



Air-appropriation: The imperial origins and legacies of the Anthropocene

European Journal of Social Theory

2020, Vol. 23(4) 611–630

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DOI: 10.1177/1368431020903169

journals.sagepub.com/home/est**Andreas Folkers** *Justus Liebig University Gießen, Germany*

Abstract

This article elucidates the spatial order that underpins the politics of the Anthropocene – the ecological *nomos* of the earth – and criticizes its imperial origins and legacies. It provides a critical reading of Carl Schmitt's spatial thought to not only illuminate the spatio-political ontology but also the violence and usurpations that characterize the Anthropocene condition. The article first shows how with the emergence of the ecological *nomos* seemingly 'natural' spaces like the biosphere and the atmosphere became politically charged. This challenges the modernist separation between natural facts and political norms. It then underlines the imperial origins of this *nomos* by introducing the concept of air-appropriation understood as the colonization of atmospheric space by CO₂ emissions. Instead of assuming that the ecological *nomos* represents a transition from a colonial to an ecological and cosmopolitan world order, focusing on air-appropriation highlights forms of ecological imperialism that go along with the new *nomos*. Accordingly, the article calls for a just redistribution of ecospace that takes into account the imperial legacies and ongoing effects of air-appropriation.

Keywords

Atmosphere, Carl Schmitt, climate change, political ecology, *nomos* of the earth, carbon

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The 'Anthropocene' marks a turning point in spatial history as it goes along with new 'geohistorical categories' (Coronil, 1996) that supplement the existing repertoire of historically and politically relevant spaces, such as national territory. Although these categories seemingly only concern natural spaces like the atmosphere and the biosphere, they must be understood as both inherently historical, because of the ways they have been altered by human interference, and political, as they call forth and underpin attempts at 'governing the Anthropocene' (Delanty & Mota, 2017). This article takes up the challenge of analysing these earth spaces as historical and political spaces. However, it departs from the dominant 'ecocratic' (Bonneuil & Fressoz, 2016) narratives of the Anthropocene by introducing the notion of air-appropriation, understood as the colonization of atmospheric space by CO₂ emissions. This concept makes it possible to foreground the violence, the imperial origins and ongoing social asymmetries of the Anthropocene condition.

Many scholars have already pointed out how environmentalism went along with the emergence of a new kind of global politics that transcends the political horizon of the nation state (Beck, 2009; Jasanoff & Martello, 2004). But the debate on the Anthropocene engendered a radicalized understanding of earthly politics that is not just about the global but about a new sense of the planetary. It introduced a series of more than human spaces like the atmosphere, the ozone layer, 'critical zones' (Arènes et al., 2018) and 'tipping elements' (Lenton et al., 2008). These spaces always served as the environmental background for societies. But the advent of the Anthropocene made visible their historical and in fact political character for at least two sets of reasons. As natural scientists as well as eco-Marxists focusing on the materiality of socio-natural metabolisms (Clark & York, 2005) argue, the material makeup and ecological functioning of these earth system spaces changed considerably as a consequence of environmental degradation. As scholars in science and technology and governmentality studies argue, new ways of mapping, measuring and managing these spaces have changed their political status as they are no longer a mute background for social operations but have become problem spaces in environmental politics. In this article, I bring both perspectives together by arguing that the material disruption of these natural spaces constitutes the condition of possibility for knowing and constituting them as political spaces to be acted upon. I argue that changing and knowing the spaces of the Anthropocene are two sides of the same process of 'appropriating' the earth, understood in an equally material and semiotic way. The sciences of the earth system that made visible the new spaces of earthly politics rely on acts of usurpation that have provided the very conditions of possibility for the subsequent measurement of the appropriated space.

The argument is informed by a critical reading of Carl Schmitt's (2011a) theory of the *nomos* of the earth. For Schmitt, a *nomos* is a historically specific spatio-political order that responds to the general apprehension and appropriation of space in a historical epoch. I argue that the Anthropocene, by introducing a new understanding of the earth as a complex life support system, provoked the emergence of a new *nomos*. In contrast to the old Eurocentric and colonial *nomos* of the earth, the basic units of the ecological *nomos* are no longer national territory and colony but ecospheres like the atmosphere that due to their degradation became political problem spaces. Yet, according to Schmitt, a new *nomos* does not just go along with a new spatial *Weltbild*, but with acts of

‘land-appropriation’ such as the colonization of the supposedly ‘new world’ by European nations during the heyday of imperialism. In this article, I will not only focus on the appropriation of land, but I will introduce the concept of air-appropriation: the colonization of the atmosphere by industrial carbon emissions. I will show how the various attempts to map the atmosphere and the global carbon cycle rely on this prior appropriation of the atmosphere, which made possible and necessary a new ecological *nomos* of the earth. The article will thus show that, just as the old colonial *nomos* of the earth emerged as a consequence of European land-appropriation, the ecological *nomos* is similarly implicated in a particular form of imperialism. This distinguishes my argument from Bruno Latour’s (2017, 2018) mobilization of Schmitt in his writings on Gaia that ignores the imperial origins of the ecological *nomos*. The article thus responds to recent calls to ‘decolonize the Anthropocene’ (Davis & Todd, 2017) and to challenge its hegemonic ‘origin stories’ (Yusoff, 2018, pp. 19–22) by elucidating the imperial trajectories that made the Anthropocene possible both as a material reality and an object of knowledge and governance in the first place.

In the next section, I sketch the new ecological *nomos* implicit in the debates on Earth System Sciences (ESS) and Earth System Governance (ESG). The following section problematizes and complicates this view by introducing the notion of air-appropriation. I will then further elucidate this notion with reference to Michel Serres’ alternative theory of appropriation that sees the origin of property in acts of pollution. This provides the conceptual resources to reveal why and how the ecological *nomos* relies on the prior appropriation of the atmosphere with carbon emissions. Finally, I critically reflect on the contemporary climate regime as the most important expression of ecological geopolitics in the Anthropocene. Currently, dominant climate politics does not take into account the imperial origins of the ecological *nomos* and its unequal distribution but furthers these imperial tendencies. I stress that an alternative politics of the Anthropocene that takes the imperial legacies and ongoing effects of air-appropriation seriously needs to fight for a just redistribution of ecospace and arrive at less damaging ways to re-appropriate the earth.

The ecological *nomos* of the earth

It is not a coincidence that Carl Schmitt’s writings on the ‘*Nomos* of the Earth’ became a point of reference in debates on the Anthropocene among social theorists (Latour, 2017, pp. 220–254, 2018; Pottage, 2017). Schmitt’s spatial–political thought is highly suggestive for thinking new forms of ‘geopower’ (Luisetti, 2018; Povinelli, 2016; Yusoff, 2016) that go along with the Anthropocene. What makes Schmitt’s approach especially relevant is that it shows the entanglements between spatial and political history. Schmitt assumes that every legal–political system is grounded in a spatial order. *Nomos* is the name for such a territorialized order. The *nomos* does not spontaneously grow out of an already existing territory. The emergence of a spatio-political order is a historical event that creates and territorializes the spatial ground on which it resides in the first place. In this way, one can also think about the Anthropocene as a historical event that goes along with a new spatial ground for politics, or, to use Schmitt’s terminology, a new *nomos*. However, the analytical potential of his thought should not obscure the fact that Schmitt was a highly problematic thinker. As a crown jurist of the National Socialists, he actively

supported Nazi politics. His considerations on the state of emergency (Schmitt, 2004) promoted the *Führer* principle. And his geopolitical writings tried to vindicate Nazi geopolitics (Neumann, 1984, p. 191ff.).

