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Climate Change in the Era of the Anthropocene - An Institutional Analysis

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Abstract

Recently, many geoscientists have re-conceptualized and re-labelled our current Holocene Era as "the Anthropocene," a less stable era with biophysical characteristics and processes strongly influenced by human activity. Yet much of the contemporary research done in organizations and the natural environmental (OandNE) theory is around climate change, which is but one of nine inter-connected "planetary boundaries" that mark this new geological epoch. With the goal of aligning institutional theory to address the deeper cultural and ideological issues of the Anthropocene, we examine this disjuncture between climate change and Anthropocene research and offer suggestions for realignment. Of particular interest to this paper is the exploration of (1) field level constituencies that have engaged, not only on climate change, but also on the other domains of the Anthropocene, and (2) the forms of discourse, meaning and framing that take place within each logic community. Empirically, we draw on systematically collected discourse data and consider specific institutional case examples of the ways in which the Anthropocene, in part or in whole, has, is or is not being engaged by various constituencies.

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Introduction

Climate change is a major challenge of our day. Public opinion polls, while oscillating with economics, have put climate change in the top ten personal concerns in the US, Canada, Germany, and, more recently, China (Pew Research Centre, 2013). Among scientists, it has been rated as one of the top ten issues of concern for the planet in this century (Powell and Martindale, 2000; Matson and Pavlus, 2010), and business commentators have embraced it as a critical issue for markets and organizations (Economist, 2011; Perrow, 2007; Sachs, 2006).

But climate change itself is part of something bigger: the Anthropocene Era (Crutzen and Stoermer, 2000). The Anthropocene Era refers to the reconceptualization of - and new label for - our current geophysical time period, one that has been accepted by an increasingly large group of researchers and academic societies within the physical sciences (Zalasiewicz et al., 2010). Instead of living in the Holocene Era, which is characterized by stability and relative fecundity for humans, we are living in an era of volatility where the underlying vector of change is human activity. That volatility, according to proponents of the concept has already pushed us past three critical thresholds and threatens to do the same in several other domains that measure the evolution of the Anthropocene, one of which is climate change.

The scope, complexity, and volatility of systems in the Anthropocene have two important implications for how organization theorists, particularly institutionalists, might approach climate change as a topic in the coming years. First, climate change is just one marker for the broader shift of the Anthropocene. While we might focus our attention on this one particular bio-physical

domain, other human-induced changes are also in play. Each is the product of the same fundamental shift in our social reality – that humans are now a powerful vector in the form and function of the natural ecosystem. In order to properly address climate change as a social and bio-physical shift, we must attend to these deeper social, cultural and ideological causes and broaden our attention to the inter-connected system of outcomes exemplified by the nine planetary boundaries.

Second, the Anthropocene cannot be directly apprehended in individual or group level observation and simple linguistic terms. Any moment of change and stability in any particular subsystem, like freshwater, biodiversity, or climate change, is only known via higher level, aggregate observation, confirmed via quantitative and qualitative benchmarking. As a result, the Anthropocene, at its root, requires a fundamental shift in our institutional beliefs about this indirectly apprehended reality as much as measuring shifts in the bio-physical reality itself. The labeling, framing, and leveraging of the meaning of the Anthropocene become the most important features for humans to understand their role in this new era.

With these two considerations in mind, institutional theory has a particularly important role to play in understanding what is before us in this new epoch. Institutional theory is dedicated to the understanding and use of meaning making, social dynamics, and the evolution of societal values, beliefs, cultures and worldviews. As such, from an institutional approach, the study of the Anthropocene Era becomes instead the study of "Anthropocene Society;" that is, the society that will emerge in the face of the Anthropocene Era. Institutionalists must attempt to understand and explain how this society avoids - or acknowledges - the evolution of the geophysical features of

that era and society's role in creating and shaping them.

In a recent article (Hoffman and Jennings, 2015), we discussed several sweeping ontological and epistemological implications of the Anthropocene Era and Society for institutional theorists. The purpose of this current paper is to take additional steps in focusing on the Anthropocene's implications for climate change research, one rich area of institutional study (Hoffman and Georg, 2013).

Climate change is one of the nine recognized domains or "boundary areas" of the Anthropocene (Rockström et al., 2009) which makes transposition of some of the knowledge from institutional studies possible. Of particular interest to this paper is the exploration of (1) field level constituencies that have engaged, not only on climate change, but also on the other domains of the Anthropocene and (2) the forms of discourse, meaning and framing that take place within each logic community. As part of that effort, we will also turn the lens back on ourselves as a research community to capture the extent to which the Anthropocene has been engaged by the research communities of Organizations and the Natural Environment (OandNE). Empirically, we will draw on systematically collected discourse data and consider specific institutional case examples of the ways in which the Anthropocene, in part or in whole, has, is or is not being engaged. However, our purpose at this point is primarily to reorient and develop theory and lay groundwork for study, not to conduct in-depth, comprehensive empirical research.

