challenging the loss of perspective, which impedes us to consider the relation between the short-term decision-making and long-term environmental consequences, the novel aims to re-forge this connection, however painful it may be. As Ty explains,

49 Boyle, *A Friend*, 11.

50 *Ibid.*, 7.

51 *Ibid.*, 24.

52 Kerridge, Richard, “Narratives of Resignation: Environmentalism in Recent Fiction,” in *The Environmental Tradition in English Literature*, ed. J. Parham (Aldershot: Ashgate, 2002), 90.

I try to avoid perspective as much as possible. Perspective hurts. Live in the present, that's what I say, one step at a time, and forget nostalgia, forget history, forget the sketchy chain of loss, attrition and disappointment that got you into bed last night and out of it this morning.⁵³

That the novel counters this culture of forgetting is most prominently demonstrated in the story within the story, hence with the book that journalist and activist April Wind is writing about Sierra Tierwater, Ty's daughter and an environmental activist, who, during a tree-sitting protest, accidentally slips from the tree and falls to her death. In the beginning, Ty is not convinced of the purpose of such a book for "posterity",⁵⁴ since this posterity is a world "turned to shit" with "people who know no more about animals—or nature, or the world that used to be—than their computer screens want them to know",⁵⁵ but once he holds the text in his hands, he appreciates "the crisp sound of paper, the printout, the stuff of knowledge as it used to be before you could plug it in".⁵⁶ Sierra's biography becomes a way of challenging the overwhelming cultural amnesia of a society in which people are considered historians if they can remember what happened 20 years ago, foregrounding and critically reflecting on the relationship between human and environment. Sierra's story takes on such an importance that even the narrative pattern of the novel is interrupted. As past events reach their climax, they are also re-claiming their space in the present, interfering with the otherwise clear-cut narrative which distinguishes between past and future in its chapter arrangement. Thus in Ty's first-person narration, memories of Sierra's tree protest emerge and the reader learns the truth about what has been foreshadowed throughout the entire novel. As the past invariably becomes part of the future and the temporal distance is thereby collapsed, it is even further highlighted that environmental destruction is a result of past actions; in the narration, Sierra's environmentalist defeat is then immediately paralleled to a world of colourless forests where wilt and decay predominate the scenery. At the same time, Ty's personal loss is equalled to the loss of biodiversity.

While often in environmentalist rhetoric the past is drawn upon as part of an elegiac mourning for what 'great nature' has been lost, this notion is complicated in *A Friend of the Earth*. Though Ty falls back into lamenting that there is nothing he really wants "except the world the way it was" with his daughter,

53 Boyle, *A Friend*, 111.

54 Ibid., 16.

55 Ibid., 7.

56 Ibid., 226.

parents, and first wife still alive, but also with the “doomed and extinguished wildlife [...] put back in their places”, the account of his past shows that none of the environmental strategies succeeded to prevent this destruction from happening—and, ironically, the very nature that the characters are trying to save is the cause of their deaths.⁵⁷ Thus Mac is killed by the lions he is trying to save, Sierra falls from the tree she wanted to prevent from being felled, and Teo, “environmental superman”⁵⁸ and lover of Ty’s third wife Andrea, is struck by a meteor. Kerridge argues, furthermore “the novel looks back not at a cause narrowly defeated but at one that was always going to be lost”.⁵⁹ As not even environmentalists can free themselves from the capitalist culture that shapes them nor from personal motives, the environmental cause that they are pursuing is also weakened. In the end, looking at the devastation in 2026, even Ty has to admit that after years of ecotage and as a “human hyena”⁶⁰—a nickname that was given to him after he almost poisoned the fresh water reservoir of Santa Barbara—he has accomplished nothing, “absolutely nothing”.⁶¹ The novel ultimately demonstrates then that environmental protest will not lead to achievements if it is not heard and supported by the rest of society. Though dystopian and accusative of humans’ role in the destruction of the biosphere, Boyle’s work rejects falling into a lamenting of a lost static and romanticised nature. Instead, past and future events illustrate that nature has agency in the transformation of the world. Also in a world in which “global warming has become the consequence”⁶² and life on earth may no longer be what it used to be, nature nevertheless prevails: “the woods [...] are coming back, the shoots of the new trees rising up out of the graveyard of the old.”⁶³ Even humans will survive, but as Ty’s final affirmation “and I’m a human being” in a post-pastoral notion seems to suggest, they have become one species among many, not one that assumes superiority.⁶⁴