Accordingly, Latour (2017, p. 228) characterizes Schmitt as ‘toxic and nevertheless indispensable’ for a theory of the new ecological world order. Latour’s strategy to deal with this predicament is to ‘detox’ Schmitt by mobilizing his concepts to apprehend ecological politics without buying into his geopolitics. ‘The ecological conflicts do not bear upon the nationalist *Lebensraum* of the past; and yet they bear, in spite of everything, on “space” and on “life”’ (Latour, 2017, p. 252). He, therefore, offers a formal conception of *nomos* as ‘redistribution of agency’ (Latour, 2017, p. 235) and tries to show how in the new *nomos* of the earth Gaia becomes a political agent. What gets lost in this ecological translation is the violence involved in the creation of a new *nomos*. The emergence of a *nomos* goes along with acts of land-appropriation that involve more than a ‘redistribution of agency’ and the scientific ‘measuring’ of space as Latour (2017, pp. 231, 250) suggests. Schmitt made clear that the modern *nomos* of the earth was a consequence of European colonialism that he calls European land-appropriation. Instead of greenwashing Schmitt, I will argue that harnessing such ‘toxic’ Schmittian insights the right way might provide a critical remedy for the homogenizing and universalizing tendencies of the Anthropocene narrative. I argue that the new *nomos* became necessary as a consequence of an act of air-appropriation understood as the colonization of the atmosphere with CO₂ emissions from (mostly western) fossil industrialization. Instead of assuming that the new ecological *nomos* represents a transition from an imperialistic world order to a cosmopolitan and ecological one, I focus on the complex entanglements and overlaps between two imperialistic world orders. I will, however, first sketch what the ecological *nomos* looks like from the perspective of contemporary ESS and attempts to govern the Anthropocene through new forms of ‘planetary stewardship’ (Steffen et al., 2011). This will make clear how the air-appropriation framework I advance in this article differs from hegemonic approaches in debates on the Anthropocene.

In his 1950 the ‘*Nomos* of the Earth’, Schmitt (2006, p. 86) made a remarkable observation on the relation between the measurement of the earth and the political order since the fifteenth century:

No sooner had the contours of the earth emerged as a real globe – not just sensed as a myth, but apprehensible as fact and measurable as space – than there arose a wholly new and hitherto unimaginable problem: the spatial ordering of the earth in terms of international law. The new global image resulting from the circumnavigation of the earth and the great discoveries of the 15th and 16th centuries, required a new spatial order. Thus began the epoch of modern international law that lasted until the 20th century.

This new spatial order of international law granted territorial sovereignty to the European nation states while the rest of the world became the designated prey for European colonialism. A horizontal conception of the space of the earth underpinned this political order, which contained three different spatial–political categories: sovereign territory, colonies and free sea (Schmitt, 2006, pp. 172–184).

Schmitt, as well as other political theorists (Arendt, 1973), rightly diagnosed the end of this political order in the twentieth century. The decline of the old colonial *nomos* did not (yet) give way to one new totalizing *nomos* but rather to a series of often quite precarious *nomoi* that are far from being consolidated. The ecological *nomos* is not the only relevant spatio-political regime of the present and clearly a series of elements of the old *nomos* still persist. However, it is particularly interesting from a Schmittian perspective because it goes along with an entirely new apprehension of the planet as a lively earth system and thus with a ‘spatial revolution’ (Schmitt, 2011b, pp. 55–57; own translation) that provokes a new *nomos* of the earth. The earth system or ‘Gaia’ (Love-lock & Margulis, 1974), the object of ESS, is markedly different from the earth that grounded the modern political order that Schmitt described. It is not the earth of the circumnavigators and colonizers. No telescope and no world map can render it properly visible. Rather, space travel, a planetary knowledge infrastructure and climatic models (Edwards, 2010) paved the way for this new experience of the earth. The new earth is not just a horizontal surface, but a voluminous and vertical body. It is not just an extended space but an intensive, molecular space where the chemical composition of the atmosphere or the oceans matters as much as the temperature on the earth surface. The essential spatial units are no longer national territory and colony, but a complex of planetary ecospheres: the hydro-, geo-, atmo- and biosphere.

This ‘discovery’ was not just a scientific but also a political event. The new spaces ceased to be a mute natural background for society and became objects for the environmental sciences and ecological politics that emerged as a consequence of recurring ecological crises. Already in the 1970s Hans Jonas (1984, p. 6) argued that

the critical vulnerability of nature [...] [was] unsuspected before it began to show itself in damage already done. This discovery, whose shock led to the concept and nascent science of ecology, alters the very concept of ourselves as a casual agency in the larger scheme of things. It brings to light [...] that an object of an entirely new order – no less than the whole biosphere of the planet – has been added to what we must be responsible for because of our power over it.

However, the ecospheres not only became political problem spaces because of a new sense of responsibility but also because of a new sense of dependency. As ESS showed, these spheres act as a ‘life support system’ (Young & Steffen, 2009), and their proper functioning constitutes and maintains the ‘safe operating space for humanity’ (Rockström et al., 2009a). It became clear that every human being does not just live on a particular piece of land, in a town, a region or a nation state. She always already lives on the earth as a whole insofar as she depends on planetary ‘ecosystem services’ and leaves her ‘carbon footprint’ in the atmosphere.

According to the climate scientist John Schellnhuber (1999), the appearance of ESS marks a ‘second Copernican revolution’ because it introduces a new understanding of the earth and its place in the universe. This has far-reaching consequences since the Copernican revolution was never just about the acknowledgement that the earth is a sphere. It came with a new understanding of scientific truth and its place in the world. It introduced a new ontology that strictly differentiates between facts and norms. As Alexandre Koyré

(1957, p. 2) has pointed out, the Copernican revolution brought about a previously unknown devaluation of nature that created the necessity to assume a separate sphere of value:

This scientific and philosophical revolution [...] can be described roughly as bringing forth the destruction of the Cosmos, that is, the disappearance, from philosophically and scientifically valid concepts, of the conception of the world as a finite, closed, and hierarchically ordered whole [...] and its replacement by an indefinite and even infinite universe which is bound together by the identity of its fundamental components and laws, and in which all these components are placed on the same level of being. This, in turn, implies the discarding by scientific thought of all considerations based upon value-concepts, such as perfection, harmony, meaning and aim, and finally the utter devalorization of being, the divorce of the world of value and the world of facts.

