

# Global Environmental Constitutionalism in the Anthropocene

Louis J Kotzé



• H A R T •  
PUBLISHING

OXFORD AND PORTLAND, OREGON

2016

## Hart Publishing

An imprint of Bloomsbury Publishing Plc

Hart Publishing Ltd  
Kemp House  
Chawley Park  
Cumnor Hill  
Oxford OX2 9PH  
UK

Bloomsbury Publishing Plc  
50 Bedford Square  
London  
WC1B 3DP  
UK

[www.hartpub.co.uk](http://www.hartpub.co.uk)  
[www.bloomsbury.com](http://www.bloomsbury.com)

Published in North America (US and Canada) by  
Hart Publishing  
c/o International Specialized Book Services  
920 NE 58th Avenue, Suite 300  
Portland, OR 97213-3786  
USA

[www.isbs.com](http://www.isbs.com)

**HART PUBLISHING, the Hart/Stag logo, BLOOMSBURY and the  
Diana logo are trademarks of Bloomsbury Publishing Plc**

First published 2016

© Louis J Kotzé

Louis J Kotzé has asserted his right under the Copyright, Designs and Patents Act 1988 to be identified as  
Author of this work.

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means,  
electronic or mechanical, including photocopying, recording, or any information storage or retrieval system,  
without prior permission in writing from the publishers.

While every care has been taken to ensure the accuracy of this work, no responsibility for loss or damage occasioned  
to any person acting or refraining from action as a result of any statement in it can be accepted by the authors,  
editors or publishers.

All UK Government legislation and other public sector information used in the work is Crown Copyright ©.  
All House of Lords and House of Commons information used in the work is Parliamentary Copyright ©. This  
information is reused under the terms of the Open Government Licence v3.0 (<http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3>) excepted where otherwise stated.

All Eur-lex materials used in the work is © European Union,  
<http://eur-lex.europa.eu/>, 1998–2015.

### British Library Cataloguing-in-Publication Data

A catalogue record for this book is available from the British Library.

ISBN: HB: 978-1-50990-758-8  
ePDF: 978-1-50990-761-8  
ePub: 978-1-50990-759-5

### Library of Congress Cataloging-in-Publication Data

Names: Kotzé, Louis J., author.

Title: Global environmental constitutionalism in the anthropocene / Louis J Kotzé.

Description: Portland, Oregon : Hart Publishing, 2016. | Includes bibliographical  
references and index.

Identifiers: LCCN 2016019863 (print) | LCCN 2016020004 (ebook) | ISBN 9781509907588  
(hardback : alk. paper) | ISBN 9781509907595 (Epub)

Subjects: LCSH: Environmental law, International. | Climatic changes—Effect of human beings  
on. | Climatic changes—Law and legislation. | Constitutional law.

Classification: LCC K3585.5 .K68 2016 (print) | LCC K3585.5 (ebook) | DDC 344.04/6—dc23

LC record available at <https://lcn.loc.gov/2016019863>

Typeset by Compuscript Ltd, Shannon  
Printed and bound in Great Britain by  
TJ International Ltd, Padstow

# 2

---

## Law and the Anthropocene's Global Socio-Ecological Crisis

---

### I. Introduction

The world is in the midst of a global socio-ecological crisis. This much is evident from global state of the environment statistics that are well known and that have been equally well documented. Some prominent analyses include: UNEP's *Global Environmental Outlook 5*;<sup>1</sup> UNEP's *Vital Water Graphics: An Overview of the State of the World's Fresh and Marine Waters*;<sup>2</sup> the Food and Agricultural Organization's (FAO) *State of the World's Land and Water Resources for Food and Agriculture: Managing Systems at Risk*;<sup>3</sup> the Secretariat of the Convention on Biodiversity's *Global Biodiversity Outlook 3*;<sup>4</sup> the International Programme on the State of the Ocean's (IPSO) *State of the Ocean Report, 2013*;<sup>5</sup> the European Environment Agency's (EEA) *The European Environment: State and Outlook 2010*;<sup>6</sup> the Assessment Reports produced by the Intergovernmental Panel on Climate Change (IPCC);<sup>7</sup> and the many in-country state of the environment reports.<sup>8</sup>

<sup>1</sup> United Nations Environment Programme (UNEP), 'Global Environment Outlook: Environment for the Future We Want' (*GEO 5*, 2012) [www.unep.org/geo/geo5.asp](http://www.unep.org/geo/geo5.asp) 23.

<sup>2</sup> United Nations Environment Programme (UNEP), *Vital Water Graphics: An Overview of the State of the World's Fresh and Marine Waters*, 2nd edn (Nairobi, UNEP, 2008).

<sup>3</sup> Food and Agricultural Organization (FAO), *The State of the World's Land and Water Resources for Food and Agriculture: Managing Systems at Risk* (Abingdon, Earthscan, 2011).

<sup>4</sup> Secretariat of the Convention on Biodiversity, *Global Biodiversity Outlook 3* (Montreal, Secretariat of the Convention on Biodiversity, 2010).

<sup>5</sup> AD Rogers (ed), 'The Global State of the Ocean; Interactions between Stresses, Impacts and Some Potential Solutions. Synthesis Papers from the International Programme on the State of the Ocean 2011 and 2012 Workshops' (2013) 74 *Marine Pollution Bulletin* 491.

<sup>6</sup> European Environment Agency (EEA), *The European Environment: State and Outlook—Synthesis* (Luxembourg, Office for Official Publication of the European Union, 2010).

<sup>7</sup> See Intergovernmental Panel on Climate Change (IPCC), 'Assessment Reports' (2015) [www.ipcc.ch/publications\\_and\\_data/publications\\_and\\_data\\_reports.shtml#1](http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml#1).

<sup>8</sup> See, eg, Australia's at Australian Government, Department of the Environment, 'State of the Environment (SoE) Reporting' (2011) [www.environment.gov.au/topics/science-and-research/state-environment-reporting](http://www.environment.gov.au/topics/science-and-research/state-environment-reporting); and South Africa's at Republic of South Africa, Department of Environmental Affairs, 'State of the Environment' (2014) [soer.deat.gov.za/State\\_of\\_the\\_Environment.html](http://soer.deat.gov.za/State_of_the_Environment.html).

These reports collectively suggest that humans are significantly altering biogeochemical, or element cycles, such as nitrogen, phosphorus and sulphur that are fundamental to life on Earth; as well as causing unprecedented modifications of the water, energy and biological cycles.<sup>9</sup> Virtually all global environmental indicators have been rising exponentially, showing that ‘the Earth system has clearly moved outside the envelope of Holocene variability’.<sup>10</sup> These indicators suggest major deterioration in all respects, including: an increase in greenhouse gas (CO<sup>2</sup>, N<sup>2</sup>O and CH<sup>4</sup>) concentrations; rising ozone depletion; rising Northern hemisphere average surface temperature; an increase in the frequency of great floods; depletion of ocean ecosystems including fisheries; a rise in annual shrimp production as a proxy for coastal zone alteration; a rise in nitrogen with respect to coastal zone biogeochemistry; sustained loss of tropical rain forest and woodland; a rise in the amount of domesticated land; increased global biodiversity loss measured as the rate of species extinction; and expanding inter- and intra-species hierarchies and accompanying injustices.<sup>11</sup>

The extent of anthropogenic encroachments on the biosphere, as evinced by these indicators, is further exemplified in the broad terms of planetary boundaries that determine the self-regulating capacity of the Earth system (otherwise understood as biophysical thresholds). Developed by Rockström and his colleagues,<sup>12</sup> the boundary theory seeks to refocus our attention on the non-negotiable planetary preconditions that humanity needs to respect in order to avoid the risk of calamitous global environmental change. As a global environmental change threshold reference framework, planetary boundaries is signalling the fact that humanity is venturing into uncharted territory as far as the Earth system is concerned;<sup>13</sup> or an ‘unsafe operating space’ for humans in the Earth system.<sup>14</sup> A ‘safe space’ on the other hand is a value judgement based on how societies deal with risk and uncertainty and it expresses the current ‘space’ we live in that has more or less safely enveloped humanity for centuries. In terms of the boundary theory, when a boundary or biophysical threshold is crossed, humanity is entering an unsafe operating space,<sup>15</sup> which implies a risk of damaging or catastrophic loss of existing ecosystem functions or services across the biosphere.<sup>16</sup> As we are approaching and/or crossing these boundaries, we are simultaneously instigating a state shift in the Earth’s biosphere that could cause critical planetary scale transitions as a

<sup>9</sup> W Steffen et al, ‘The Anthropocene: Conceptual and Historical Perspectives’ (2011) 369 *Philosophical Transactions of the Royal Society* 842, 843.