57 Boyle, *A Friend*, 260.

58 Mayer, Sylvia, “American Environmentalism and Encounters with the Object: T. Coraghessan Boyle’s *A Friend of the Earth*,” in *The Object of Desire: The Aestheticization of the Unaesthetic in Contemporary Literature and Culture*, ed. Konstanze Kutzbach and Monika Mueller (Amsterdam: Rodopi, 2007), 228.

59 Kerridge, Richard, “Narratives of Resignation,” 88.

60 Boyle, *A Friend*, 218.

61 Boyle, *A Friend*, 270.

62 *Ibid.*, 185.

63 *Ibid.*, 274.

64 The term post-pastoral has been coined by Terry Gifford in his work *Pastoral* (London: Routledge, 1999) to describe writings that value nature also in its destructive aspects and take responsibility for it, though not out of false idealism.

Through the contraction (using analepsis and prolepsis) and partial collapse of time by structurally blurring past and future, Boyle's novel permits a "timescape perspective,' in which the timespans of ordinary life, onto which we map our personal hopes and plans, are viewed alongside drastically longer and shorter distances."⁶⁵ In the case of global warming, especially, where change does not register immediately and thus often eludes human perception, an explicit focus on timescapes allows the reader to notice the otherwise imperceptible. Following the life of one particular character allows one to relate to the emotional and personal contours that future consequences of climate change may have.

Even though Boyle clearly demarcates the future—not only through the description of setting and characters, but also through temporal markers (for example chapter headings)—he also employs several techniques in the narration to make the reader part of that future. Firstly, the timeframe chosen, 2025, is not a very distant future from the standpoint of a novel published in 2000, but more importantly this temporal distance is interrupted on several occasions when Ty directly addresses the reader. Breaching out of the future narrative framework, he relates to the reader of the present:

And just like you—if you live in the Western world, and I have to assume you do, or how else would you be reading this?—I caused approximately two hundred fifty times the damage to the environment of this tattered, bleeding planet.⁶⁶

Ty's account then takes on a storytelling character, as the listener/reader is immediately drawn into the world of the narrator, which becomes the continuation of the present and allows critical reflection about what kind of a future could have been avoided.

The novel maps the relation between short-term and long-term not only through its narrative structure, but also on the level of content. It thereby demonstrates that environmental crisis is the result of a conflict between the dynamics of environmental time and human-cultural time.⁶⁷ In fact, human time is rendered atemporal in the future of *A Friend of the Earth*, that is, indifferent to environmental processes and changes. In 2025, seasons no longer

65 Richard Kerridge, in his elaboration on environmental narratives in "Ecothrillers: Environmental Cliffhangers," in *The Green Studies Reader*, ed. Laurence Coupe (London: Routledge, 2000), 243.

66 Boyle, *A Friend*, 43.

67 See also White, "Environmental Time."

exist in California and an ever-present “black sky”⁶⁸ makes it difficult to distinguish between day and night-time. Many species are extinct and irregular weather patterns have made farming impossible. Thus with meat or other fresh produce no longer available, human diet has been extremely altered and relies on non-natural food production. Rats are the only thriving species, “multiplying like there’s no tomorrow (but of course there is, as everybody alive now knows all too well and ruefully, and tomorrow is coming for the rats too).”⁶⁹ As birth rates decline and society ages rapidly, there are attempts to make the human body timeless: organs can be regrown, signs of age are hidden by plastic surgery and a distinction between nuances of young (young-young, young, young-old, etc.) has made exact age obsolete. Yet, instead of considering this development as medical progress, Ty observes, “we could live another twenty-five or fifty years even. The thought depresses me. What is going to be left by then?”⁷⁰ The control over the temporality of a lifetime then is worth nothing if ultimately the disastrous present is all there is and the future only becomes a worsening continuation thereof. In this context, posterity becomes an empty signifier, a word without meaning, most prominently illustrated in the death of Sierra—the daughter who dies before her father.