But with the rise of ESS and the promotion of the Anthropocene, the modern separation of norms and facts is beginning to dissolve. The earth is no longer just any planet in an infinite universe. It is itself a valuable cosmos because of its unique ability to make life possible. The earth as a whole, often referred to as Gaia (Lovelock & Margulis, 1974), features a set of self-regulatory mechanisms that establish and maintain certain normal and livable states, such as a balanced average temperature. This ‘biological normativity’ (Canguilhem, 1989, p. 127)¹ constitutes the exceptionality of the earth in the universe. The normalcy and life-enabling normativity of the earth is a highly improbable effect of a long process of evolution. Since Gaia is not just a devalored *res extensa* the normative order of the earth system is not expressed in terms of law but in terms of ‘planetary boundaries’ (Rockström et al., 2009b): critical thresholds not to be transgressed in order to sustain conditions of enduring life on earth. Prudent ‘planetary stewardship’ recognizes the norms of the earth and adapts to them. Such normative scripts of ESG do not replace, but at least supplement juridical norms with norms immanent to the earth system. The 2°C threshold in international climate protocols is an example of an already recognized political goal that supposedly reflects the inherent norms of the planet.

Air-appropriation: The imperial underpinning of the ecological *nomos*

The ecological *nomos* is not about the European conquest of the ‘new world’ but about the collective preservation of the ‘one world’. The ecological *nomos* seems to be the proper ground for a reflexive cosmopolitics in which nation states set aside their petty conflicts to fight united against the common threat of ecological world risks (Beck, 2009). However, the transition from the old to the new *nomos* is not a straightforward transition from an imperialistic to a non-imperialistic world. By introducing the notion of air-appropriation, I want to point out the imperial origins and durabilities of the ecological *nomos*.

Schmitt stresses that a new political world order always goes along with a new experience of space. In his essay *Land und Meer* he calls this a ‘spatial revolution’

(Schmitt, 2011b, pp. 55–57, author’s translation). Yet Schmitt also emphasizes that such a revolution always goes along with an act of land-appropriation (*Landnahme*). Schmitt’s concept of land-appropriation bears many similarities to the *nomos* concept. *Nomos* comes from the Greek word ‘neimen’ and – according to Schmitt (2011b, p. 71) – means first taking or conquering (the land) (German: ‘nehmen’ as in *Landnahme*), second dividing and distributing and third cultivating it. Like *nomos*, land-appropriation entails all of these processes. It is about measuring, dividing and distributing the land, but it is also about the violent conquering of land. Schmitt cites the conquests of Alexander the Great, the Roman Empire and the Crusades as historic events catalysing a spatial revolution (Schmitt, 2011b, pp. 58–63). Moreover, he frequently admits that modern international law became necessary because of European colonization. Even though he often trivializes colonization as ‘discovery’, he is clear that ‘European land appropriation’ (Schmitt, 2006, p. 75), and thus imperialistic conquest, is the critical historical event catalysing the new *nomos*. For him, land-appropriation is a pre-legal act. From the perspective of the colonizers, the only perspective Schmitt cares about, it represents the conquest of an uncharted terrain that makes necessary an order that retrospectively hedges and legalizes this act of violence. Understood in this way, the measuring of the earth did not precede its conquest but followed it.

The appropriation of *land* is not the only mechanism for creating a *nomos*. The *nomos* is not the natural ground that offers the foundation for law. Rather, the act of appropriating, measuring and dividing space makes up and orders these spaces in the first place. Therefore, non-terrestrial appropriation is possible and in fact happens frequently. Schmitt (2011b, pp. 86–89) argues that the British dominance of world trade was made possible by an act of ‘sea-appropriation’. He considers the global-networked space disclosed by modern technologies such as railway, electricity and radio (Schmitt, 2011b, p. 103f.) and ponders the impact of aviation on the modern experience of space and its significance for warfare (Schmitt, 2011b, p. 104f.).

Yet the notion of air-appropriation that I want to foreground in this article is not about the role of aviation for ‘vertical geopolitics’ (Elden, 2013). It instead refers to the occupation of the atmosphere by CO₂ emissions as an effect of the combustion of fossil fuels. Indeed, in contrast to the debate on vertical geopolitics, this understanding of air-appropriation is not just about vertical space or volume, but about the molecular spatiality that concerns the chemical composition of the atmosphere expressed in parts per million (ppm) of CO₂. The large-scale combustion of fossil fuels has colonized the atmosphere with the molecules of a geological formation: carbon minerals. That is why an *atmospheric* chemist, Paul Crutzen (2002), could declare a new *geological* epoch – the Anthropocene – that began with the invention of the steam engine. In contrast to colonial land-appropriation, air-appropriation does not involve the use of immediate physical violence, but it is responsible for the ‘slow violence’ (Nixon, 2011) of climate change. The ‘weapons’ of such an ‘air-grabbing’ are not guns and canons but steam engines, furnaces, cars and aeroplanes. The temporal lag between the cause (emissions) and its effect (global warming) renders this violence less visible, but by no means less real. Apart from the innumerable lives endangered by extreme weather, droughts and spreading disease, climate change will lead to new forms of land-expropriation through rising sea levels and desertification.

It is important to note that the history of air-appropriation is deeply entangled with colonial land-appropriation. The impact of colonial practices on the atmosphere started even before the industrial-scale combustion of fossil fuels. Lewis and Maslin (2015, p. 175) associate the temperature drop during the little ice age in the seventeenth century with the colonization of the Americas from 1610. This colonial genocide brought the fire clearing practices of the American natives to a halt. As a consequence, forests could fix more carbon and thus reduce the concentration of CO₂ in the atmosphere. Yet with the invention of the steam engine and the subsequent industrialization of Europe, colonial land- and air-appropriation started to reinforce each other. The exploitation of resources and labour in the colonies and the opening up of new export markets increased the combustion of fossil fuels.

In *Land und Meer*, Schmitt cites a famous paragraph from Hegel's *Philosophy of Right*, where the latter emphasizes the deterritorializing tendencies of capitalist industries by pointing out the affinity between industry and the sea: 'Just as the earth, the firm and *solid ground*, is a precondition [. . .] of family life, so is the *sea* the natural element for industry, whose relations with the external world it enlivens' (Hegel, 1991, p. 268, italics in the original). It turns out that the element that 'enlivens' capitalist industry is not just the sea (and the colonization it engendered), but also the fire of fossil fuels and the air in which it dumps its emissions.

Writing nature: Pollution as material-semiotic appropriation

But why does the pollution of the atmosphere constitute an act of appropriation? Part of the answer lies in the way climate science and politics conceptualize, measure and divide the atmosphere. In climate politics the atmosphere figures as a dumb space with limited capacity (Whittington, 2016). The limited capacity of the atmosphere indicates the relative amount of carbon allowed to enter it without causing global warming to exceed 1.5°C or 2°C. According to official estimates, this corresponds to 450 ppm CO₂ molecules. Though this implies a relational-molecular spatiality of the atmosphere's chemical composition, the atmosphere is mostly cast in the geometrical terms of a limited dumb space. This makes it possible to treat atmospheric space as bounded and amenable to measurement and division. Climate policy becomes the management and distribution of atmospheric space or 'atmospheric capital' (WBGU, 2009, p. 2). It seems counter-intuitive that the atmosphere figures both as a dumb space and as capital, and so as a valuable property. Liberal theories of property, at least since John Locke (1982, pp. 17–31), assume that something becomes property by virtue of the work invested in it, not the waste dumped on it. According to liberal theories, a plot of land becomes property through the labour of cultivation – an argument that frequently served as a justification for the seizure of supposedly unpropertied land (*terra nullius*) by the European colonialists (Verran, 1998). In contrast, the atmosphere became a property through its pollution. But how can pollution (waste), rather than labour (work), become an act of appropriation, of making property?