<sup>10</sup> *ibid* 850–51.

<sup>11</sup> *ibid* 852–53.

<sup>12</sup> J Rockström et al, ‘Planetary Boundaries: Exploring the Safe Operating Space for Humanity’ (2009) 14(2) *Ecology and Society* 1.

<sup>13</sup> PJ Crutzen and EF Stoermer, ‘The “Anthropocene”’ (2000) 41 *IGBP Global Change Newsletter* 17.

<sup>14</sup> Rockström et al, ‘Planetary Boundaries’ (n 12) 1.

<sup>15</sup> Steffen et al, ‘The Anthropocene’ (n 9) 860.

<sup>16</sup> B Brook et al, ‘Does the Terrestrial Biosphere have Planetary Tipping Points?’ (2013) 28(7) *Trends in Ecology and Evolution* 1, 1.

result of threshold effects that could change life on Earth as we know it.<sup>17</sup> Of the nine planetary boundaries,<sup>18</sup> it is estimated that three have already been crossed, ie climate change, rate of biodiversity loss and the nitrogen cycle.<sup>19</sup>

While the Earth and its systems have been impacted and altered before, this is the first time in Earth's history that humans are considered to act as geological agents capable of changing Earth and its natural systems in the same way that a meteorite, for example, is. We have the potential 'to transform Earth rapidly and irreversibly into a state unknown in human experience'.<sup>20</sup> As a cognitive response to this realisation of a human-induced global socio-ecological crisis, it has recently been informally suggested that we have left the Holocene and entered a new geological epoch called the Anthropocene; or the epoch of humankind. Preparatory work is currently underway to propose the formal acceptance of the Anthropocene to the International Commission on Stratigraphy as a new epoch.<sup>21</sup>

## II. About this Chapter

This chapter will argue that the Anthropocene, whether it is formally established or not, is a powerful framework that allows us to re-interrogate our regulatory institutions, including juridical institutions, with a view to devising a different approach to mediating the human-environment interface. Consequent upon the Anthropocene's imagery of a global socio-ecological crisis, we would need an apex juridical normative regulatory approach (among other interventions) with elevated authority that is global in its reach and at once more deliberately geared towards instilling the degree of environmental care and moral responsibility that would be necessary to continue life on Earth. Subsequent chapters will argue that such an approach at the global level must, as a minimum, be anchored in constitutionalism.

In order to illustrate the influence that the Anthropocene likely will exert on how we view our regulatory institutions and to understand the responsibility framework it creates as an impetus for constructing more far-reaching juridical interventions that are cast in global constitutional terms, the discussion commences with a brief contextual background that situates the Anthropocene debate in the

<sup>17</sup> AD Barnosky et al, 'Approaching a State Shift in Earth's Biosphere' (2012) 486 *Nature* 52.

<sup>18</sup> Climate change; rate of biodiversity loss (terrestrial and marine); interference with the nitrogen and phosphorus cycles; stratospheric ozone depletion; ocean acidification; global freshwater use; change in land use; chemical pollution; and atmospheric aerosol loading.

<sup>19</sup> J Rockström et al, 'A Safe Operating Space for Humanity' (2009) 461 *Nature* 472.

<sup>20</sup> Barnosky et al, 'Approaching a State Shift' (n 17) 52. Some, however, question the theory of critical tipping points and state shifts. See, eg, Brook et al, 'Does the Terrestrial Biosphere have Planetary Tipping Points?' (n 16) 396–401.

<sup>21</sup> See Subcommission on Quaternary Stratigraphy, 'Working Group on the "Anthropocene"' (2015) [quaternary.stratigraphy.org/workinggroups/anthropocene/](http://quaternary.stratigraphy.org/workinggroups/anthropocene/), and Ch 1 of this book.

context of the Earth's geological history. The next part reflects on the controversial historical point of origin of the Anthropocene. The discussion will illustrate that pinpointing a specific Anthropocene onset date is merely auxiliary to the more important realisation that an historical account of the Anthropocene as a cognitive framework seeks to convey: the extent of biospheric human domination, the resulting global socio-ecological crisis, and the need for urgent regulatory intervention.

The next part delves deeper into the etymology of the Anthropocene, with a view to emphasising human responsibility for creating the conditions that have led to the Anthropocene's socio-ecological crisis and that give rise to human responsibility to address this crisis. The chapter concludes in the final part by interrogating the significance and consequences of the Anthropocene, as a framework, for our socio-political and legal institutions with a view to framing a justificatory basis for a more intrusive, far-reaching and deliberate global constitutional approach to environmental law and governance in later chapters.

### III. The Anthropocene and the History of Earth

Considering that the Earth is approximately an unfathomable 5 billion years old, scientists usefully divide this vast expanse of geological time into geochronological units of descending order of length termed eons,<sup>22</sup> eras,<sup>23</sup> periods<sup>24</sup> and epochs.<sup>25</sup> The division's chronological function seeks to present Earth's history 'as an ordered sequence of events, each placed in its correct relative position and allocated its proper time span',<sup>26</sup> thus providing a framework for deciphering the history of the Earth.<sup>27</sup> As far as the current formally recorded division is concerned, we live in the Phanerozoic Eon, the Cenozoic Era, the Quaternary Period and the Holocene Epoch. The Holocene Epoch or 'Recent Whole' is the latest of Quaternary interglacial phases and it denotes the relatively stable period of the past 10,000–12,000 years that has been characterised by extraordinarily good living conditions that enabled the development of modern societies in a world of

<sup>22</sup> Including Pre-Cambrian and Phanerozoic eons.

<sup>23</sup> Including the Protozoic, Archaean, Paleozoic, Mesozoic and Cenozoic eras.

<sup>24</sup> Including the Cambrian, Ordovician, Silurian, Devonian, Carboniferous: Mississippian, Carboniferous: Pennsylvanian, Permian, Triassic, Jurassic, Cretaceous, Tertiary and Quaternary periods.

<sup>25</sup> Including the Age of Invertebrates, the Age of Fishes, the Age of Amphibians, the Age of Reptiles, the Paleocene, the Eocene, the Oligocene, the Miocene, the Pliocene, the Pleistocene and the Holocene. See, for a useful tabular summary, HyperPhysics, 'Geological Time Scale' (*Department of Physics and Astronomy, Georgia State University*, date unknown) [hyperphysics.phy-astr.gsu.edu/hbase/geophys/geotime.html](http://hyperphysics.phy-astr.gsu.edu/hbase/geophys/geotime.html); and for a discussion F Fitch, S Forster and J Miller, 'Geological Time Scale' (1974) 37 *Reports on Progress in Physics* 1433.

<sup>26</sup> Fitch, Forster and Miller, 'Geological Time Scale' (n 25) 1436.

<sup>27</sup> F Gradstein and J Ogg, 'Geological Time Scale 2004—Why, How and Where Next!' (2004) 37 *Lethaia* 175, 175.

7 billion people.<sup>28</sup> To date, it is the only interglacial unit to have been officially accorded the status of an epoch.<sup>29</sup>

To formally establish the Anthropocene as the new geological epoch will require of scientists to find evidence of human-induced Earth system changes in the fossil record, such as evidence of cities and diversion of waterways, or a warming climate and radioactive traces of nuclear activities.<sup>30</sup> If accepted, the proposal will have the effect of amending formal time stratigraphic nomenclature which, from a geographic and stratigraphic point of view, will be significant considering that the keystone rationale of the Anthropocene is that humanity's (and not a volcano's or meteorite's) stratigraphic imprint would be discernible to future geologists.<sup>31</sup>

In this sense, the Anthropocene is different from any other period in geological history, since its geological agents are humans and not a 'natural' phenomenon. As well, its justification does not rest on the issue of exact equivalence to past epochs in a formal sense, but on physical and biological human-induced changes that could alter the Earth's geology.<sup>32</sup> Essentially then, a central issue surrounding the Anthropocene revolves around efforts to successfully unite human history with Earth's history: '[I]n the Anthropocene era, "men" make more than history, they make *geological* history'.<sup>33</sup>

A further novelty of its possible formal acceptance is that, instead of following the usual retrospective approach, it would be the first geochronical unit to have been proactively designated before it has ended; a consideration which is eliciting some critique because, as a general rule, geological epochs are backward looking, ie, they are named and dated when they have passed, always following prolonged observations of major changes in the fossil contents of rocks below

<sup>28</sup> The (still officially continuing) Holocene started approximately 12,000 years ago and is characterized by stable and temperate climatic and environmental conditions which have (mostly) allowed human development to flourish: E Swyngedouw, 'Whose Environment? The End of Nature, Climate Change and the Process of Post-Politicization' (2011) XIV *Ambiente & Sociedade Campinas* 69; and Rockström et al, 'A Safe Operating Space' (n 19) 472.