The novel ultimately illustrates the dangers of solely focusing on short-term-oriented human time, tracing the life of one individual and the ways in which it is dramatically affected and constituted by his environment. The narrative frame then allows for a dialectic between short-term human perspectives and long-term environmental consequences, which is key for the reader to identify otherwise elusive, invisible and long-scale environmental hazards. To focus on the reading of time in climate change fiction, and more precisely on how geological timescales can be related to individual and human timescales, thus helps illustrate the ways in which literature participates in climate change communication and attempts to make this phenomenon graspable.

3.2 *Environmental Risks in an Age of Security*

As scholars such as Ursula Heise or Susan Mizruchi have most notably shown, literature is part of an important imaginative realm that participates in the communication of risks.⁷¹ Its importance lies not only in the selection of what

68 Boyle, *A Friend*, 2.

69 *Ibid.*, 6.

70 *Ibid.*, 260.

71 See Heise, Ursula, “Toxins, Drugs, and Global Systems: Risk and Narrative in the Contemporary Novel,” *American Literature* 74.4 (2002): 747–778. See also Mizruchi, S., “Risk Theory and the Contemporary American Novel,” *American Literary History* 22.1 (December 2009):

kind of risks need to be contemplated, but especially in the ways in which information about certain risks is put into an intelligible narrative pattern, pointing to possible causes and consequences, defining actors and victims, portraying affected places and reconstructing historical coherence, thereby making the invisible visible again. Furthermore, as Mizruchi has explained,

provisional, often ineffable, as beholden to ethical and affective considerations as it is to scientific ones, the phenomenon of risk seems especially suited to fictional representation. Fictions dramatize vividly in terms that force us to think, as well as to feel, that the extent to which humans control their destinies is often the extent of their capacity for destruction.⁷²

Fictional representations of risk have the capacity to stimulate affect—which is essential to conveying a phenomenon such as climate change that so far has remained very abstract for the general public—and to encourage critical reflection about our role in the production of risks.⁷³

Most climate change novels present a dystopian, though not necessarily apocalyptic, vision of the future. Conferring with Mizruchi's indication that "modern history is the source of the narrative of risk",⁷⁴ these texts respond to our current dwelling in crisis. As Frederic Buell discusses in *From Apocalypse to Way of Life*, environmental crisis has become a normal feature of everyday life. While the 20th century still experienced a rise of apocalyptic environmental rhetoric, rupture and revelation no longer work in a world in which complex processes pose constant threats to society. Danger appears to be all around us, and "instead of being haunted by a sudden world-end [...], we more

109–135. Though these two literary scholars refer to several approaches in risk theory, I am relying here on the notion of risk elaborated on by sociologist Ulrich Beck who describes the transformation of modern industrial society into a risk society. This risk society finds itself endangered by the self-inflicted hazards of its own modernisation—a development that Beck and others call reflexive modernisation (Beck, *Risk Society*, 14).

72 Mizruchi, "Risk Theory," 119.

73 As already analysed in detail by scholars like Ursula Heise, the dramatisation of (environmental) uncertainty is not limited to climate change fiction. The well-known 'risk' classic *White Noise* by Don DeLillo proves a case in point, but also numerous other writers such as Richard Powers or Ana Castillo have dealt with the issue of possible exposure to toxic chemicals and pesticides in their works. Also the dangers of radioactivity find prominent resonance in risk narratives such as Christa Wolf's novel *Störfall: Nachrichten eines Tages* or Michael Madsen's documentary *Into Eternity*.