Michel Serres' (2010) theory of property provides an answer that allows us to understand the logic of air-appropriation and implicitly criticizes liberal theories of property. Serres seeks to show that the secret origin of property lies in acts of contamination.

Animals mark their territory with excrement and kids lick food to claim it as their own. Serres (2010, pp. 5–7) even argues that the fertilization of soil with dung is originally a territorializing technique. In turn, every act of signification that marks a territory or, respectively, an exclusive property – from initials in briefs, to advertisements in the urban landscape – is a form of pollution. Against this backdrop, Serres (2010, pp. 65–66, 79) interprets modern environmental pollution, especially air pollution – as representing both the culmination point and the crisis of the contaminating logic of property:

At least since the industrial revolution, heat effluents no longer encounter any limits and are diffused in the atmosphere [...] all over the world. [...] The owner of a blast furnace was able to dirty the air all the way to the ocean and the stratosphere and thereby increased his property on earth, water, and air, *without limits*. Whether he intended it or not, his property swelled and became global and exploded. [...] Pushed to the limit [...] acts of appropriation will inevitably lead to the end of property.

Contemporary climate politics addresses this crisis of property with more of the same and salvages the logic of property in the moment of its inevitable decline. Emissions trading turns distinct parts of the atmosphere into a tradable commodity (Lohmann, 2005), and thus not only internalizes economic externalities but also reterritorializes deterritorialized space (Lövbrand & Stripple, 2006) and property.

Serres' theory not only challenges traditional theories of property but also theories of pollution. Waste is not 'matter out of place' (Douglas, 1966, p. 36), and so something that becomes a pollutant by falling out of an already established symbolic spatial order. Instead, pollution acts as a medium to carve out territories and thus to establish such an order in the first place. Polluting matter is not in or out of place, but a spatial operator that creates places. Understood as a theory of territorialization, Serres' considerations represent a counterpoint to Deleuze and Guattari's (1987, pp. 310–350) theory of territory in their famous chapter on the refrain in *Thousand Plateaus*. To them, animals carving out their territory are proto-artists and not conquerors (Folkers, 2017). However, both Serres and Deleuze/Guattari have a similar systematic idea about the appropriation – whether artful, economic, polluting or violent – of territory. Both argue that appropriation hinges on material operators that carve out a territory by becoming expressive. Deleuze and Guattari (1987, p. 315) argue that everything – excrement, leaves, a bird's song – can become a 'matter of expression'. As a matter of expression things or pieces of matter undergo an 'incorporeal transformation' (Deleuze & Guattari, 1987, p. 81) and acquire a semiotic quality. For example, a leaf turned upside down by a bird is no longer just a piece of biomass but a signpost in its habitat (Deleuze & Guattari, 1987, p. 315).

Against this backdrop, it becomes possible to see CO₂ emissions not only as a pollutant but also as expressive or 'informationally enriched matter' (Barry, 2013, p. 141). As such they serve as the condition of possibility for the legibility of the atmosphere as a valuable dumb space. Air-appropriation is not only an act of occupation but also of signification. Industrial carbon footprints are an inscription, an act of 'earth writing' (Yusoff, 2009, p. 1010), or rather air writing, that enables the subsequent description of the atmosphere. Science and technology studies scholars like Paul

Edwards (2010) have rightly emphasized that all knowledge about atmospheric pollution and climate change depends on a ‘vast machine’ of sensors, data infrastructures and computer models. However, one should not forget the agentive role carbon molecules play in climate science by acting both as pollutant and ‘tracer – a way to see relations’ (Tsing et al., 2017, p. M-8). A series of scholars have convincingly argued (Bond, 2013; Jonas, 1984; Masco, 2010) that our knowledge of the environment hinges on environmental disruption and the materiality of pollutants that render visible the relations of ecosystems. In this sense, carbon is not just a passive material but a medium that together with scientific apparatuses takes part in the disclosure of the natural world. The ‘vast machine’ of climate science only reads what acts of air-appropriation have already ‘written’ in the sky.

That is why environmental knowledge in the Anthropocene is no longer about observing nature ‘out there’, but increasingly about the interpretation of human traces. The epistemology of the sciences in the Anthropocene is more akin to what is traditionally understood as a particular feature of the humanities: making explicit the implicit structures of the lifeworld, spelling out what has been inscribed in it. Vico’s *verum factum* principle according to which one can only know the truth of what one has made seems to apply here (Chakrabarty, 2009, pp. 202–203). The difference is, however, that in this case the ‘making’ is always already a destroying and disrupting, not a *factum* but a *destructum*, not a performative but a deformative act. The *deformation* and displacement of carbon – from geological to atmospheric strata – has increased its *informational* value turning it into a ‘signal of the Anthropocene’ (Zalasiewicz et al., 2014, p. 37).

The processes and materials that cause the climate crises also underpin the science that made the crisis visible and the atmosphere legible. James C. Scott (1998, pp. 11–52) has famously shown how ‘nature and space’ became legible by the state through processes of standardization and simplification. The sovereign vision rests on material practices that rendered the world visible and governable. The legibility that ‘carbon’ induces follows a similar logic. Carbon metrics are simplifying by not only measuring all greenhouse gas (GHG) emissions against the benchmark of CO₂ (MacKenzie, 2009) but also by utterly reducing nature to the stocks and flows of carbon (Bonneuil & Fressoz, 2016, p. 56). After all, the measurement of the world in terms of ‘carbon’ does not just take into account CO₂ emissions from the combustion of fossil fuels or the carbon footprint associated with consumer goods along their ‘life cycle’ (Freidberg, 2013). With the emergence of emissions trading (Lohmann, 2005) ecosystems that sequester CO₂, such as tropical rainforests, entered the climate balance sheet as potential offsets for industrial GHG emissions. ‘Carbon’ not only makes atmospheric space measurable, but also a wide variety of ecospace that partake in the planetary carbon cycle: from forests to oceans. Carbon is no longer just the basic chemical building block of life (sustaining)-processes on earth, but increasingly its principle of legibility and accountability. As in high-modernist state projects, the visibility that carbon brought about produces measurable, dividable and fungible spaces of nature through an epistemology that eclipses alternative ways of knowing (Moreno et al., 2015).²

