Environmental Politics and Governance in the Anthropocene: Institutions and Legitimacy in a Complex World

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Environmental Politics and Governance in the Anthropocene

Institutions and legitimacy in a complex world

Edited by
Philipp Pattberg and Fariborz Zelli

ROUTLEDGE

Environmental Politics and Governance in the Anthropocene

The term Anthropocene denotes a new geological epoch characterized by the unprecedented impact of human activities on the Earth's ecosystems. While the natural sciences have advanced their understanding of the drivers and processes of global change considerably over the last two decades, the social sciences lag behind in addressing the fundamental challenge of governance and politics in the Anthropocene.

This book attempts to close this crucial research gap, in particular with regards to the following three overarching research themes: 1) the meaning, sense-making and contestations emerging around the concept of the Anthropocene related to the social sciences; 2) the role and relevance of institutions, both formal and informal as well as international and transnational, for governing in the Anthropocene; and 3) the role and relevance of accountability and other democratic principles for governing in the Anthropocene. Drawing together a range of key thinkers in the field, this volume provides one of the first authoritative assessments of global environmental politics and governance in the Anthropocene, reflecting on how the planetary-scale crisis changes the ways in which humans respond to the challenge.

This volume will be of great interest to students and scholars of global environmental politics and governance, and sustainable development.

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Global environmental governance has been a prime concern of policymakers since the United Nations Conference on the Human Environment in 1972. Yet, despite more than 900 multilateral environmental treaties coming into force over the past 40 years and numerous public–private and private initiatives to mitigate global change, human-induced environmental degradation is reaching alarming levels. Scientists see compelling evidence that the entire Earth system now operates well outside safe boundaries and at rates that accelerate. The urgent challenge from a social science perspective is how to organize the co-evolution of societies and their surrounding environment; in other words, how to develop effective and equitable governance solutions for today's global problems.

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1 Global environmental governance in the Anthropocene

An introduction

Philipp Pattberg and Fariborz Zelli

The meaning of the Anthropocene is contested. No agreement exists concerning a number of important issues, including the exact start date and appropriate stratigraphic markers, its normative implications and political consequences. In the social sciences, various disciplines have started to explore what the Anthropocene means for studying interactions between society and the environment. Broadly speaking, there have been two reactions to proposing the Anthropocene as a new epoch in planetary history. First, a positive reception of the concept, using it as an argument to call for more and better governance of the environment. And second, a critical notion that questions the rationales and interest-configurations underlying the Anthropocene hypothesis and further scrutinizes the resulting politics of the Anthropocene and its theoretical and normative implications.

These disagreements notwithstanding, the scale and scope of environmental challenges has significantly broadened as we are collectively entering the Anthropocene as an epoch of planetary-scale changes that threaten the very processes – from a stable climate to biodiversity – on which human development is ultimately based. In addition, the causes and consequences of global environmental change are increasingly acknowledged to be highly complex, constituting a class of wicked problems (Roberts 2000).

What does this mean for global environmental governance research? Global environmental governance, both as an empirical object and as a field of study, is likely to be transformed by the Anthropocene hypothesis. We see two alternative reactions. First, the Anthropocene hypothesis is greeted with much enthusiasm as it provides a strong argument for the relevance of environmental governance research. However, rather than critically engaging with what the Anthropocene means for global governance, research practice remains largely unaltered. Second, global environmental governance research is fruitfully challenged by the Anthropocene hypothesis, leading to a reorientation of theory and practice. In other words, is the Anthropocene hypothesis a constructive, reinvigorating challenge to the study of environmental politics, or rather just an ingenious framing that gives more weight to environmental concerns? We put forward three arguments why the Anthropocene is a substantial challenge but also an opportunity for the social sciences in general

and environmental governance research in particular to reorient itself in light of fundamental transformations.

First, the Anthropocene hypothesis calls into question long-held assumptions about the human-nature dualism and has therefore been associated with the end-of-nature discourse (see Wapner 2014). At the heart of most environmental activism of the last five decades lies the conviction that nature exists independent of human agency and that (supposedly) 'natural' states of our planet, such as a stable climate system, should be protected. However, if the nature-human dualism is questioned by the advent of the Anthropocene, what does this mean for popular conceptions of conservation, wilderness and sustainability and for environmental politics more generally?