74 *Ibid.*, 129.

realistically worry about a world that doesn't end, but which descends and further descends."⁷⁵ This aspect is also illustrated in the previous analysis of Boyle's novel. Thus the future will bring no end of the world, not even of humanity, but an increase of the environmental threats that are already present today. Even though some climate change novels present wide-ranging disasters and in doing so may employ apocalyptic rhetoric, I argue that they predominantly engage with worlds at risk, which are in a process of becoming and not already finished or determined to end.⁷⁶ As these novels contemplate the role of the human in the extremely altered worlds of climate change, they nevertheless engage in the question of how this catastrophe can be mitigated. Many climate change novels could thus be characterised as critical dystopias. Moylan and Baccolini explain that "critical dystopias allow both readers and protagonists to hope by resisting closure: the ambiguous, open endings of these novels maintain the utopian impulse within the work."⁷⁷ Unlike the usual dystopia, which ends on a clearly pessimistic tone, the open-endedness and emphasis on uncertainty in the climate change novel then leaves room for hope and change.

As explained in the foregoing short introduction to literature and climate change, the relatively small corpus of climate fiction works indicates that it nevertheless remains difficult to portray the risks which climate change poses. One of the problems then may also be that a non-apocalyptic version of climate change is exceedingly hard to render as a compelling narrative. For instance, a near future world in which a huge part of the population is killed by an enormous tidal wave (as in *The Day After Tomorrow*) is more likely to be portrayed than a tracing of the very slow and gradually elevating salinity of the oceans. Of course, readers'/viewers' expectations and interest in the issue also play a role here. In an interview, science fiction author Kim Stanley Robinson explained that although he had been interested in the topic of global warming for some time, he has had difficulty writing about it—until he heard of abrupt climate change. Engaging with this phenomenon, which takes place at a future point when the otherwise slow and gradual climate regime is pushed over a threshold, resulting in sudden major changes, allowed him to circumvent the

75 Beck in Buell, *Apocalypse*, 29.

76 In her insightful chapter on narratives and risk in *Sense of Place and Sense of Planet*, Ursula Heise argues that ultimately, apocalyptic narrative is one form of risk perception, and is therefore not completely opposed.

77 Baccolini, Raffaella, and Tom Moylan, "Introduction. Dystopia and Histories," in *Dark Horizons: Science Fiction and the Utopian Imagination* (New York: Routledge, 2003), 7.

problem of the portrayal of long timescapes in his latest *Science in the Capital* trilogy. As literary scholar Adeline Johns-Putra has furthermore explained,

the near-future setting of the Science in the Capital novels enables the imaginative construction of climate change in a way that is psychologically and—one is compelled to add—politically and ideologically relevant.⁷⁸

In contrast to his critically acclaimed *Mars* trilogy, Robinson has repeatedly pointed out in interviews that it was his concern to illustrate that humanity, rather than terraforming a faraway planet, is actively changing the earth system and that, therefore, “we have to learn to think of ourselves as terraforming it on purpose, in order to keep it healthy and save human civilisation.”⁷⁹ Thus a near future on earth setting seemed necessary to draw the cognitive relations. In his trilogy, Robinson then alludes to two possibilities which could cause abrupt climate change: one is the stall of the Gulf Stream and the other is the breaking up of the West Antarctic Ice Sheet. However, Robinson points out, “how that [abrupt climate change] might begin, no one can be sure.”⁸⁰ The results are nonetheless disastrous. His first novel *Forty Signs of Rain* introduces a cast of characters and then follows their lives and actions, leading up to a great flood in Washington D.C. The sequel *Fifty Degrees Below* continues the multi-perspective story and describes how the city’s inhabitants endure an extremely severe winter. The final novel *Sixty Days and Counting* describes “a moment of history when climate change, the destruction of the natural world, and widespread human misery were combining in a toxic and combustible mix”⁸¹ and the newly elected President, Phil Chase, is trying his best to work his way through the adversaries of weather, politics and economy. Though Robinson’s trilogy, like *The Day After Tomorrow*, engages with major climatically induced disasters, it conceptualises the endangerment that climate change poses very

78 Johns-Putra, Adeline, “Ecocriticism, Genre, and Climate Change: Reading the Utopian Vision of Kim Stanley Robinson’s Science in the Capital Trilogy,” *English Studies* 91 (November 2010): 745.