From the (re)distribution of ecospace to the re-appropriation of the earth

The ecological *nomos* of the earth hinges on the prior process of air-appropriation because this material-semiotic appropriation constituted the epistemological conditions of possibility to measure and divide the ecospace of the earth. This measurement, in turn, constitutes another political and economic reason why the air-appropriation provoked a new *nomos*. The colonization of the atmosphere poses questions over the right distribution of ecospace and the remaining atmospheric capital just as the old land-appropriation posed the question of how to distribute the supposedly ‘New World’ among the European colonizers. This is a socio-economic distributional conflict concerning the question of how to distribute the atmospheric dumb space, among whom and for what purpose. But it is also about the ‘redistribution of agency’ (Latour, 2017, p. 235) because it raises the question of who can be held accountable for the colonizing consumption of atmospheric space, or, put differently, who is the author of air writing. The question of authorship is a particularly tough one in the hermeneutics of the atmosphere. The carbon traces in the atmosphere do not come with a signature. The atmosphere remembers air writings. It has a good, in fact all too good, memory for retaining carbon traces for centuries (on the memory of the earth, see: Szerszynski, 2019), but it is a pretty messy archiver. It only retains and accumulates the writings itself and does not care about who wrote it. For the atmosphere, the author is always already dead. However, if climate knowledge is about the interaction between carbon air writing and its scientific decipherment, then there is more than one possible reading of the atmosphere and way of construing authorship. For the hegemonic Anthropocene narrative, the author of air writing is humanity per se, which systematically sidesteps considerations of distributing atmospheric space according to differentiated responsibilities for global heating. The hegemonic climate regime does not do much better. It allocates atmospheric capital through a budgeting approach. According to the Paris Agreement (UN, 2015) there should be net zero emissions, and so a balanced budget, by 2050. Until then there is only a limited amount of available carbon space left to divide. The remaining budget is then distributed among nation states (Lövbrand & Stripple, 2006). This amounts to an economic and future-oriented reading of the carbon traces. It does not focus on who has left traces in the past, but rather on how much available carbon space this leaves for the future.

Scholars from the global south and climate justice activists have criticized this approach for decades on several grounds: the current carbon accounting regime makes no distinction between ‘subsistence emissions’ and ‘luxury emissions’ (Agarwal & Narain, 1991, p. 3), national carbon budgets do not reflect the population size of the respective countries (Agarwal & Narain, 1991, p. 9), and do not take into account the historic debt of industrialized countries that occupy a disproportionately large part of the atmospheric space (Agarwal & Narain, 1991, p. 15f.). Where the hegemonic climate regime only sees uniform emissions, climate justice advocates highlight historically and contextually thick traces of different kinds of carbon (from, say, rice farming and aeroplanes) that can be traced back to different actors/authors indicating differentiated responsibilities. This critical concern with socio-economic context among climate

justice advocates also concerns the countermeasures to climate change. Climate justice activists criticise emissions trading for disenfranchising people whose lives and livelihoods depend on ecosystems that they can no longer use when they become a carbon sink (Fogel, 2004). Even though the earth system, and especially the atmosphere, figures as global commons, the world of international climate politics is less a common world but a 'commensurable' world that allows for trade-offs between different parts of a uniform earth system. Tropical rainforests that sequester CO₂ are equivalent to emissions reductions. The atmospheric dumb space has an equivalent ecological dumb space on the earth's surface which – in the current climate regime – is construed just like the smooth and abstract space of the atmosphere. According to this logic, if the land people inhabit is more efficient as a 'carbon sink' than for their subsistence, it should become a dump for CO₂ emitted in other parts of the world. If in the past the *terra nullius principle* legitimized the expropriation of land (Verran, 1998), hence the idea that land not cultivated according to European standards ought to be appropriated, today it is the notion of ecosystem services that legitimizes the seizure of land for ecological purposes (Lohmann, 2005, p. 206), turning it, ironically, into nobody's land. Current climate politics, as the most important and developed manifestation of geopolitics in the Anthropocene, thus continues and intensifies the unequal distribution of ecospace through new forms of 'environmental colonialism' (Agarwal & Narain, 1991).

The politics of the earth might thus be constituted as a politics of redistribution that struggles for a just way of 'sharing our ecospace' (Gupta, 2016). By taking into account the historical and still ongoing inequalities in terms of ecospace consumption, such a redistribution could also contribute to a 'decolonization of the Anthropocene' by accounting for the historical injustices associated with the air-appropriation. Instead of the ecocratic narrative of the Anthropocene that suggests that humans as a homogenous species is equally responsible for the ecological crisis, such a redistributive politics entails the recognition of the unequal contribution to ecological problems and the unequal occupation of the atmosphere. Carbon metrics that allow for the measurement and distribution of atmospheric space can provide the epistemological bedrock for claims to compensate those most affected by climate change by those mostly responsible for it, for repaying the ecological debt of developed countries resulting from centuries of 'unequal ecological exchange' (Hornborg, 2009). Such a redistributive politics would avoid many of 'the pitfalls of Anthropocene ethics' (Karera, 2019) that tends to lose sight of historically deep rooted, structural inequalities over its generic focus on 'relationality'. As Alain Pottage (2019, p. 172) has remarked, the 'schema of appropriation-distribution' provides a valuable counterpoint to the current trend of short-circuiting an ontology of relationality with an ethics of response-ability in which the simple fact of ecological entanglement constitutes a common and therefore rather undifferentiated ethical obligation for the well-being of all life on earth (Haraway, 2016).

However, such a redistributive politics would have to rely on the imperial ontologies that caused the distributive problems that go along with air-appropriation in the first place. This creates a serious predicament. Critical scholars have criticized carbon metrics as a form of 'ecological epistemicide' (Moreno et al., 2015) because it eclipses alternative ways of knowing and being on the earth. Many calls for a 'decolonization of the Anthropocene' have therefore advanced a critique of western-modernist naturalistic

(De Castro, 2014) ontologies (Davis & Todd, 2017; Spencer et al., 2019), that is, of ontologies that assume that there is only one, homogenous nature out there and that disregard alternative, non-western ontologies of natureculture. They criticize what John Law (2015, p. 127) has called the ‘one-world-world’ view, which assumes that the world is just one abstract ‘large space-time box’, without recognizing the multiple ontologies of coexisting worlds residing on and making up the earth. Indeed, even radical propositions like climate reparations for those affected by climate change like the small Island States would only be able to compensate people for the pieces of earth space they lost and not the meaningful worlds that flourished on them. A redistribution of ecospace risks continuing the process of rendering the incommensurable commensurable, which turns meaningful worlds into fungible units of ecospace. At the same time, it is hard to imagine how a compensation for past and ongoing injustices could be feasible without mobilizing the existing infrastructure of measuring earth space and thus resorting to the current ecological *nomos* of the earth. It seems to be inevitable to engage in some sort of ‘strategic naturalism’ that would make it possible to advance a socio-economic critique of current forms of distributing the ecological *nomos* without losing sight of the ontological problems of this very *nomos*. The challenge would thus be to ‘stay with the ontological trouble’ and forge an alternative understanding of the ecological *nomos* that allows for righting historical wrongs while recognizing the imperial origins and political limitations of the ontology such claims would have to strategically mobilize. The political challenge is thus to bend and fold the ecological *nomos* so that it can account for the ‘many worlds’ while also enabling a just distribution of a shared earth. The telos of such a politics might be to construct a ‘common world’ that is more than the commensurable world of contemporary climate politics but, according to Isabell Stengers (2005, p. 995), an ‘unknown constituted by [...] multiple, divergent worlds’.³ Constructing such a common world would not only entail a just redistribution of existing ecospace (being the product of the polluting appropriation of the earth), but makes necessary a re-appropriation and thus a reworlding of the earth in less damaging ways.