One important realization is that the terms 'human' and 'nature' are both social constructions. If humans have developed (as all other current and historic species) through a natural process of evolution to become the dominant species on earth, then we must conclude that anthropogenic global change is a result of natural processes (by which we mean generic and stable patterns of cause and effect). Is not then human domination of nature 'natural'? However, how can nature, and what is natural, be appreciated other than through human norms and values? In Wapner's words (2014, p. 39): 'Nature, then, is not a separate realm, as many environmentalists assume but, because it is always interpreted through cultural lenses, is part and parcel of human affairs.' The challenge for global environmental governance scholarship is to scrutinize human agency as part of a broader 'earth-system' perspective.

Second, the notion of the Anthropocene, and the related idea of a unified human force that exerts unprecedented influence on the earth system, challenges political science scholarship in two ways. First, it urges scholars to take a more system-theoretical perspective in order to identify the system-wide drivers of anthropogenic global change. For example, social science knowledge is indispensable in analysing how historic and current human impacts (think of the Neolithic revolution, the European expansion of the fifteenth and sixteenth century AD and the advent of the nuclear age) have been triggered by a combination of technological progress and changes in political and economic organization and governance. And second, the social sciences, and political science and governance scholarship in particular, are urgently needed as a corrective to accounts of the Anthropocene that neglect the fact that human agency is not uniform across the planet, and that contributions to the problem and the distribution of risks and opportunities are highly uneven.

Third, the Anthropocene discourse places governance research in the centre of attention, as the central question becomes: how can we steer towards socio-natural co-evolution and a resulting safe operating space (in most interpretations: for human development)? As a result, this centrality opens up opportunities for genuine inter-disciplinarity, in which the social sciences are not just a 'junior partner' of the sciences, but contribute fundamental insights into drivers, solutions and complex feedbacks between agency, unintended consequences and reactions to these.

In this introduction, we discuss the key issues and guiding questions that will structure the entire volume. First, we introduce three defining characteristics that are reflected in different theoretical, conceptual and empirical discussions of the Anthropocene: urgency, responsibility and complexity. As a second step, we introduce the three broad areas of inquiry that are covered in this volume: 1) the meaning, sense-making and contestations emerging around the concept of the Anthropocene related to governance research; 2) the role and relevance of institutions, both formal and informal as well as international and transnational, and the implications of increasing institutional complexity for governing in the Anthropocene; and 3) the role and relevance of accountability and other democratic principles for governing in the Anthropocene.

The Anthropocene hypothesis

The term Anthropocene denotes a new epoch in planetary history, one that is characterized by the unprecedented impact of human activities on the earth's ecosystems:

> Human activity is now global and is the dominant cause of most contemporary environmental change. The impacts of human activity will probably be observable in the geological stratigraphic record for millions of years into the future, which suggests that a new epoch has begun.
>
> (Lewis and Maslin 2015, p. 171)

When this new epoch in planetary history began is a matter of intense debate and is, as of 2015, also under formal review with the Anthropocene Working Group of the International Commission on Stratigraphy (ICS), the international body that defines earth's geological timescale. Geologists of the future might well remember 16 July 1945 as the start of the Anthropocene, the day the first atomic bomb was exploded at the White Sands Proving Ground, New Mexico, under the code name 'Trinity'. Debris from more than 500 above-ground nuclear tests conducted between 1945 and 1963 (when the Limited Test Ban Treaty took effect) has created a detectable layer of radioactive elements in sediments all around the planet. However, other potential start dates have been put forward. In their original proposal of the Anthropocene, Crutzen and Stoermer (2000) suggest the beginning of the Industrial Revolution as an appropriate start date. In their own words:

> To assign a more specific date to the onset of the Anthropocene seems somewhat arbitrary, but we propose the latter part of the 18th century, although we are aware that alternative proposals can be made …
>
> (Crutzen and Stoermer 2000, p. 17)

Other researchers (e.g. Ruddiman 2013) have suggested earlier start dates, highlighting the continuous influence of the human species on a planetary

scale since at least 3000 BC, when agriculture and livestock cultivation intensified and the first centralized political authorities emerged. An intermediate position between the early anthropogenic hypothesis and the nuclear hypothesis is taken by Lewis and Maslin (2015) who propose the noticeable decline in atmospheric CO_2 concentrations between 1570 and 1620 as a good marker for the start of the Anthropocene. On this account, the European expansion into the Americas resulted in the death of some 50 million indigenous people, triggering a re-growth of abandoned agricultural lands, causing a measurable decrease in CO_2 concentrations. The 'Orbis hypothesis' is interesting from a social sciences perspective, as the observed atmospheric changes coincide with the emergence of the capitalist world system (Wallerstein 1974). The meeting of European and American cultures and the related dip in atmospheric CO_2 concentrations illustrate the complex and unpredictable nature of human-nature interactions. While humans are a force of nature, this force is neither directional nor necessary.