79 Robinson, Kim Stanley, “Imagining Abrupt Climate Change,” *Amazon Shorts* (2005): 3. Robinson’s argument here resonates Crutzen’s theory that we have entered the Anthropocene, a new geological epoch shaped by humankind (see also Crutzen, Paul, and Eugen Stoermer, “Have We Entered the Anthropocene?” *International Geosphere Biosphere Program*, October 31 2010, accessed November 28, 2012. <http://www.igbp.net/5.d8b4c3c12bf3be638a8000578.html>).

80 Robinson, *Forty Signs of Rain*, 225.

81 *Ibid.*, 5.

differently. Already the sheer volume (about 1500 pages) of the trilogy—a “Victorian triple-decker” as Robinson names it—demonstrates that although climatically induced disasters, i.e. the flood, the cold wave, give the trilogy a structure, they do not constitute the climax or sole focus of narration.⁸² Instead, the novels focus on the meticulous description of the characters’ personal and professional lives and their experience of a world at risk. The trilogy thereby raises interesting questions about uncertainty, engaging the misconceptions of science by the general public, emphasising the importance of the ‘precautionary principle’, and critically exposing the “commodification of contingency”,⁸³ each of which will be elaborated in the following.

In order to describe how science works and “how it relates to the worlds of power politics, capital, and daily life”,⁸⁴ the novel follows the daily work routine of several characters who are scientists working at the National Science Foundation in Washington D.C.—most notably Frank Vanderwal, who recently joined the team from California, and Anna Quibler, statistician and mother of two, who in the course of the novel becomes acquainted with the representatives of the embassy of the fictional island of Khembalung which is threatened to be inundated by rising sea levels. Readers gain a very detailed insight on the processes that shape scientific knowledge and the difficulties scientists face in communicating climate risks to the public or politicians. As the work of scientists is more and more demystified, it becomes obvious that although complete certainty for future modelling may never be possible, scientists nevertheless take the risks involved with rising greenhouse gases seriously and thus decide to actively engage in the issue, i.e. to get involved in politics. The change of attitude is most prominently portrayed in the generally rational and cynical character of Frank, who undergoes a transformation after transfixing on one particular sentence from a lecture by the Buddhist Khembalung ambassador: “an excess of reason is itself a form of madness.”⁸⁵ As he further contemplates this statement, he comes to realise that “reason had never explained the existence of life in this universe”⁸⁶ but what is done with knowledge, how one has lived with it and made sense out of it also bears importance. According to Buddhism, practising compassion is essential for humanity’s

82 Robinson, “Abrupt Climate Change,” 16

83 Luis Lobo-Guerrero describes in his book *Insuring Security: Biopolitics, Security, and Risk* (New York: Routledge, 2012) the intriguing intersection between economic industry and risk society from which a profitable and powerful insurance sector emerges.

84 Robinson, “Abrupt Climate Change,” 16.

85 Robinson, *Forty Signs*, 268.

86 *Ibid.*, 272.

survival. Frank begins to recognise that a paradigm shift is needed, that science had to become part of the political decision making process—even though the thought filled him with fear and anxiety. It serves as a call for action in spite of the uncertainties that this change involves.

The novel furthermore draws parallels between large-scale, invisible and thus hard to grasp climate risks and the personal risks that various characters have to face. Though weather extremes all over the globe are happening with more frequency, events such as the breaking off of the Ross Ice Shelf do not seem to be regarded with enough importance. When Charlie, environmental policy advisor to the presidential candidate and Anna's husband, realises the ramifications of this event—the acceleration of ice flow of the West Antarctic Ice Sheet—he wonders why he would find such important information only on the final pages of a newspaper, but simultaneously proposes an explanation: “People were talking about it the same way they did any other disaster. There did not seem to be any way to register a distinction in response between one coming catastrophe and another.”⁸⁷ This passage alludes to a society which increasingly domesticates crisis. Though “researchers didn't appear to know” how fast the acceleration of ice flow was, since the “modeling [was] inconclusive”, this uncertainty does not affect Charlie's understanding of the related risks.⁸⁸ On the contrary, the article gives him a

sharpened sense that this was serious, and perhaps the tipping point into something worse. All of a sudden it coalesced into a clear vision standing before him, and what he saw frightened him. Twenty percent of humanity lived on the coast. He felt like he had one time driving in winter when he had taken a turn too fast and hit an icy patch he hadn't seen, and the car had detached and he found himself flying forward, free of friction or even gravity, as if sideslipping in reality itself.⁸⁹