Conclusion

This article elucidated the ecological *nomos* of the earth understood as the spatial order supporting the geopolitics of the Anthropocene. This *nomos* entails new spatio-political categories like the biosphere and the atmosphere as well as a new normative order immanent to the operations of the self-regulative earth system. As such it is markedly different from the old *nomos* that gravitated around the spatial units of national territory and colony and imposed an external normative order on a seemingly value-neutral planet. Although this *nomos* is not yet a consolidated reality it currently emerges as a political blueprint in debates among earth system scientists and in proposals for planetary stewardship. Especially in the politics of climate change, elements of this new *nomos* – both in its spatial and normative dimension – are already part of a powerful *Realpolitik*. Here, the atmosphere is a crucial political space and the deviation from the planet’s mean temperature represents a critical political problem. Climate politics is the first, most powerful and paradigmatic site where the ecological *nomos* emerges and from where it may expand. Accordingly, this article focused on climate politics and the air-

appropriation that made it necessary. It showed how, as a consequence of air-appropriation understood as carbon imperialism, the entire earth system is rendered visible in terms of stocks and flows of carbon. It is, therefore, fair to say that the CO₂ molecule became the most important unit of the ecological *nomos* that measures and endangers planetary ecospace which are global and molecular at the same time.

There are four reasons why the ecological *nomos* emerged. Firstly, a new ontology of the earth provoked the emergence of a new *nomos*. In ESS the earth is no longer just an extended spherical surface in an infinite universe, but a complex, self-regulating, lively and life-enabling system. According to Schmitt, such a far-reaching ‘spatial revolution’ in science must have consequences for the political ordering of space. Secondly, this spatial revolution made clear that the earth system as a whole provides the ‘safe operating space for humanity’. The ‘earthbound’ (Latour, 2017, p. 248) no longer just live in a particular place, a city or a nation. Rather, the entire earth system functions as their ‘life support system’. This transcends the scope of the nation state and thus made necessary a new *nomos* that goes beyond the territorial order of the old *nomos*. These two points, developed in the first section of the article, are more or less in line with the ‘grand geocratic narrative’ (Bonneuil & Fressoz, 2016, pp. 45–96) of the Anthropocene. The latter part of the article critically engages with this view. It introduces the concept of air-appropriation, understood as the colonization of atmospheric space by industrial carbon emissions, to draw attention to the imperial origins and legacies of this *nomos*. I argue, and this is the third reason for the emergence of the ecological *nomos*, that the air-appropriation not only historically preceded the science of the earth system but that it provides the very conditions that made these sciences possible, because air-appropriation entails both the (material) occupation and the (semiotic) signification of the atmosphere that allowed it to be ‘read’ as an engendered ecosphere. Carbon emissions made the atmosphere legible as a simultaneously natural and political space. Just as the early colonizers set foot on a territory before knowing what and where exactly it was, the carbon footprints preceded the charting and measuring of the atmosphere. Finally – the fourth reason – this air-appropriation made a new *nomos* necessary because it posed the question over the proper distribution of the atmosphere. This is again analogous to the colonial land-appropriation that created the need for a new spatial and political order to divide a supposedly ‘New World’ among European colonizers.

To be very clear, this analogy should merely make clear that a new *nomos* becomes necessary as a response to distributional conflicts and is of course not intended to draw the same Eurocentric and imperialistic conclusions. The focus on air-appropriation makes it possible to criticize the imperial origins and ongoing injustices of the Anthropocene and to support a different ecological politics that does not repeat these imperial tendencies. Progressive geopolitics of the Anthropocene will have to find just solutions to the distributional problems that result from the air-appropriation. Yet the contemporary climate regime tends to repeat the mistakes of the past. It does not properly take into account the fact that the industrial countries of the global north occupy a disproportionately large part of the atmospheric space. Many of the instruments of climate change mitigation, like the creation and administration of carbon sinks, introduce new forms of ‘environmental colonialism’. That is why the emergence of the ecological *nomos* does not yet mark a transition from imperial to cosmopolitan geopolitics but tends instead to

continue imperial patterns with ecological means. The negotiation over the ecological *nomos* should not remain in the hands of the geocrats of ESS and of self-appointed planetary stewards. Critical social theorists should therefore not uncritically stick to the geocratic grand narrative of ESS or accept planetary stewardship as an adequate way to govern the Anthropocene, but should instead start to critically reflect on the presuppositions of Anthropocene talk, the *Realpolitik* of climate change and recognize or even incite alternative ways of drawing the political map of the Anthropocene. While such a redrawing of the anthropocenic map that attempts to contribute to a just redistribution of ecospace will have to rely to a certain extent on the ontological and epistemological repertoire of the ecological *nomos* – like carbon metrics – it also needs to keep a critical distance from it because its origins and conditions of possibility reside in acts of air-appropriation. Excavating the origins and legacies of the ecological *nomos* of the earth thus not only illuminates the violence and imperialism of the Anthropocene, it also indicates the need for new ways of re-appropriating the earth. The task is thus to come up with a non-imperialistic earthly politics for and against ‘the Anthropocene’.

Acknowledgement

I would like to thank the three anonymous reviewers for their productive remarks on the manuscript.


Declaration of conflicting interests

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author received no financial support for the research, authorship, and/or publication of this article.

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Notes

1. While the notion of the Anthropocene is a geological concept, the earth of Earth System Sciences (ESS) cannot be understood merely as a geological entity. Only the introduction of biological concepts – most clearly in Lovelock and Margulis’ (1974) Gaia hypothesis – made it possible to think of the earth as a complex self-regulating system (Dahan, 2010, p. 286 ff.). A series of social theorists recently argued that the emergence of the Anthropocene introduced a new form of geopolitics or geopower (Luisetti, 2018; Yusoff, 2016) that goes beyond Foucauldian biopolitics. While the new politics of the earth cannot be reduced to Foucauldian population biopolitics, it would be wrong to assume that these new forms of geopower simply supersede biopolitics. It is more appropriate to analyse them as an extension of traditional biopolitics: a politics of life beyond itself (Folkers, 2017, 2018a, pp. 343–352). The problem of the norm, the normal and normativity is where the biopolitical character of contemporary ‘geopolitics’ becomes most obvious, since – as Foucault (1990) showed – biopolitics is characterized by the growing importance of vital – rather than just juridical or disciplinary – norms