Irrespective of ongoing debates among geologists and stratigraphers, the Anthropocene hypothesis has gained political ground as a symbolic representation of complex transformations within the earth system. As one observer notes, 'What you see here is, it's become a political statement. That's what so many people want' (cited in Monastersky 2015, p. 147). On this account, the Anthropocene hypothesis has become a rallying call for action in the light of scientific evidence that warns against global environmental change. For example, in 2001, the four international global change research programmes – the International Geosphere-Biosphere Programme (IGBP), the International Human Dimensions Programme on Global Environmental Change (IHDP), the World Climate Research Programme (WCRP) and the international biodiversity programme DIVERSITAS – jointly issued the Amsterdam Declaration on Global Change, warning that:

> Human activities are significantly influencing Earth's environment in many ways in addition to greenhouse gas emissions and climate change. Anthropogenic changes to Earth's land surface, oceans, coasts and atmosphere and to biological diversity, the water cycle and biogeochemical cycles are clearly identifiable beyond natural variability. They are equal to some of the great forces of nature in their extent and impact. Many are accelerating. Global change is real and is happening now.
>
> (Pronk 2002, p. 208)

There is in fact robust evidence that a number of 'planetary boundaries' (Rockström et al. 2009; Steffen et al. 2015) have already been crossed and urgent action in terms of governance and policy is required. Scientists have consequently argued for societal transformations that would steer away from paths that might lead to rapid and irreversible change, while ensuring sustainable livelihoods for all (Biermann et al. 2012). Suggestions reach from reforming and upgrading the

environmental agencies of the United Nations to strengthening considerations of equity and fairness in global environmental governance.

Governance challenges in the Anthropocene

The Anthropocene blurs all possible boundaries and puts human action in an ever closer connection to nature. Not only are there no spatial boundaries, also the temporal boundaries are open. Time has to tell to what extent we can change our behaviour to ever allow again for spaces untouched by human action. Possibly these days are numbered. This places an even bigger demand on governance, as the intentional and collective aspect of human action. To what extent are we to blame and could we have done better? And to what extent can we really induce change – of our societies and of the way that we affect the environment?

We see three characteristics as central in the governance discussion in the Anthropocene. None of them is new, but in their combination and intensity they set an unprecedented challenge. All contributors to this volume tried to address these challenges in their work – and could hardly avoid this, even if they had wanted to.

Urgency. The Anthropocene is marked by an unprecedented urgency to act. Its defining feature of the earth system comprehensively impacted by human actions implies that we need to be more vigilant than ever about irreversible impacts that should be avoided. This avoidance may, in many cases, imply immediate changes of course. To be clear, urgency does not consider hard targets like avoiding dangerous climate change or species loss altogether. In a system affected by human behaviour, species have been lost and extreme weather events indicate an increasing effect of climate change. The Anthropocene rather means to act as quickly as possible to achieve relative goals: mitigating climate change, losing less species, reducing the ozone depletion of the ozone layer. In addition, the notion of urgency also raises questions about irreversibility. In how far can the process that led to the Anthropocene be slowed down, stopped or even reversed?

Responsibility. Anthropocene also means a shift in responsibility. With mankind as a whole impacting nature as a whole it is more difficult than ever to assign clear-cut responsibilities for environmental damages and losses. This does not mean that such an assignment is impossible. But we need a more dynamic view of responsibility. Fault lines might run through societies and social groups and they might quickly change over time. These changes have to be mapped and assessed since they entail crucial questions of governance and social behaviour: Why do certain groups have a particular responsibility to act? Through which processes is responsibility shifted in the Anthropocene? Which actors gain responsibility, which actors lose out?