<sup>29</sup> J Zalasiewicz et al, 'Are we Now Living in the Anthropocene?' (2008) 18(2) *Geological Society of America Today* 4, 4.

<sup>30</sup> M Whitehead, *Environmental Transformations: A Geography of the Anthropocene*, Kindle edn (New York, Routledge, 2014) 398/5354.

<sup>31</sup> W Autin and L Holbrook, 'Is the Anthropocene an Issue of Stratigraphy or Pop Culture?' (2012) July *GSA Today* 60; E Crist, 'On the Poverty of our Nomenclature' (2013) 3 *Environmental Humanities* 129, 130. Waters et al explain that stratigraphy deals with the classification of geological time (geochronology) and material time-rock units (chronostratigraphy), which has historically defined geological units based upon significant, but temporally distant, events that are usually associated with major changes in the fossil contents of rocks and thus the temporal distribution of life forms. Scientists will probably use the appearance and increased abundance of anthropogenic deposits; biotic turnover; and geochemical evidence as potential stratigraphical tools and techniques that may be used to define the base of the Anthropocene: CN Waters et al, 'A Stratigraphical Basis for the Anthropocene' (2014) 395 *Geological Society of London Special Publications* 1, 1.

<sup>32</sup> F Oldfield et al, 'The Anthropocene Review: Its Significance, Implications and the Rationale for a New Transdisciplinary Journal' (2014) 1 *The Anthropocene Review* 1, 2.

<sup>33</sup> E Löwbrand, J Striiple and B Wiman, 'Earth System Governmentality: Reflections on Science in the Anthropocene' (2009) 19 *Global Environmental Change* 7, 11.

and above a particular horizon.<sup>34</sup> Thus in terms of normal geological convention, the Anthropocene (or the human impact) would be visible millions of years from now in the layer of sediment indicating the present time in our history, reflecting a distinct epoch marked by human-driven geological change.<sup>35</sup>

The Anthropocene, however, has already been informally named and dated well before the nature of the signature of this proposed stratigraphical unit has even been determined. One optimistic view on this dichotomy is that '[f]or the first time in geological history, humanity has been able to observe and be part of the processes that potentially may signal ... a change from the preceding to succeeding epoch'.<sup>36</sup> Another is that proactive designation of the Anthropocene invites a temporal dimension to the global regulatory debate on environmental change: the Anthropocene 'is as much about the future as the past',<sup>37</sup> thus opening up a wider range of policy options to the regulatory community that are directed at future interventions. At the same time, the temporal dimension that the Anthropocene introduces challenges us to think more critically about our existing regulatory interventions and forces us to ask whether they are capable of responding to the events that are causing the Anthropocene.<sup>38</sup> If they are found lacking, we might still have the opportunity to change them accordingly.

Others argue more critically that any attempts at formal classification of the Anthropocene now are essentially useless 'because future generations will have plenty of information to classify and characterize [the current epoch] with great precision',<sup>39</sup> because it is and should be their task according to the conventions of stratigraphy. As Waters et al in a recent survey suggest:

if there is a consensus that the main environmental changes lie ahead of us, it might be concluded that it is too early to judge the position of the base of the Anthropocene, even if there is sufficient material evidence that the stratigraphic change to date is significant.<sup>40</sup>

## IV. Turning Rock into Air: A Brief History of the Anthropocene

Whether or not to formally designate the Anthropocene is not the only controversial issue. There seems to be considerable disagreement on assigning a specific date to the onset of the Anthropocene, with the many proposals that are advanced

<sup>34</sup> Waters et al, 'Stratigraphical Basis' (n 31) 1.

<sup>35</sup> S Baker, 'Adaptive Law in the Anthropocene' (2015) 90 *Chicago-Kent Law Review* 563, 566.

<sup>36</sup> Waters et al (n 31) 1–2.

<sup>37</sup> K Scott, 'International Law in the Anthropocene: Responding to the Geoengineering Challenge' (2013) 34 *Michigan Journal of International Law* 309, 316.

<sup>38</sup> *ibid.*

<sup>39</sup> G Visconti, 'Anthropocene: Another Academic Invention?' (2014) 25 *Rendiconti Lincei* 381, 387.

<sup>40</sup> Waters et al (n 31) 15.

either being culturally constructed in a subjective sense, or based on more objective scientific evidence emerging from a specific scientific field. Generally though, scientists seem to follow either the 'pre-industrial' or the 'industrial' approach. Some of the more prominent views that are situated in these two approaches are explored below.

On the basis of a rise in CO<sup>2</sup> and methane gasses as a result of land clearing, fires and rice cultivation, Ruddiman follows a pre-industrial approach and estimates the onset of a human-dominated geological epoch to be 6,000 years ago when humans abandoned hunter-gatherer lifestyles and embarked on the domestication of crops and livestock (the Neolithic revolution).<sup>41</sup> He postulates that these early agricultural practices have led to a situation where pre-industrial temperature changes caused by humans could even be more than double the anthropogenic warming caused by the more recent industrial era.<sup>42</sup>

Considering that the measure of onset is coupled to human intervention in the Earth system, Glikson argues that the Anthropocene has commenced even earlier during the mid-Pleistocene when humans developed the unique ability to ignite the carbon-rich biosphere with fire, which in turn considerably magnified entropy.<sup>43</sup> As a 'fire species', humans could modify extensive land surfaces of Earth with consequences for the composition of the atmosphere, a process that culminated in the Anthropocene and possibly a sixth mass extinction of species in the near future. (Although some indicate that a mass extinction in itself would not in stratigraphic terms necessarily be sufficient to label the Anthropocene as a formal geological epoch).<sup>44</sup> Notably though, while humans have not been around during the earlier five mass extinctions, it is humans, so the argument goes, that are now instigating a possible sixth mass extinction, not through natural processes that influence the Earth and all life on it, but through 'unnatural' processes such as genetic modification, the introduction of toxins not naturally occurring in the Earth system, and through the physical alteration of soil, water and air. The mastery of fire by humans also resulted in an increase in brain size and a drop in tooth size as it became easier to eat tough meat and as the brain obtained much more nourishment through increased protein intake,<sup>45</sup> allowing humans to become cleverer, leaner, taller and more dominating as a species.<sup>46</sup> The argument accordingly suggests that it was the discovery of fire and subsequent

<sup>41</sup> W Ruddiman, 'Orbital Insolation, Ice Volume, and Greenhouse Gases' (2003) 22 *Quaternary Science Reviews* 1597; W Ruddiman, 'The Anthropocene' (2013) *Annual Review of Earth and Planetary Sciences* 45.

<sup>42</sup> Ruddiman, 'The Anthropocene' (n 41) 65.

<sup>43</sup> AY Glikson, *Evolution of the Atmosphere, Fire and the Anthropocene Climate Event Horizon* (Heidelberg, Springer Verlag, 2014) 75–88.

<sup>44</sup> Waters et al (n 31) 16.

<sup>45</sup> The human brain nearly tripled in size up to an average volume of about 1,300 cm<sup>3</sup>, and gave humans the largest ratio between brain and body size of any species: W Steffen, PJ Crutzen and J McNeill, 'The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature?' (2007) 36 *Ambio* 614, 614.