- in politics. By understanding the Earth as an organism, as Lovelock (2000) does, it becomes possible to depict its preferences and intrinsic normative order. However, as Canguilhem (1989) showed, 'biological normativity' not only entails homeostasis, the return to the normal state after a perturbation, but also the ability to establish new normative states. In ESS, this relative adaptability of the earth system is addressed by 'resilience thinking' (Folke et al., 2010) that stresses the ability of a system to absorb and reorganize in reaction to shocks. For a more elaborate engagement with normativity and resilience thinking in Earth System Governance, on which the argument in this section builds, see Folkers (2018b).
2. It may seem that in contrast to high-modernist state projects, this 'carbon literacy' was not an effect of governmental planning but an unintentional consequence of industrialization. However, as Eyal Weizman (2017, pp. 254–255) argues, a certain form of 'climatization' has always been an aim of modernity especially in the colonial context: '[S]een from the point of view of colonial history [...] climate change is no longer the collateral of history [...]. [C]olonial settlers, officials, and homme de lettres have debated [...] human-induced transformations across the expanding frontiers of colonialism [...] (T)aking over harsher, unfamiliar land also required their climatization so as to make them more inhabitable and productive for Europeans. [...] Climate change thus could be thought of as a form of government over both nature and man'.
 3. To mark the difference between such a version of a common world composed from divergence from prevalent concepts of the commons, Mario Blaser and Marisol de la Cadena (2017, p. 186) speak of 'the uncommons' understood as 'a condition that disrupts (yet does not replace) the idea of the world as shared ground'.

References

- Agarwal, A., & Narain, S. (1991). *Global warming in an unequal world: A case of environmental colonialism*. Centre for Science and Environment.
- Arendt, H. (1973). *The origins of totalitarianism*. Harcourt.
- Arènes, A., Latour, B., & Gaillardet, J. (2018). Giving depth to the surface: An exercise in the Gaia-graphy of critical zones. *The Anthropocene Review*, 5, 120–135.
- Barry, A. (2013). *Material politics: Disputes along the pipeline*. Blackwell.
- Beck, U. (2009). *World at risk*. Polity Press.
- Blaser, M., & De la Cadena, M. (2017). The uncommons: An introduction. *Anthropologica*, 59, 185–193.
- Bond, D. (2013). Governing disaster: The political life of the environment during the BP oil spill. *Cultural Anthropology*, 28, 694–715.
- Bonneuil, C., & Fressoz, J.-B. (2016). *The shock of the Anthropocene: The earth, history and us*. Verso Books.
- Canguilhem, G. (1989). *The normal and the pathological*. Zone Books.
- Chakrabarty, D. (2009). The climate of history: Four theses. *Critical Inquiry*, 35, 197–222.
- Clark, B., & York, R. (2005). Carbon metabolism: Global capitalism, climate change, and the biospheric rift. *Theory and Society*, 34, 391–428.
- Coronil, F. (1996). Beyond occidentalism: Toward nonimperial geohistorical categories. *Cultural Anthropology*, 11, 51–87.
- Crutzen, P. J. (2002). Geology of mankind. *Nature*, 415, 23.

- Dahan, A. (2010). Putting the earth system in a numerical box? The evolution from climate modeling toward global change. *Studies in History and Philosophy of Science Part B: Studies in History and Philosophy of Modern Physics*, 41, 282–292.
- Davis, H., & Todd, Z. (2017). On the importance of a date, or decolonizing the Anthropocene. *ACME: An International E-Journal for Critical Geographies*, 16, 761–780.
- De Castro, E. V. (2014). *Cannibal metaphysics*. University of Minnesota Press.
- Delanty, G., & Mota, A. (2017). Governing the Anthropocene: Agency, governance, knowledge. *European Journal of Social Theory*, 20, 9–38.
- Deleuze, G., & Guattari, F. (1987). *A thousand plateaus. Capitalism and schizophrenia*. University of Minnesota Press.
- Douglas, M. (1966). *Purity and danger: An analysis of concepts of pollution and taboo*. Routledge.
- Edwards, P. N. (2010). *A vast machine: Computer models, climate data, and the politics of global warming*. MIT Press.
- Elden, S. (2013). Secure the volume: Vertical geopolitics and the depth of power. *Political Geography*, 34, 35–51.
- Fogel, C. (2004). The local, the global, and the Kyoto protocol. In S. Jasanoff & M. L. Martello (Eds.), *Earthly politics: Local and global in environmental governance* (pp. 103–126). MIT Press.
- Folke, C., Carpenter, S., Walker, B., Scheffer, M., Chapin, T., & Rockstrom, J. (2010). Resilience thinking: Integrating resilience, adaptability and transformability. *Ecology and Society*, 15, 20.
- Folkers, A. (2017). Politik des Lebens jenseits seiner selbst. Für eine ökologische Lebenssoziologie mit Deleuze und Guattari. *Soziale Welt*, 68, 365–384.
- Folkers, A. (2018a). *Das Sicherheitsdispositiv der Resilienz. Katastrophische Risiken und die Biopolitik vitaler Systeme*. Campus.
- Folkers, A. (2018b). Resilienz als Nomos der Erde. Earth System Governance und die Politik des Anthropozäns. In A. Henkel & H. Laux (Eds.), *Die Erde, der Mensch und das Soziale. Zur Transformation gesellschaftlicher Naturverhältnisse im Anthropozän* (pp. 137–160). Transcript.
- Foucault, M. (1990). *The history of sexuality I: An introduction*. Vintage.
- Freidberg, S. (2013). Calculating sustainability in supply chain capitalism. *Economy and Society*, 42, 571–596.
- Gupta, J. (2016). Toward sharing our ecospace. In S. Jinnah & S. Nicholson (Eds.), *New earth politics: Essays from the Anthropocene* (pp. 271–291). MIT Press.
- Haraway, D. J. (2016). *Staying with the trouble: Making kin in the Chthulucene*. Duke University Press.
- Hegel, G. W. F. (1991). *Hegel: Elements of the philosophy of right*. Cambridge University Press.
- Hornborg, A. (2009). Zero-sum world: Challenges in conceptualizing environmental load displacement and ecologically unequal exchange in the world-system. *International Journal of Comparative Sociology*, 50, 237–262.
- Jasanoff, S., & Martello, M. L. (2004). *Earthly politics: Local and global in environmental governance*. MIT Press.
- Jonas, H. (1984). *The imperative of responsibility. In search of an ethics for the technological age*. University of Chicago Press.
- Karera, A. (2019). Blackness and the pitfalls of Anthropocene ethics. *Critical Philosophy of Race*, 7, 32–56.