Complexity. Finally, the Anthropocene is marked by an ever-increasing material complexity. The human impact on nature goes back to an intricate sequence of intended and unintended causations and consequences, overlapping subjects and goals and the co-existence and mutual intrusion of different social and natural systems. This material complexity is partly mirrored in our efforts to

govern the Anthropocene with complex networks of institutions and processes that may be synergistic or conflictive.

Many disciplines have reacted to the Anthropocene hypothesis by re-examining their core assumptions, research objectives and normative underpinnings, including organizational studies (Hoffman and Devereaux Jennings 2015), geography (Johnson and Morehouse 2014), theology (Simmons 2014) and Asian studies (Philip 2014), to name a few examples. This volume aims to provide a similar critical reflection from the perspective of environmental governance research.

Structure of the book

The book is structured in three parts, each engaging with a different broad question about global environmental governance and the Anthropocene, and each addressing the cross-cutting challenges identified above.

Part I critically engages with the origins and conceptual issues surrounding the Anthropocene hypothesis. While it has received support from many natural scientists as a plausible descriptor of our current geological time, the reception from the social sciences has been mixed. Contributions to Part I enquire into the various interpretations of the Anthropocene concept, from celebratory and affirmative to critical and concerned, the relation between conceptual notions and political practices as well as into the concrete interests involved in arguing for the Anthropocene as a genuine characteristic of our current epoch.

Part II analyses the changing governance landscape in the Anthropocene by scrutinizing the increase and changing role of institutions, both intergovernmental and transnational, in governing the global and worldwide problems associated with the Anthropocene diagnosis. In more detail, global environmental governance research has highlighted the extent to which our responses to environmental problems have been broadened significantly to reach beyond the confines of formal, legally binding multilateral environmental agreements (MEAs). Consequently, global environmental governance in the Anthropocene poses new and challenging questions to the analyst.

Since the emergence of global environmentalism as a political topic and social movement in the 1960s and 1970s, there has been a proliferation of cross-border environmental governance arrangements. The 1990s witnessed a 'golden age' in international norm-setting where the number and type of intergovernmental environmental regimes increased substantially and states adopted well-known MEAs such as the UN Framework Convention on Climate Change and the Convention on Biological Diversity. Today, more than 1100 MEAs and an estimated 1500 bilateral agreements govern inter-governmental relations across different environmental domains forming a dense web of international public environmental law. From 2000 onwards, however, fewer MEAs have been adopted and a general 'stagnation' in international law-making has been observed (Pauwelyn et al. 2012). Instead, the new millennium saw the birth of a broad range of private and transnational institutions, public–private partnerships,

private norms and global public policy networks addressing environmental issues (Pattberg 2007). As a result, we observe the emergence of a patchwork of governance arrangements at all levels of the world political system (Biermann et al. 2009; Zelli 2011; Zelli and van Asselt 2013).

In other words, the structure of global environmental governance has changed dramatically. However, the implications of this governance transformation, both in terms of effectiveness to address the overarching challenge of sustainability and the resulting (re)configuration of political power are not well understood. Consequently, this part analyses relevance and implications of increased institutional complexity in the Anthropocene.

In Part III, authors study the principles, old and new, that can help us address these challenges, placing particular focus on the relevance of legitimacy and accountability. Recent scholarship in global environmental governance has highlighted the legitimacy challenges resulting from hyper-globalization and neo-liberal environmental policies, including the intensifying integration of non-state actors (in particular multinational corporations) in transnational rule-making. For example, Biermann and Gupta (2011) identify the process of globalization as a major driving force in the search for accountable and legitimate governance, strengthening the need for new rule-making institutions at all levels of the political system. In their words:

> the complexities of globalization have also given rise to a stronger political role for actors beyond the nation-state, from multinational corporations and transnational advocacy groups to science networks and global coalitions of municipalities.
>
> (Biermann and Gupta 2011, p. 1856)

On this account, the Anthropocene presents a unique challenge for democratic, legitimate and accountable global governance, as both drivers and solutions to global environmental change have become complex and disaggregated.

Following this broad overview, we briefly introduce the individual contributions to this volume.