<sup>46</sup> Glikson, *Evolution of the Atmosphere* (n 43) 82.

evolutionary developments that provided humans their dominating capabilities and allowed them to manipulate the Earth's systems in major ways from generation to generation in cataclysmic fashion.<sup>47</sup> Also in line with the pre-industrial view, Oldfield et al choose to designate more generally the period running throughout the Holocene, and increasingly since the transition to farming,<sup>48</sup> as the most likely onset date when human activities began to move crucial aspects of Earth system functions well outside the preceding envelope of variability.<sup>49</sup>

Following the mainstream industrial approach, Crutzen and Stoermer admit to the arbitrary nature of their own choice when they indicate the onset date of the Anthropocene to be the latter part of the eighteenth century with the start of the Industrial Revolution (and more specifically the invention of the steam engine in 1784 and later the internal combustion engine).<sup>50</sup> In a subsequent publication, Steffen, McNeill and Crutzen argue that pre-industrial humans did not possess the technological or organisational capability to match or dominate the great forces of nature.<sup>51</sup> It was only with the expansion in the use of fossil fuels as a result of the Industrial Revolution that the human imprint became a central marker for Earth system changes, with perhaps the single simplest indicator to track the progression of the Anthropocene being the tremendous spike in atmospheric CO<sup>2</sup> concentrations since the Industrial Revolution. The authors argue that as part of a three-staged historical continuum, the Industrial Era (1800–1945) (first stage) was followed by the Great Acceleration (1945–onwards) (second stage); a period that saw the global population doubling in size, the global economy increasing by more than 15-fold, as well as increased urbanisation and motorisation that led to unprecedented spikes in carbon dioxide, a rise in inorganic nitrogen in the oceans, and increases in atmospheric sulphur dioxide concentrations.<sup>52</sup> They believe that we are possibly now entering the third stage of the Anthropocene's development continuum, namely that of 'Earth System Stewardship' (more generally known as environmentalism). This stage is mainly characterised by growing awareness of human impacts on the Earth system and a desire to more fully respond to anthropogenic modifications of this system, while assuming greater responsibility and modicum of environmental care.

Clearly, determining a specific onset date for the Anthropocene has become a considerable academic enterprise in itself and debates around this issue are

<sup>47</sup> PJ Crutzen, 'The Anthropocene: Geology by Mankind' in HG Brauch et al (eds), *Coping with Global Environmental Change, Disasters and Security: Threats, Challenges, Vulnerabilities and Risks* (Heidelberg, Springer Verlag, 2011) 3.

<sup>48</sup> Although some question the hypothesis that the advent of agriculture thousands of years ago changed the course of glacial-interglacial dynamics: Steffen, Crutzen and McNeill, 'The Anthropocene' (n 45) 615.

<sup>49</sup> Oldfield et al, 'The Anthropocene Review' (n 32) 1.

<sup>50</sup> Crutzen and Stoermer, 'The "Anthropocene"' (n 13) 17. Gear, however, points out that this argument seems counter-intuitive, since it is odd to imagine that the invention of the steam engine would coincide precisely with its later effects: A Gear, 'Deconstructing Anthropos: A Critical Legal Reflection on "Anthropocentric" Law and Anthropocene "Humanity"' (2015) *Law and Critique* 1, 3.

<sup>51</sup> Steffen, Crutzen and McNeill (n 45) 614–21.

<sup>52</sup> *ibid* 617.

controversial, varied and likely to continue. It seems more probable, however, that the majority of commentators will follow the industrial approach, especially considering that we have significantly more first-hand knowledge and evidence about the causes and the consequences of global change for the period since the Industrial Revolution: after all, this period has been part of our living reality whereas the pre-industrial era has not been. Moreover, the pre-industrial approach could have the effect of entirely eliminating the Holocene, which has for long been the official geological designation of the past 10,000–12,000 years; because the Holocene is thought to be divided into three stages (early, mid and late), it does not leave the option of officially considering the Anthropocene as a Late Holocene stage.<sup>53</sup> Such an extension into the Holocene by the Anthropocene, as it were, could affect the Holocene's continued scientific legitimacy as a formal geological epoch; an undesirable scientific delegitimising eventuality which could put into question much of the scientific work that has been done on the Holocene.

For present purposes, it is probably less important to side with either of these opposing views (industrial vis-à-vis pre-industrial). Instead, the Anthropocene onset debate serves a useful purpose for this study to the extent that it accentuates human domination over the biosphere, while simultaneously beckoning a contemplation of how we should counter the countless infringements caused by anthropogenic impacts. Many of the landscapes upon which global change is occurring have a long history of human interference and modification,<sup>54</sup> resulting in complete human mastery over the biosphere with humans altering, shaping and reshaping the biosphere according to their own needs.<sup>55</sup> For example, humans' ability to alter natural conditions and to create their own controlled and controllable environments specifically suited to their needs, is clearly exemplified by the city and increased urbanisation, which has become a 'defining spatial characteristic'<sup>56</sup> of the Anthropocene.

This tendency of humans to dominate the living order is properly captured by the Anthropocene's imagery of human impacts that stretch as far back as the emergence of humans on Earth; impacts that have exponentially increased since the Industrial Revolution. Its imagery also projects a disembodied and dislocated Cartesian epistemic human mastery over the biosphere that atomistically prioritises the individual as the sole concern for all implications of social life,<sup>57</sup> including the many 'self-certainties of western capitalism and the epistemologies of mastery it underwrites' that 'condones multiple intolerable exploitations'.<sup>58</sup> Accepting that

<sup>53</sup> Waters et al (n 31) 3.

<sup>54</sup> Oldfield et al (n 32) 4.

<sup>55</sup> P Pattberg, 'Conquest, Domination and Control: Europe's Mastery of Nature in Historic Perspective' (2007) 14 *Journal of Political Ecology* 1, 1.

<sup>56</sup> Whitehead, *Environmental Transformations* (n 30) 2666/5354.

<sup>57</sup> A Grear, 'Human Bodies in Material Space: Lived Realities, Eco-crisis and the Search for Transformation' (2013) 4 *Journal of Human Rights and the Environment* 111, 113.

<sup>58</sup> L Code, *Ecological Thinking: The Politics of Epistemic Location* (Oxford, Oxford University Press, 2006) 4, 7.

the many inequalities and injustices in human relations are simultaneously reproduced in our relations with the environment,<sup>59</sup> these are exploitations of humans by humans, and of voiceless non-human, but living, entities by humans; a victorious human endeavour of conquest with all too predictable results in hindsight: 'history is written by the victors, and how much truer for the history of the planet's conquest against which no nonhuman can direct a flood of grievances that might strike a humbling note into the human soul'.<sup>60</sup> This imagery of human domination, exploitation and destruction that the Anthropocene seeks to project, inevitably leads to the realisation that '[t]he enslavement of nature and the subsequent enslavement of humans by other humans has led to a global state of affairs that is neither morally nor practically sustainable'.<sup>61</sup>

As well, the onset debate illustrates that the Anthropocene is not only about humans dominating and interfering with the biosphere; it is also about humans having become and becoming an integral part of the biosphere where the parochial separation between humans and 'nature' is becoming increasingly blurred as a result:

Humanity is part of the flows of energy and materials within the biosphere, but we are adding novel factors into the arrangement of these flows; new chemicals, habitat changes, atmospheric change by literally turning rocks into air in the processes of carbon fuel combustion.<sup>62</sup>

In this way, the Anthropocene is responsible for the steady emergence of a new epistemic constellation where 'it is impossible to understand nature without society, and society without nature'.<sup>63</sup> Within this new understanding, humans have become more than removed observers of 'nature' as pristine landscapes and/or as resources to which we are entitled. In the Anthropocene we have instead become major contributors to and actors in biophysical and biochemical processes; a consideration that will likely have profound implications for how we view our position and responsibilities in the biosphere, how we view our regulatory institutions through which we legitimise and enable our self-proclaimed entitlements to nature, and how we evaluate and design regulatory interventions to deal with increasingly unstable and unpredictable biospherical conditions.<sup>64</sup>

The new epistemological space of the Anthropocene thus rejects an objectified, removed and simplified external nature that people are unable to understand or to

<sup>59</sup> R Baghel, 'Knowledge, Power and the Environment: Epistemologies of the Anthropocene' (2012) 3(1) *Transcience* 1, 3.

<sup>60</sup> Crist, 'On the Poverty of our Nomenclature' (n 31) 133.

<sup>61</sup> Pattberg, 'Conquest, Domination and Control' (n 55) 7.