- Koyré, A. (1957). *From the closed world to the infinite universe*. Johns Hopkins Press.
- Latour, B. (2017). *Facing Gaia. Eight lectures on the new climatic regime*. Polity Press.
- Latour, B. (2018). *Down to earth: Politics in the new climatic regime*. Polity Press.
- Law, J. (2015). What's wrong with a one-world world? *Distinktion: Scandinavian Journal of Social Theory*, 16, 126–139.
- Lenton, T. M., Held, H., Kriegler, E., Hall, J. W., Lucht, W., Rahmstorf, S., & Schellnhuber, H. J. (2008). Tipping elements in the earth's climate system. *Proceedings of the National Academy of Sciences*, 105, 1786–1793.
- Lewis, S. L., & Maslin, M. A. (2015). Defining the Anthropocene. *Nature*, 519, 171.
- Locke, J. (1982). *Second treatise of government: An essay concerning the true original, extent and end of civil government*. Harlan Davidson.
- Lohmann, L. (2005). Marketing and making carbon dumps: Commodification, calculation and counterfactuals in climate change mitigation. *Science as Culture*, 14, 203–235.
- Lövbrand, E., & Stripple, J. (2006). The climate as political space: On the territorialisation of the global carbon cycle. *Review of International Studies*, 32, 217–235.
- Lovelock, J. E. (2000). *Gaia: A new look at life on earth*. Oxford Paperbacks.
- Lovelock, J. E., & Margulis, L. (1974). Atmospheric homeostasis by and for the biosphere: The Gaia hypothesis. *Tellus*, 26, 2–10.
- Luisetti, F. (2018). Geopower: On the states of nature of late capitalism. *European Journal of Social Theory*, 22, 342–363.
- MacKenzie, D. (2009). Making things the same: Gases, emission rights and the politics of carbon markets. *Accounting, Organizations and Society*, 34, 440–455.
- Masco, J. (2010). Bad weather: On planetary crisis. *Social Studies of Science*, 40, 7–40.
- Moreno, C., Chassé, D. S., & Fuhr, L. (2015). *Carbon metrics: Glocal abstractions and ecological epistemicide*. Heinrich-Böll-Stiftung.
- Neumann, F. (1984). *Behemoth. Struktur und Praxis des Nationalsozialismus 1933–1944*. Fischer.
- Nixon, R. (2011). *Slow violence and the environmentalism of the poor*. Harvard University Press.
- Pottage, A. (2017). Our geological contemporary. In J. Desautels-Stein & C. Tomlins (Eds.), *Searching for contemporary legal thought* (pp. 177–198). Cambridge University Press.
- Pottage, A. (2019). Holocene jurisprudence. *Journal of Human Rights and the Environment*, 10, 153–175.
- Povinelli, E. A. (2016). *Geontologies: A requiem to late liberalism*. Duke University Press.
- Rockström, J., Steffen, W., Noone, K., Persson, A., Chapin, F. S. III, Lambin, E. F., Lenton, T. M., Scheffer, M., Folke, C., Schellnhuber, H. J., Nykvist, B., de Wit, C. A., Hughes, T., van der Leeuw, S., Rodhe, H., Sörlin, S., Snyder, P. K., Costanza, R., Svedin, U., . . . Foley, J. A. (2009a). A safe operating space for humanity. *Nature*, 461, 472–475.
- Rockström, J., Steffen, W. L., Noone, K., Persson, A., Chapin, F. S. III, Lambin, E. F., Lenton, T. M., Scheffer, M., Folke, C., Schellnhuber, H. J., Nykvist, B., de Wit, C. A., Hughes, T., van der Leeuw, S., Rodhe, H., Sörlin, S., Snyder, P. K., Costanza, R., Svedin, U., . . . Foley, J. A. (2009b). Planetary boundaries: Exploring the safe operating space for humanity. *Ecology and Society*, 14, 32.
- Schellnhuber, H.-J. (1999). 'Earth system' analysis and the second Copernican revolution. *Nature*, 402, 19–23.

- Schmitt, C. (2004). *Politische Theologie: Vier Kapitel zur Lehre von der Souveränität*. Duncker & Humblot.
- Schmitt, C. (2006). *The nomos of the earth in the international Law of the Jus Publicum Europaeum*. Telos Press.
- Schmitt, C. (2011a). *Der Nomos der Erde im Völkerrecht des Jus Publicum Europaeum*. Duncker & Humblot.
- Schmitt, C. (2011b). *Land und Meer. Eine weltgeschichtliche Betrachtung*. Klett-Cotta.
- Scott, J. C. (1998). *Seeing like a state: How certain schemes to improve the human condition have failed*. Yale University Press.
- Serres, M. (2010). *Malfesance: Appropriation through pollution?* Stanford University Press.
- Spencer, M., Dányi, E., & Hayashi, Y. (2019). Asymmetries and climate futures: Working with waters in an Indigenous Australian settlement. *Science, Technology, & Human Values*, 44, 786–813.
- Steffen, W., Persson, Å., Deutsch, L., Zalasiewicz, J., Williams, M., Richardson, K., Crumley, C., Crutzen, P., Folke, C., Gordon, L., Molina, M., Ramanathan, V., Rockström, J., Scheffer, M., Schellnhuber, H. J., & Svedin, U. (2011). The Anthropocene: From global change to planetary stewardship. *Ambio*, 40, 739–761.
- Stengers, I. (2005). The cosmopolitical proposal. In B. Latour & P. Weibel (Eds.), *Making things public: Atmospheres of democracy* (pp. 994–1003). MIT Press.
- Szszynski, B. (2019). How the earth remembers and forgets. In A. Bobbette & A. Donovan (Eds.), *Political geology. Active stratigraphies and the making of life* (pp. 219–236). Palgrave Macmillan.
- Tsing, A. L., Bubandt, N., Gan, E., & Swanson, H. (2017). Introduction: Bodies tumbled into bodies. In A. L. Tsing, N. Bubandt, E. Gan, & H. Swanson (Eds.), *Arts of living on a damaged planet: Monsters of the Anthropocene* (pp. M1–M14). University of Minnesota Press.
- UN. (2015). *Paris agreement*. United Nations, Framework Convention on Climate Change.
- Verran, H. (1998). Re-imagining land ownership in Australia. *Postcolonial Studies: Culture, Politics, Economy*, 1, 237–254.
- WBGU. (2009). *Kassensturz für den Weltklimavertrag. Der Budgetansatz*. Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen.
- Weizman, E. (2017). *Forensic architecture: Violence at the threshold of detectability*. MIT Press.
- Whittington, J. (2016). Carbon as a metric of the human. *PoLAR: Political and Legal Anthropology Review*, 39, 46–63.
- Young, O. R., & Steffen, W. (2009). The earth system: Sustaining planetary life-support systems. In C. Folke, G. P. Kofinas, & S. F. Chapin (Eds.), *Principles of ecosystem stewardship. Resilience based natural resource management in a changing world* (pp. 295–315). Springer.
- Yusoff, K. (2009). Excess, catastrophe, and climate change. *Environment and Planning D: Society and Space*, 27, 1010–1029.
- Yusoff, K. (2016). Anthropogenesis: Origins and endings in the Anthropocene. *Theory, Culture & Society*, 33, 3–28.
- Yusoff, K. (2018). *A billion black Anthropocenes or none*. University of Minnesota Press.
- Zalasiewicz, J., Williams, M., Waters, C. N., Barnosky, A. D., & Haff, P. (2014). The technofossil record of humans. *The Anthropocene Review*, 1, 34–43.

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