In Chapter 2, Marcel Wissenburg critically engages with the problematic prescriptive notion of the Anthropocene by arguing for a comprehensive normative theory to embed the Anthropocene debate in current notions of politics. In more detail Wissenburg argues that the term 'Anthropocene' is different from other geological periods, as it denotes an artificial break in geological and climate history. Criteria for the definition of other geological periods are ethically and politically more or less neutral and give rise to few conflicts – at worst polite debates among academics. Defining the Anthropocene on the other hand, characterizing it, locating its beginning in time (see above) are all cause for heavily politicized controversies. The chapter therefore contends that a prescriptive use of the notion of an Anthropocene can only be justified, if at all, using comprehensive political theories, which would have to evolve from theories of the body politic into theories of the body ecologic.

In Chapter 3, Manuel Arias-Maldonado scrutinizes whether the Anthropocene concept denotes the end of nature. The philosophical answer to that question may determine the political answer to the phenomenon that is described by this geological-cum-historical notion. On this account, the notion of the Anthropocene might indeed confirm that nature has ended in a particular yet important way, but that such ending does not preclude further reflection about the human relation with the environment. In fact, such recognition makes possible another understanding of the task that lies ahead: a reflective re-organization of socionatural relations and a reconceptualization of sustainability that might open up potential avenues for fair and just governance in the Anthropocene.

Chapter 4 by Simon Hailwood identifies three interpretations and responses to the Anthropocene hypothesis: the first argues that the Anthropocene in fact signifies the 'end of nature' in the sense that the ubiquity and depth of human impact makes it no longer intelligible to raise concerns about human impacts on nonhuman nature. Although it is easy to see how the end of nature discourse can dovetail with the Anthropocene discourse, the chapter argues that this is a delusional reading of the situation. The second reaction is one of celebration, taking it as a sign that (aside from some significant malfunctions of the programme such as climate change) human mastery of nature for the sake of anthropocentric ends is proceeding apace and can be expected to increase indefinitely. The third interpretation is a critical one and takes the Anthropocene as a sign that we should be deeply concerned about the implications both for human interests and for nonhuman nature, and consider ways to lessen anthropogenic impacts on the latter.

Concluding the critical self-reflections on the Anthropocene concept, Chapter 5 by Simon Meisch discusses questions of distributive justice to provide an ethical foundation to the concept. Building on a normative understanding of sustainable development, the chapter asks which norms ought to steer political action and ethically inform governance within the Anthropocene. In more detail, the chapter first asks: what do we owe other contemporary and future human beings in a sustainable world? In answering this question, the paper employs two ethical approaches that base human rights on human dignity and aim to give a substantial account of human rights: Martha Nussbaum's *Capability Approach* and Alan Gewirth's *Principle of Generic Consistency*. And second, the chapter consequently engages with the question of to whom we have moral and political obligations and how these insights translate into political rules. While both might look like mere theoretical questions, they have practical impact on governing the Anthropocene.

Chapter 6 opens Part II on institutions with Oscar Widerberg's discussion of institutional complexity and fragmentation through a network perspective. The chapter starts from the assumption that the traditional manner of addressing global problems, by negotiating multilateral environmental agreements between states under the auspices of the United Nations, has been complemented by a surge in governance initiatives driven by smaller groups of countries, cities,

regions, international organizations, companies, non-governmental organizations and philanthropists. The chapter then moves on to explore how to best address this emerging heterogeneity and diversity methodologically. It suggests a network-based approach to map and measure the degree of fragmentation of global governance architectures. The approach is illustrated by a case study on global climate governance with a focus on networks involving public actors, including governments, municipalities and sub-national regions.

Chapter 7 by Christine Moser and Robert Bailis employs a polycentric perspective on institutional complexity in the Anthropocene, taking the field of sustainable biofuels governance in Europe as the empirical illustration. In more detail, the chapter starts from the assumption that little is known about the measurable effectiveness of novel modes of governance that may be more flexible to address some of the challenges in the Anthropocene. In its sustainable production of biofuels, the EU relies on hybrid governance, which can be considered such a novel governance approach: the 2009 Renewable Energy Directive provides an environmental meta-standard for sustainable biofuels production under which it accepts private certification systems as 'quasi-implementing agencies', including in non-EU countries of production. Synergies resulting from mixing public and private modes of governance are obviously assumed by policymakers. The question then arises how constructive interplay across levels is facilitated. The chapter thus interrogates the institutional design of biofuels governance as an illustration of institutional complexity in the Anthropocene.