<sup>62</sup> S Dalby, 'Anthropocene Ethics: Rethinking "The Political" after Environment' (Paper presented at the 45th International Studies Annual Convention, Montreal, Canada, 17–20 March 2004) [www.yumpu.com/en/document/view/42485216/anthropocene-ethics-rethinking-the-political-after-environment/3](http://www.yumpu.com/en/document/view/42485216/anthropocene-ethics-rethinking-the-political-after-environment/3).

<sup>63</sup> E Becker, 'Socio-ecological Systems as Epistemic Objects' (Institut für sozial-ökologische Forschung, 2010) [www.isoe.de/ftp/publikationen/eb\\_soccesystem2010.pdf](http://www.isoe.de/ftp/publikationen/eb_soccesystem2010.pdf).

<sup>64</sup> M Hill, *Climate Change and Water Governance: Adaptive Capacity in Chile and Switzerland* (Dordrecht, Springer, 2013) 4.

care for, but able to exploit without limits.<sup>65</sup> It invites instead a more enlightened view of human-nature relations that requires a deliberate effort to shift the parochial human-dominant exploitative focus of our regulatory institutions to a more inclusive ecological one which does not only include responsibility for the self, but also for all other non-human entities. Bosselmann illustratively puts it thus:

In the light of the fact that no species can survive without respecting its ecological conditions, an anthropocentric perception of human freedom [manifesting here as nature removed from humans] appears as an absurdity. It is the saw to cut the branch we are sitting on.<sup>66</sup>

At the same time, the Anthropocene's new constellation of greater responsibility challenges the notion of inter and intra-species hierarchies, working to transcend the divide that has for so long placed humans and nature on separate, yet interrelated, sides of a duality.<sup>67</sup> Such hierarchies are gradually disappearing as a result of a steady ontological shift that is being driven by the Anthropocene imagery, where nature and humans are seen to have become one in the Anthropocene:

Nature as we know it is a concept that belongs to the past. No longer a force separate from and ambivalent to human activity, nature is not an obstacle nor a harmonious other. Humanity forms nature. Humanity and nature are one, embedded from within the recent geological record. This is the core premise of the Anthropocene thesis, heralding a potentially far-reaching paradigm shift in the natural sciences as well as providing new models for thinking about culture, politics, and everyday interactions.<sup>68</sup>

Or as Latour puts it:

the Earth is no longer 'objective'; it cannot be put at a distance and emptied of all Its humans. Human action is visible everywhere—in the construction of knowledge *as well as* in the production of the phenomena those sciences are called to register.<sup>69</sup>

For the sake of our regulatory interventions that focus on the human-environment interface, the conventional human-nature dualism 'no longer provides an adequate basis for assessing the functional dimensions of human-environment interactions.'<sup>70</sup>

In sum, the overall utility and discursive importance of the Anthropocene and its history of human domination is that it points to our and the biosphere's vulnerability by allowing us to see that multiple forms of vulnerability are constructed, aggravated and perpetuated by human actions and by the power we exert over the

<sup>65</sup> On external and universal ideologies of nature, see N Smith, *Uneven Development: Nature, Capital and the Production of Space* (New York, Blackwell, 1984).

<sup>66</sup> K Bosselmann, 'In Search of Global Law: The Significance of the Earth Charter' (2004) 8 *Worldviews* 62, 63.

<sup>67</sup> Grear, 'Deconstructing Anthropos' (n 50) 1.

<sup>68</sup> Haus der Kulturen der Welt, 'The Anthropocene Project: An Opening' (10–13 January 2013) [www.hkw.de/media/en/texte/pdf/2013\\_2/programm\\_6/anthropozaen/booklet\\_anthropozaen\\_eine\\_eroeffnung.pdf](http://www.hkw.de/media/en/texte/pdf/2013_2/programm_6/anthropozaen/booklet_anthropozaen_eine_eroeffnung.pdf).

<sup>69</sup> B Latour, 'Agency at the Time of the Anthropocene' (2014) 45 *New Literary History* 1, 5.

<sup>70</sup> Oldfield et al (n 32) 4.

vulnerable biosphere and its many and varied components.<sup>71</sup> As vulnerable, but powerful, entities that live in an increasingly unpredictable geological epoch and as part of ‘nature’, we cannot afford to cross the planetary boundaries that are now looming closer than ever before, for these boundaries have the quality of both finitude and finality.<sup>72</sup> More pertinently, the Anthropocene’s imagery of human mastery, vulnerability and Earth system decay redirects attention away from hitherto overpowering human demands on nature, to human responsibilities and duties to address the global socio-ecological crisis. As subsequent chapters in this book argue, these responsibilities and duties could be expressed, among others, through the idea of constitutionalism.

## V. The Anthropocene: What Lies Behind a Word?

In her musings on the Anthropocene’s etymology, Moore warns: ‘we should use words cautiously. Words are powerful, magical, impossible to control. With a single misguided phrase, they can move a concept from one world into another, altering forever the landscape of our thinking.’<sup>73</sup> Traces of such occurrences are evident in the climate governance arena where, as Scott indicates, phrases such as ‘climate catastrophe’, ‘securitization of climate change’ and the ‘declaration of war on climate change’ have been used to bring climate change under more direct attention of world leaders (albeit not nearly sufficient to bring about any drastic regulatory changes yet).<sup>74</sup>

In addition to the foregoing insights surrounding the Anthropocene’s onset date, what does the word ‘Anthropocene’ mean and is it capable of ‘altering forever the landscape of our thinking’ about human-environment relations? Because the Anthropocene has not been formally accepted as a geological epoch, it has no formal universally endorsed definition. This is perhaps because no deliberate paradigm-shifting scientific discovery or moment accompanied its creation; quite the opposite. An ecologist, Eugene Stoermer, has used the term informally since the 1980s, and in 1995 he sent an email to colleagues describing terrestrial and

<sup>71</sup> A Grear, ‘The Vulnerable Living Order: Human Rights and the Environment in a Critical and Philosophical Perspective’ (2011) 2 *Journal of Human Rights and the Environment* 23; E Grant, LJ Kotzé and K Morrow, ‘Human Rights and the Environment: In Search of a New Relationship. Synergies and Common Themes’ (2013) 3 *Oñati Socio-legal Series* 953. Hans Jonas refers in this context to the critical vulnerability (*kritische Verletzlichkeit*) of a nature that has been subjected by humans: H Jonas, *Das Prinzip Verantwortung: Versuch einer Ethik für die technologische Zivilisation* (Frankfurt am Mein, Suhrkamp, 1988) 26–27.

<sup>72</sup> LJ Kotzé, ‘Crossing Boundaries: Water and the Rights Paradigm’ (2014) 5 *Journal of Human Rights and the Environment* 1, 1–4.

<sup>73</sup> K Moore, ‘Anthropocene is the Wrong Word’ (*Earth Island Journal*, Spring 2013) [www.earthisland.org/journal/index.php/eij/article/anthropocene\\_is\\_the\\_wrong\\_word/](http://www.earthisland.org/journal/index.php/eij/article/anthropocene_is_the_wrong_word/).

<sup>74</sup> Scott, ‘International Law in the Anthropocene’ (n 37) 312.

neritic oceanic production during ‘the Anthropocene’.<sup>75</sup> Since then, popular use of the term caught on and in 2000 Stoermer and Crutzen published a more formal scientific account of the Anthropocene in the *Global Change Newsletter*.<sup>76</sup>

While a formal and universally endorsed definition is lacking, some commentators have ventured their own descriptions of the Anthropocene. For example, Steffen, Crutzen and McNeill state:

The term *Anthropocene* ... suggests that the Earth has now left its natural geological epoch, the present interglacial state called the Holocene. Human activities have become so pervasive and profound that they rival the great forces of Nature and are pushing the Earth into planetary *terra incognita*. The Earth is rapidly moving into a less biologically diverse, less forested, much warmer, and probably wetter and stormier state.<sup>77</sup>

In a later paper, the authors (with Grinevald) propose:

The term Anthropocene suggests: (i) that the Earth is now moving out of its current geological epoch, called the Holocene and (ii) that human activity is largely responsible for this exit from the Holocene, that is, that humankind has become a global geological force in its own right.<sup>78</sup>

For Lövbrand, Stripple and Wiman, it is the human imprint that is now ‘according to the Anthropocene logic, so pervasive and profound in its consequences that it is influencing the very dynamics and functioning of Earth itself’;<sup>79</sup> an idea which is reiterated by Brauch, Dalby and Spring when they state that we are ‘shaping the earth, literally producing nature, as a consequence of our industrial metabolism, a metabolism that has very uneven geographical results as development transforms our political spaces and natural circumstances simultaneously’.<sup>80</sup>

Globaia, in its cartography of the Anthropocene, defines it thus:

A period marked by a regime change in the activity of industrial societies which began at the turn of the nineteenth century and which has caused global disruptions in the Earth System on a scale unprecedented in human history [including]: climate change, biodiversity loss, pollution of the sea, land and air, resources depredation, land cover denudation, radical transformation of the ecumene, among others.<sup>81</sup>

In a paper exploring the history of scientific historiography, Robin and Steffen propose:

The Anthropocene defines the momentous and historical change in circumstances whereby the biophysical systems of the world are now no longer independent of the

<sup>75</sup> J Syvitski, ‘Anthropocene: An Epoch of our Making’ (2012) 78 *Global Change* 11.