Charlie links the risks involved with rising sea levels to a personal experience and by describing his feelings in the event, makes them even more relatable. This correlation effectively counters the disengagement evoked by abstract concepts because, as Frank points out in the novel, the “only things people understand are sensory.”⁹⁰

87 Robinson, *Forty Signs*, 238.

88 Loc. cit.

89 Loc. cit.

90 Frank in *Forty Signs*, 79.

Another passage in the novel, which focuses on Frank, illustrates the difficulties of making decisions when confronted with risks. After a violent encounter with a stranger, Frank suffers from a severe head injury, which both physically and psychologically affects him after a long healing period as he continues to taste blood in the back of his throat every now and then and experiences difficulties in processing decisions. When he finally agrees to see a doctor, he finds out that a subdural hematoma, which exercises pressure on the frontal cortex, and thereby influences the “emotional components of risk assessment and the like”,⁹¹ may be the reason for his cognitive problems. Frank needs to decide whether he will pursue risky neurosurgery to drain the hematoma, or continue to live with it, even though “problems in decision-making can be pretty debilitating”⁹² for some people:

Frank sighed. Possibly he could construct an algorithm that would make this decision for him, by indicating the most robust course of action. Some kind of aid. Because it was a decision that he could not avoid; it was his call only. And doing nothing was a decision too. But possibly the wrong one. So he had to decide, he had to consciously decide. Possibly it was the most important decision he had before him right now.⁹³

Ultimately, Frank decides to schedule the surgery. Doing nothing when confronted by risks was not an option according to Frank. On the contrary, all the book’s characters aim for the precautionary principle, “meaning that you don’t delay acting on crucial matters when you have a disaster that might happen, just because you can’t be a hundred percent sure that it will happen”.⁹⁴ Thus risks may be productive when they become an agent for change.

In order to further counter a society which statically dwells in crisis, Robinson juxtaposes the dangers of environmental risks (thus uninsurable risks) to risks which are externalised, managed in agencies, and thus generally accepted as having acquired a rather positive notion because they are related to profit. One of the storylines of the trilogy therefore elaborates on the ways in which contingency is made profitable. During one of Frank’s secret meetings with Catherine, who later becomes his girlfriend, he finds out that he’s been part of a larger network of people under surveillance. Powerful lobbies have established—though not necessarily legally, “future markets”, a potent

91 Robinson, *Sixty Days*, 186.

92 *Ibid.*, 178.

93 *Ibid.*

94 Robinson, *Forty Signs*, 160.

computer-simulation program which allows them to bet on people “who may become some kind of a security risk”⁹⁵ or whose work will lead them to lucrative innovations. Well-developed technology allows surveillance of phone connections, emails, and credit card purchases, but also of physical locations. Such monitoring capabilities permit the creators of future markets and interested parties to track their suspects’ actions into the smallest details. However, this complex “security apparatus” turns out to be life-threatening for Frank and Catherine, as they not only try to undermine the system by ‘getting off the radar’, but also by exposing the planned election fraud designed by the creators of future markets. This story then complicates pre-supposed notions of security and insurance by demonstrating how risks are also artificially created for power and monetary purposes.⁹⁶ It furthermore describes another problem in contemporary society, which Shapiro highlights:

while fear is an epistemological attentiveness, located in the individual body [...] ‘fear’ in the contemporary city and nation state evokes a complex dispositif; it is located in an apparatus rather than in single alert bodies.⁹⁷

Relating back to Charlie’s comment of not being able to distinguish any longer between one disaster and the next, people in a risk society are no longer able to distinguish between ‘real’ and ‘artificial’ risks. Robinson’s trilogy illuminates this dilemma.