Chapter 8 by Judith van Leeuwen explores the implications of increased accessibility of the Arctic due to climate change and the subsequent growth of maritime activities in the region, also from a polycentric governance perspective. Shipping routes become available which are economically attractive as they shorten the voyage between continents. The concern with regard to increased Arctic shipping relates both to operational pollution as well as possible accidents which would result in spillage of oil and/or cargo. In short, this chapter analyses how corporate environmental performance is influenced by both industry-specific characteristics as well as the polycentric nature of Arctic shipping governance. The chapter also examines which governance solutions, private or state-led, are ultimately preferred by actors and why this is the case.

In Chapter 9, Christine Prokopf analyses international river governance through the example of the Rhine river basin. The economic and social uses of rivers by humanity conflict with claims to protect and restore nature, i.e. the rivers' ecosystems. Institutions like international river basin organizations are founded to address the resulting governance problems. This chapter assesses the relevance of contextual factors for the development of comprehensive institutional governance strategies that include economic, social and ecological considerations. In other words, what induces institutional change in the Anthropocene? The author illustrates how, ultimately, extreme events and their perceptions trigger this change. She thereby links large-scale global change to institutional innovation. To substantiate this argument, the chapter examines

the case of the International Commission for the Protection of the Rhine (ICPR).

Part III on accountability and legitimacy in the Anthropocene starts with Chapter 10 by Robert Bartlett and Walter Baber proposing a deliberative model of transnational democratic accountability to overcome the democratic deficit of governance in the Anthropocene. The primary mechanism for holding administrative agencies accountable in democratic states has been the practice of legislative oversight. Yet, humankind's ability to disturb the ecosystem in fundamental ways creates the need for effective governance responses, which will unavoidably rely on strong administrative capacities. What is more, two of the forces of globalization that combine to create this ecological challenge (the internationalization of capital and weakening of the Westphalian nation state) also conspire to make legislative oversight of administrative action unlikely, if not impossible. Drawing primarily on an analysis of the emerging administrative practices of the European Union, the chapter describes a model of democratic accountability that does not rely on legislative oversight.

Chapter 11 by Martina Kühner analyses the role of global monitoring mechanisms as an increasingly used tool of 'holding and being accountable'. The chapter contributes to the investigation of the significance of 'soft' instruments for improving accountability for and, ultimately, compliance with environmental actions agreed upon in the context of the complex, multi-actor environment of the Anthropocene. As a case study, the chapter puts the main focus on the parties of the Kyoto Protocol (KP) within the framework of the United Nations Framework Convention on Climate Change (UNFCCC). Finally, lessons learned from this case are translated into recommendations on how to set up a monitoring framework for climate action that exhibits both flexibility and effectiveness in times of the Anthropocene.

In Chapter 12, Marija Isailovic engages with the question of legitimacy related to the engagement of actors from the global South in governing the Anthropocene. The Anthropocene concept does not fully do justice to the specific position of the global South and its actors. Research and practice of negotiations and agenda-setting in global environmental governance have shown that differences in opinions, interests and norms as well as access to resources between the global North and global South are still considerable. Against this backdrop, this chapter offers a legitimacy-based understanding of ongoing transformations of world politics from a global South perspective. Rather than providing empirical evidence-based research, the question is how shifts in authority entail changes in legitimacy and what this implies for questions of complexity, responsibility and urgency to act.

Chapter 13 by Linda Wallbott asks critical questions about how indigenous peoples have built and exerted their agency in international negotiations on forests and genetic resources. She analyses how far the narrative of the Anthropocene provides for potentials and pitfalls for indigenous peoples' claims to more effective participation in international environmental negotiations. Which new spaces open up and which new fault lines emerge? The Anthropocene aims to capture the substantial impact of human activities on the earth system.

Yet, often it comes with a Western, anthropocentric bias – and also with some negative normative imprint, as it usually describes impacts such as biodiversity loss and climate change. On the other hand, the activities of indigenous peoples and local communities are often considered to contribute to the sustainability and stewardship of natural resources 'in harmony with nature'. However, a linkage between these two images is rarely drawn, neither in actual debates nor in scientific analyses.

In our concluding chapter (Zelli and Pattberg, this volume), we summarize this broad survey of global environmental governance and the Anthropocene along the three guiding concepts explored throughout the book. Finally we distil a number of important avenues for future research on global environmental governance in the Anthropocene.

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