<sup>76</sup> Crutzen and Stoermer (n 13) 17.

<sup>77</sup> Steffen, Crutzen and McNeill (n 45) 614.

<sup>78</sup> Steffen et al (n 9) 843.

<sup>79</sup> Lövbrand, Stripple and Wiman, ‘Earth System Governmentality’ (n 33) 10.

<sup>80</sup> HG Brauch, S Dalby and Ü Oswald Spring, ‘Political Geoecology for the Anthropocene’ in HG Brauch et al (eds), *Coping with Global Environmental Change, Disasters and Security Threats, Challenges, Vulnerabilities and Risks* (Berlin, Springer, 2011) 1470.

<sup>81</sup> Globaia, ‘A Cartography of the Anthropocene: Mens Agitat Molem’ (2013) [globaia.org/portfolio/cartography-of-the-anthropocene/](http://globaia.org/portfolio/cartography-of-the-anthropocene/).

actions of people. It is the Epoch dominated by humans. People have officially and geologically changed the course of nature at a global scale.<sup>82</sup>

For me, Dalby captures most eloquently the essence of the Anthropocene when he states:

we now inhabit a planet that has been remade by human activities and the technologies that power our social systems ... The need for a new term comes not from a single historical innovation or ecological change but from the recognition that the total amount of human activity in all its diversity is now on such a scale we are living in a qualitatively new era ... The larger context of our collective being isn't a matter of fate or divine design; increasingly we are constructing the context for our lives at the very biggest of scales that, at least so far, matter to humanity, that of the planetary biosphere itself.<sup>83</sup>

Yet, even before these descriptions have emerged, a variety of other terms were used to convey something similar to what the Anthropocene seeks to impart today. For example, the term Anthropozoic ('Anthropo' meaning 'human' and 'zoic' meaning 'life') was used in the 1870s by Stoppani to describe the increasing human impact on the Earth and its systems.<sup>84</sup> The early-1900s saw the emergence of terms and phrases such as 'anthroposphere'; 'anthropogenic transformation of the Earth system';<sup>85</sup> and Vernadsky's 'noosphere' (indicating the emergence of human cognition where people began to create resources through the transmutation of elements that also transform the biosphere).<sup>86</sup> In the 1970s, Lovelock suggested the Gaia hypothesis; a global conceptual framework for human influence on biogeochemical cycles that is concerned with 'the evolution of a tightly coupled system whose constituents are the biota and their material environment, which comprises the atmosphere, the oceans, and the surface rocks'.<sup>87</sup> More recently in 1992, in reference to a 'post-Holocene' period that he describes as a 'geological age of our own making', Revkin proposed the term 'Anthrocene'.<sup>88</sup>

How do the foregoing terms differ from the Anthropocene, and is there a reason why the Anthropocene stuck instead of any one of the other terms? Steffen et al propose that these related notions are not equivalent to the concept of the Anthropocene because the Anthropocene is the only term that accurately captures the more recent 'Great Acceleration' of human impacts since post-Second World

<sup>82</sup> L Robin and W Steffen, 'History for the Anthropocene' (2007) 5 *History Compass* 1694, 1699.

<sup>83</sup> Dalby, 'Anthropocene Ethics' (n 62).

<sup>84</sup> Steffen et al (n 9) 843–44.

<sup>85</sup> *ibid* 844.

<sup>86</sup> V Vernadsky, 'The Transition from the Biosphere to the Noosphere: Excerpts from Scientific Thought as a Planetary Phenomenon 1938' (2012) Summer-Spring *21st Century* 10 (trans W Jones). See also for a discussion B Guillaume, 'Vernadsky's Philosophical Legacy: A Perspective from the Anthropocene' (2014) *The Anthropocene Review* 1.

<sup>87</sup> JE Lovelock, 'Geophysiology, the Science of Gaia' (1989) 27 *Reviews of Geophysics* 215; JE Lovelock, 'Hands up for the Gaia Hypothesis' (1990) 344 *Nature* 100.

<sup>88</sup> A Revkin, *Global Warming: Understanding the Forecast* (New York, Abbeville Press, 1992) 55. See also Waters et al (n 31) 17.

War industrialisation, technological and scientific development, the nuclear arms race, the population explosion and economic expansion.<sup>89</sup> They seem to argue that the Anthropocene conceptually encompasses the same histories of human domination as the other concepts do, but that the Anthropocene significantly differs to the extent that it also includes within its conceptual remit a more accentuated reference to the recent unprecedented spike in the biospherical human imprint. Such an interpretation is perhaps slightly one-sided, since these scientists follow the view that the roots of the Anthropocene lie in the Industrial Revolution and not in some earlier period such as the mid-Pleistocene that significantly pre-dates the Industrial Revolution.<sup>90</sup> In my view there are neither any convincing indications that the term Anthropocene is more appropriate or should be more meaningful or descriptive than the other terms; nor that it carries any greater explanatory or conceptual gravitas that should emphasise human domination more than any of the other terms. If it is the Great Acceleration that justifies the use of the 'Anthropocene' for those who follow the 'industrial view', then there is equal justification for all the other terms that are not contingent on the Great Acceleration factor. Terms and their meanings are what people ascribe to them and it depends on how people interpret them in accordance with their own kaleidoscopic scientific orientations, cultural and ethical stances and the purpose for which they propagate scientific terms.

Therefore, the choice of the term Anthropocene and its ensuing popularity rather seem to be balancing on the tip of arbitrariness. The reasons for its terminological legitimacy, and ultimately discursive endurance, remain speculative. The fact that 'Anthropocene' prevailed and not 'Anthrocene', for example, could be merely accidental, or an occasion of timing where the term and its apocalyptic imagery that is reminiscent of end-of-the-world movies, became embedded in the imagination of a despondent scientific audience that has been eagerly awaiting a novel common conceptual paradigm to better understand and express the severity of global socio-ecological change. To be sure, the fact that the term Anthropocene has developed and has taken root in the spectacular way it has, probably emphasises our desperate attempts to understand the global socio-ecological crisis we are witnessing today and to collectively express, through one term, the surrounding epistemological challenges in this respect.

After all, it does not take much for a word, an idea or a concept to become enduringly engrained in popular and scientific imagination, and ultimately in legal and political reality. A United Nations report could suffice, as the Brundtland Commission's report *Our Common Future* of 1987 illustrates with respect to the term 'sustainable development'.<sup>91</sup> While not suggesting they are in any way similar

<sup>89</sup> Steffen et al (n 9) 845.

<sup>90</sup> See the discussion above.

<sup>91</sup> Brundtland GO, 'Report of the World Commission on Environment and Development: Our Common Future' (1987) [www.un-documents.net/our-common-future.pdf](http://www.un-documents.net/our-common-future.pdf).

in terms of their meaning or purpose,<sup>92</sup> the Anthropocene's popular rise as a term of art in the global legal and political domain is to some extent analogous to the rise of sustainable development as a framework. Since its creation in the 1970s, sustainable development has become the worldwide dominating leitmotif for shaping international environmental and developmental relations, and it has developed at the international, regional and national levels into 'a crucial political precept that governs virtually every sphere of activity aimed at balancing and integrating economic, social and environmental policies.'<sup>93</sup> Despite its many shortcomings, as a concept, sustainable development introduced a new way of thinking about the human-environment interface that was at least novel, if not paradigm shifting, at the time.<sup>94</sup> Considering that it is increasingly permeating scientific discourse and the popular media (if not yet policy and legal processes in the way that sustainable development does), the Anthropocene could very well walk the same route in terms of its terminological development trajectory.