Engaging with risks, uncertainty and choice, and emphasising the open-endedness in the climate change story, the *Science in the Capital* trilogy suggests that we are at a crossroads at which we must decide which scenarios seem favourable—or at least less disastrous. The novels propose that the future will not be the end of the world, but it may be the end of the world as we know it: humans will live in and adapt to a climatically changed world, but it becomes clear that in order to maintain a certain standard of living, negotiating between adaptation and mitigation is crucial. Robinson’s work then is

95 Robinson, *Fifty Degrees*, 95.

96 Michel Foucault’s term *dispositif* is relevant here, as it describes the elements of an apparatus through which a certain power structure is generated—in this case the security apparatus. See “The Confession of the Flesh.” In *Power/Knowledge: Selected Interviews & Other Writings*, ed. Colin Gordon (New York: Pantheon, 1977), 288.

97 Shapiro, Michael J., “The Fear Dispositif,” *Theory & Event* 14.1 (2011), <http://muse.jhu.edu/>, accessed 1 August 2012.

‘utopian in the making’, a way to imagine alternatives to contemporary lifestyles. As the author himself explains,

the story of [...] adaptation has to be told, and told many times over, I think, so we can imagine it better [...] science fiction is therefore, in that context, a kind of scenario—making, part of the effort of modelling that we do to figure out what we should do to get through.⁹⁸

4 Conclusion

As artists and writers are starting to claim their place in a formerly solely scientific space in order to call attention to the actual global climate change crisis, they engage in the challenges of representation as much as in the ethical and socio-political ramifications of this unprecedented phenomenon. Attempting to grasp the complexity of the issue, novelists present a multitude of stories and a variety of possible futures, but nevertheless create meaning-giving narratives, which allow the reader to engage with climate change beyond the constraints of truth and reality. Literature thus provides the space not only to imagine but also to relate emotionally to climate change—this so far elusive, invisible and distant phenomenon. Matters of fact are then turned into matters of concern in climate fiction.⁹⁹

Nevertheless having to grapple with the narrative and representational challenges of global warming, novelists come up with innovative ways to portray long timescales and thereby re-draw the relationship between short-term human perspectives and long-term environmental consequences.¹⁰⁰ Thus, they encourage readers to consider their place in a future world affected by climate change. The bridging of past, present and future—as in, for example, T.C. Boyle’s novel *A Friend of the Earth*—then demonstrates that human time cannot be conceived apart from environmental time.

⁹⁸ Robinson, “Abrupt Climate Change,” 18.

⁹⁹ I am referring here to Latour’s elaborations on matters of concern in: Latour, Bruno, “Why Has Critique Run Out of Steam? From Matters of Fact to Matters of Concern,” *Critical Inquiry* 30 (2004): 225–248.

¹⁰⁰ While beyond the scope of this article, a comparative analysis of different works of eco-fiction engaging with ‘future discounting’ would certainly provide interesting insights into the changes in portraying long histories, and allow conclusions to be drawn on the particular nature of climate change fiction’s portrayal of it. (I am indebted to the anonymous peer reviewer of this volume for the insightful remarks on literary history and genealogies).

Furthermore, without turning to apocalyptic rhetoric, which often dominates environmental discourse, climate fiction such as Robinson's *Science in the Capital Trilogy* engages with the issue of climate risks. The author's three novels ultimately render risks visible by depicting how society and politics deal with the anticipation of environmental crisis. Robinson thereby not only exposes today's commodification of risks but also postulates that action beyond monetary claims is needed, especially in times of uncertainty.

Climate change fiction, though often dystopian, ultimately serves as a counter-discourse to current society's dwelling in crisis and presents "sparks of invention within destruction while providing formal means for recognising our own role in enhancing and alleviating risk".¹⁰¹ Literature thus serves as the cultural space through which environmental crisis is not only communicated but also mitigated. Both works discussed here are set in and highly influenced by a US American context, and thus engage with the topic of climate change within its particular socio-historical framework. Climate Change, however, is an issue of global scale and thus will require thinking beyond national boundaries, especially when it comes to questions of climate justice. How climate fiction will deal with the challenge of portraying the planetary dimension of global warming remains to be seen.¹⁰²

¹⁰¹ Mizruchi, "Risk Theory," 127.

¹⁰² I would like to thank Elizabeth Grennan Browning and Gregers Andersen for proofreading as well as their insightful and engaging comments.