A more constructive, if not entirely argumentatively satisfying etymological approach with respect to the Anthropocene, is arguably one which simply accepts that while the foregoing terms differ to a greater or lesser extent in their disciplinary origins, their scope and their depth, they do share a common denominator by collectively imparting the idea of an epoch of the natural history of the Earth that is being driven by humans. Etymologically, Anthropocene derives from the Greek 'anthropo' and 'cene', or 'kainos', which mean 'human' and 'new'/'recent' respectively.<sup>95</sup> In the geo-ecological context this denotes a new period when humans dominate the geological epoch by acting as major driving forces in modifying the biosphere with humans being very much aware of their unprecedented

<sup>92</sup> M Mahony, 'The Anthropocene: Reflections on a Concept—Part 1' (*Topograph: Contested Landscapes of Knowing: Blogspot*, 12 April 2013) [thetopograph.blogspot.de/search?updated-min=2013-01-01T00:00:00-08:00&updated-max=2014-01-01T00:00:00-08:00&max-results=14](http://thetopograph.blogspot.de/search?updated-min=2013-01-01T00:00:00-08:00&updated-max=2014-01-01T00:00:00-08:00&max-results=14).

<sup>93</sup> U Beyerlin and T Marauhn, *International Environmental Law* (Oxford, Hart Publishing, 2011) 76.

<sup>94</sup> An idea that was confirmed by the International Court of Justice in the *Gabčíkovo-Nagymaros* case:

Throughout the ages, mankind has, for economic and other reasons, constantly interfered with nature. In the past this was often done without consideration of the effects upon the environment. Owing to new scientific insights and to a growing awareness of the risks for mankind—for present and future generations—of pursuit of such interventions at an unconsidered and unabated pace, new norms and standards have been developed and set forth in a great number of instruments during the last two decades. Such new norms have to be taken into consideration, and such new standards given proper weight, not only when States contemplate new activities, but also when continuing with activities begun in the past. This need to reconcile economic development with protection of the environment is aptly expressed in the concept of sustainable development.

*Gabčíkovo-Nagymaros* (1997) ICJ Reports 78 para 140.

<sup>95</sup> RA Slaughter, 'Welcome to the Anthropocene' (2012) 44 *Futures* 119; Dictionary.com, 'Anthropocene' (2016) [dictionary.reference.com/browse/anthropocene](http://dictionary.reference.com/browse/anthropocene).

impact on the Earth and its systems;<sup>96</sup> a central idea that is suggested by all other related terms. Collectively and from a descriptive point of view for the purpose of establishing a minimum definitional base line, all Anthropocene descriptions suggest the following: as a result of observable Earth systems changes such as climate change and biodiversity loss, informally and unofficially, there is a Holocene-Anthropocene boundary separating a more harmonious reality (Holocene) from an increasingly erratic, non-linear and non-static reality (Anthropocene); this boundary has been caused by humans who have become geological forces that are capable of changing the Earth and its systems in the same way that natural forces such as volcanoes are able to do; and the unprecedented global anthropogenic impacts that are exerted on the biosphere demand a shift in how humans understand and respond to global change.

Therefore, as with the onset of debate, terminological exactitude seems ancillary to the broader consequences of the historically descriptive etymology debate: whether designated as 'the Anthropocene' or simply 'an historical era of novelty',<sup>97</sup> we now live in times of unprecedented socio-ecologic upheaval as a result of our own doing where we act as masters of the biosphere and are at once an integral part of the biosphere. This period has become popularly known as the Anthropocene, and unless this epoch of human domination is officially assigned another name, it is most likely that the Anthropocene will continue to be used in scientific and popular discourse, especially considering that it has become virtually inextricably embedded in global ecological change conversations.

Baskin correctly points out that the Anthropocene 'does not need to be an object of scientific inquiry by geologists and stratigraphers, or even a formally-recognised geological epoch, in order to have an impact'.<sup>98</sup> Arguably then, even if it is not formally established, the Anthropocene will remain useful as an informal term of art that expresses biospheric human domination; acting as a framework in all sectors of life that are concerned with mediating the human-environment interface. Informal endorsement and use of the term will mean that we can concentrate on developing a narrative and mapping 'a unit conceptually rather than conceptualizing a mappable stratigraphic unit',<sup>99</sup> that is based on a popular framework

<sup>96</sup> M Hodson and S Marvin, 'Urbanism in the Anthropocene: Ecological Urbanism or Premium Ecological Enclaves?' (2010) 14 *City* 299. The extent of human impacts on Earth has been extensively documented in many disciplines and contexts. In the context of the Anthropocene, see among others: R Wagler, 'The Anthropocene Mass Extinction: An Emerging Curriculum Theme for Science Educators' (2011) 73 *The American Biology Teacher* 78; JJ Armesto et al, 'From the Holocene to the Anthropocene: A Historical Framework for Land Cover Change in Southwestern South America in the Past 15,000 Years' (2010) 27 *Land Use Policy* 148; I Ayestaran, 'The Second Copernican Revolution in the Anthropocene: An Overview' (2008) 3 *Revista Internacional Sostenibilidad, Tecnología y Humanismo* 146.

<sup>97</sup> Dalby (n 62).

<sup>98</sup> J Baskin, 'Paradigm Dressed as Epoch: The Ideology of the Anthropocene' (2015) 24 *Environmental Values* 9, 12.

<sup>99</sup> Autin and Holbrook, 'Is the Anthropocene an Issue of Stratigraphy or Pop Culture?' (n 31) 61.

that usefully and vividly expresses the extent of the global socio-ecological crisis. Baskin more recently has confirmed that the Anthropocene is ‘paradigm dressed as epoch’, that it has entered the *zeitgeist* in spectacular fashion, and that it has ‘scientific respectability despite not yet being an accepted scientific term’.<sup>100</sup>

In sum then, I would estimate that Moore’s earlier warnings about the Anthropocene’s etymology are probably correct to the extent that the Anthropocene has been able, though an ongoing process, to alter the landscape of our thinking about our current reality, and the human role in changing the Earth and its systems. The Anthropocene is capturing the popular and scientific imagination of those who concern themselves with the global socio-ecological crisis, acting as it does, as a mindset that emphasises human responsibility for causing *and* responding to this crisis: ‘[I]t radically unsettles the philosophical, epistemological and ontological ground on which both the natural sciences and the social sciences/humanities have traditionally stood’.<sup>101</sup> To this end, the Anthropocene:

is not simply a neutral characterisation of a new geological epoch, but it is also a particular way of understanding the world and a normative guide to action. It is ... more usefully understood as an ideology—in that it provides the ideational underpinning for a particular view of the world, which it, in turn, helps to legitimate.<sup>102</sup>

Because such a new world view or ideology ‘heralds an opening of sorts, a clarion call for change’,<sup>103</sup> as Baker argues, this change must also be reflected in, and carried through, our regulatory institutions as we shall see further in this book.

## VI. The Anthropocene and Regulatory Institutions

Ironically, while humans are now arguably dominating the biosphere as ecological agents, we are simultaneously the only species capable of deliberately intervening in the human-environment interface to address the global socio-ecological crisis. As Kobayashi puts it:

On the one hand mankind, as Hobbes, Voltaire and Schopenhauer stressed, is a foolish animal that has such ill morals as cruelty, greed, and arrogance, but on the other hand it has the potential for beautiful morals, creative imagination and a prosperous existence. Mankind is the only being in nature to enjoy a rational existence, and therefore to choose by itself the route of self-destruction is blasphemy against the self and the creator; such a foolish act must be avoided ... mankind must stop warfare and environmental destruction, and redirect the rudder towards a constructive future.<sup>104</sup>

<sup>100</sup> Baskin, ‘Paradigm Dressed as Epoch’ (n 98) 10.

<sup>101</sup> *ibid.*

<sup>102</sup> *ibid* 10–11.

<sup>103</sup> Baker, ‘Adaptive Law in the Anthropocene’ (n 35) 567.

<sup>104</sup> N Kobayashi, ‘Constitutional Studies and World Problems: A Study of Japan’s Constitutional History as a Starting Point’ in T Fleiner (ed), *Five Decades of Constitutionalism: Reality and Perspectives (1945–1995)* (Bale, Helbing and Lichtenhahn, 1999) 14.

In an effort to ‘redirect the rudder’, it is clear that our social regulatory institutions must change if they are to better respond to the exigencies of the Anthropocene: the Anthropocene requires a fundamental reorientation and restructuring of our institutions towards more effective Earth system governance and planetary stewardship.<sup>105</sup> If it is true, as Dalby suggests, that ‘[t]he global political agenda for the twenty-first century will be about how to live in the Anthropocene’,<sup>106</sup> and if we accept that law, order and regulation will always be required in any society, then we need to ask: what is the significance of the Anthropocene and its imagery for our regulatory institutions, and more specifically, for the institution of law?

As a powerful overarching trope expressing ‘epochal manifestation of concrete socio- and bio-material conditions’,<sup>107</sup> the Anthropocene could have myriad technological, regulatory, ethical, legal and broader social implications at many levels and in different spheres of life; ‘command[ing] a major realignment of our consciousness and worldviews, and call[ing] for different ways to inhabit the Earth’.<sup>108</sup> Conceptually and as a term of art, the Anthropocene’s significance lies in its recognition of human domination of Earth and its systems: it signifies that we are living in a period of Earth’s geological history where our interactions with each other and with the non-human living and non-living world, the way we understand and practise science, and the way we create and maintain order, and design and implement social regulatory institutions such as law, economics, ethics and religion cannot continue to depart from the assumption that there is biospheric harmony, predictability and stasis as was the case in the Holocene, or that nature is something far removed from, yet available for the unrestricted use of, humans. Therefore, like Pallett, for me the significance and utility of the Anthropocene lies less in the empirical truth of the claim that we are in a new geological era, than in the Anthropocene acting as a system of thought that provides a framework and context for thinking about biospheric change, our responsibility for causing and mediating this change, and our regulatory responses to this change.<sup>109</sup>

To this end, the Anthropocene presents a new living reality characterised by the hitherto unacknowledged complexity of the Earth’s systems, making it all but impossible to establish simple, clear, linear links between causes and effects, and making it crucially necessary, yet challenging, to craft and execute future regulatory interventions.<sup>110</sup> Our efforts to facilitate a sustainable future, to maximise equitable choices and to identify and enable those options that would keep us within safe operating spaces away from critical tipping points in the Earth

<sup>105</sup> F Biermann et al, ‘Navigating the Anthropocene: Improving Earth System Governance’ (2012) 335 *Science* 1306, 1306.

<sup>106</sup> S Dalby, ‘Geographies of the International System: Globalization, Empire and the Anthropocene’ in P Aalto, V Harle and S Moisiso (eds), *International Studies: Interdisciplinary Approaches* (New York, Palgrave Macmillan, 2011) 143.

<sup>107</sup> Gear (n 50) 1.

<sup>108</sup> Globaia, ‘Cartography of the Anthropocene’ (n 81).

<sup>109</sup> Mahony, ‘The Anthropocene’ (n 92); Löwbrand, Stripple and Wiman (n 33) 8.

<sup>110</sup> Oldfield et al (n 32) 3.

system, will require our better understanding, mediating and responding to human interference with an increasingly unpredictable and complex Earth system.<sup>111</sup> While the latter is probably the ultimate regulatory challenge of the Anthropocene, it simultaneously provides us with a framework to contemplate global Earth system change and to devise appropriate responses to such change.

Analogous to the influence that sustainable development has had on politics, law and governance generally (see the discussion above) and the extent to which it has become an object of governance, the Anthropocene could provide a current, far-reaching and consolidated conceptual objectification of a regulatory challenge or a governance problem, ie dramatic human-induced global environmental change that requires urgent regulatory intervention to ensure the continuation of life on Earth. Importantly, as a result of the severity of its imagery, the Anthropocene could possibly do this in a way that reaches further and deeper than any other framework has since been able to do. Acting as a collective term encapsulating the apocalyptic exigencies of many single issues through its expression of urgency, the Anthropocene 'is a concept which is perhaps big enough to urge transformation on the level of values and ontology in a way that could never have happened in response to one singular societal or environmental challenge, from globalisation to climate change'.<sup>112</sup>

Through its 'problem objectification' role, the Anthropocene could spur political action agitating for more effective environmental law and governance, because '[o]bjects can only be governed when they are represented and conceptualized in a way that can enter the sphere of conscious political calculation'.<sup>113</sup> Acting as a terminological collective that expresses both human mastery over the biosphere and regulatory urgency to counter the effects of human domination, the Anthropocene could arguably instigate more concerted and far-ranging global political and regulatory action to address ecological disaster by opening up an entire range of political rationalities;<sup>114</sup> thus working to instigate wholesale reforms of our regulatory interventions that are embedded in law, among others, as part of many alternative political rationalities.

As a counterpoint to the foregoing, while the Anthropocene imagery undoubtedly might spur some urgent and thorough interventions, some commentators caution that its reflexive dimension could have quite the opposite effect, ie one of ambivalence and inaction as a result of uncertainty, paralysis and humans' inability to control the future state of the world as a result:<sup>115</sup>

The profound uncertainty generated within a globalized, indeterministic world erodes the basis for decision making, freezes action, and ultimately blocks the possibility of forward movement into the future. Indeed, the future no longer exists as something that

<sup>111</sup> *ibid.*

<sup>112</sup> Mahony (n 92).

<sup>113</sup> Lövbrand, Stripple and Wiman (n 33) 11.

<sup>114</sup> *ibid.*

<sup>115</sup> *ibid.*

is open to ‘colonization’ by confident, rational action, but rather as a site of anxiety, full of unknowns, that is not amenable to human intervention. This creates a quandary, for although the future may be radically contingent and unknowable, the individual must still engage with it. The problem that now faces them is—how to act.<sup>116</sup>

This is a cautionary tale of reality that has proven true for big ideas such as sustainable development and the many global environmental governance regimes which it informs: the ailing global climate change regime is probably most exemplary in this respect. Yet, for all the reasons mentioned above, there are also equally sufficient reasons to believe that the Anthropocene as a framework and everything that it seeks to convey, would be better able to spur the type of global regulatory interventions in a way that other grand ideas have not yet been able to do.

## VII. Conclusion

This chapter has shown that the Anthropocene is a common denominator that facilitates our understanding of the human-dominated biosphere and the various challenges this creates. Bettini, Brandstedt and Thorén present us with a metaphor in which the Anthropocene is an inverted prism that ‘combines into a single beam the numerous (apparently) divergent messages that signal the unprecedented impacts that humans exercise on the biosphere and gives them a common meaning’.<sup>117</sup> In doing so, the Anthropocene levels the scientific playing field, as it were; it creates a common understanding of the centrality of people in global Earth systems change; it refocuses the debate on ways to ameliorate this impact; it instils a common understanding of the global geographical, temporal and causal dimension of anthropogenic impacts and the resultant socio-ecological crisis; and it promotes a deeper appreciation of the divergent considerations relating to socio-legal institutional change and reforms because it helps us to recognise, understand and respond to the global socio-ecological crisis that we are witnessing.

Thus, as a framework, the Anthropocene could help us to better understand the global extent and effects of human impacts on the biosphere and resultant Earth system changes; it could guide us in rethinking our responses to these changes; it could offer a framework for re-imagined Earth system ethics, care and responsibility; and ultimately it could serve as a justification for interventionist action that can also be achieved through law as one of many regulatory institutional responses. With respect to the last point specifically, Baskin observes that the idea of the

<sup>116</sup> G Reith, ‘Uncertain Times: The Notion of “Risk” and the Development of Modernity’ (2004) 13 *Time Society* 383, 393.

<sup>117</sup> G Bettini, E Brandstedt and H Thorén, ‘Sustainability Science and the Anthropocene: Re-negotiating the Role for Science in Society’ (2010) edocs.fu-berlin.de/docs/servlets/MCRFileNodeServlet/FUUDocs\_derivate\_000000001299/Bettini-Sustainability\_Science\_and\_the\_Anthropocene-305.pdf?hosts=.

Anthropocene clearly indicates that we are living amidst exceptional conditions and that such a 'framing through exceptionality can legitimate the need for exceptional rule'.<sup>118</sup> The remainder of this book reflects on constitutionalism as a form of 'exceptional rule', which it argues is essential for the type of urgent regulatory interventions that are required to more adequately confront the socio-ecological crisis of the Anthropocene.

<sup>118</sup> Baskin (n 98) 22.