We begin by briefly examining the notion of the Anthropocene, we then turn to the climate change research in organization theory, especially as conducted by institutionalists, and show the

implications for how it is conducted and to what issues it is properly directed to be fully engaged on the entirety of the issue at hand. We consider the multiple planetary boundaries of the Anthropocene and the level of attention that each is receiving within various field level constituencies. We examine the level of discourse in each, the extent of overlap and the implications for what this means to the further study of the Anthropocene within the OandNE field.

The Anthropocene Era and Anthropocene Society

The Anthropocene Era refers to the changes in the earth's geological and biophysical markers that have been observed since the start of the Industrial Revolution in 1790, though some argue this change goes back 2,000 years to when greenhouse gas buildups, freshwater pollution, de-speciation and several other domains of geophysical system began to be noticeably influenced by human inhabitants (Steffen et al., 2011). Several theorists have argued that the changes we are observing at the regional and planetary level are best captured on the level of nine planetary boundaries (Rockström et al., 2009), each with certain thresholds or boundaries that carry significant problems for human society. They are: climate change, ocean acidification, ozone depletion, atmospheric aerosol loading, phosphorous and nitrogen cycles, global freshwater use, land system change, loss of biodiversity and chemical pollution (Gillings and Hagan-Lawson, 2014).

Anthropocene Society refers to the society that emerges in the Anthropocene Era (Hoffman and Jennings, 2015; Rowan, 2014). As such, it is a discursive term that entails the operation of all current societies across various countries and regions with regard, not only to the nine domains

and the overall change in planetary health, but also to the underlying institutionalized beliefs upon which it is based. It is an explanatory term that focuses primarily on how specific operations of these societies around the planet jointly influence each domain and the overall system. Yet, it is also an inherently normative term, for it implies that an Anthropocene Society that does not deal with threshold boundary conditions during the Anthropocene Era will suffer negative and harmful consequences.

We have argued elsewhere that, in light of its sweeping socio-political nature, the Anthropocene Society represents a zeitgeist or overall societal paradigm shift, one that may not keep various domains of the Anthropocene within their planetary boundaries (Hoffman and Jennings, 2015). One reason, as shown in Figure 1, is that scientific research indicates that some boundaries have already been crossed and others may be soon (Rockström et al., 2009).

--- Insert Figure 1 about here ---

A second reason that the emergent Anthropocene Society may not fully address the cultural changes required by the Anthropocene Era is that within given boundaries, such as biodiversity loss and the nitrogen cycle, there has not been much progress within society at either recognizing society's impact or addressing the threshold effects. A third reason is that this lack of recognition, in spite of sweeping evidence within some of these domains, is due to institutional contestation. The evidence is often avoided or actively challenged by particular social groups and social movements which direct attention to challenging scientific conclusion, making only marginal change, or focusing on only parts of the whole, all of which lead to an inability for

society to influence the root cultural causes of the bio-physical threshold effects (thus far). A fourth reason relates to the inherent complexity of the system effects of the Anthropocene; changes in one planetary domain may affect and be affected by those in another. Attempts to address changes in one domain may have unintended consequences for changes in another. As such, it may be that we need a shift in perspective akin to the philosophical and cultural shift in the Enlightenment in order for the linkage between the Anthropocene Era and Anthropocene Society to be embraced.

Current Climate Change Research in Institutional Theory

Even though climate change has been studied from many organizational theories over the last dozen years (for a summary, see Hoffman and Bansal, 2012; Hoffman and Georg, 2013), institutional theory possesses a particularly strong positioning for examining the Anthropocene Era-Society link. Given that strength, we focus on how it has examined this one domain of the Anthropocene and what changes might be made to institutional theory and analysis in that domain going forward.

In institutional theory, climate change research has been conducted around three main topics at the intersection of the two sets of related processes: 1) the discourse and framing, especially by skeptics of climate change; 2) the determinants and impediments of technical innovation in climate change related industries (e.g., energy and renewables), and 3) climate change policy and negotiations (Hoffman and Georg, 2013). These three topic areas in institutional research on climate change are depicted in Figure 2.

--- Insert Figure 2 about here ---

Discourse and framing of climate change, from an institutional theory angle, refer to the problematization and theorization of climate change by organizational actors in multiple fields. Lefsrud and Meyer (2012) have examined how climate change is viewed by various geoscience and engineering professionals in a region dependent on climate damaging oil production and shown that these natural allies in resisting the reality and need for mitigation of climate change generate ambiguities around the nature of the issue and decouple their own roles from climate change outcomes. Hoffman (2011; 2015) in his study of the social dynamics of the climate change debate has shown how very active climate change contrarians create powerful political groups supporting their position and also rely on a small number of contrarian scientists to reinforce their position.

The determinants and impediments of technical innovation in climate change related industries examine the multiple and related social and political forces that lead to diffusion or stasis. For example, studies of electric utilities and alternative energy have shown that it is possible to create viable innovation that has lower climate change effects and diffuse those innovation across different states or regions (Delmas, 2002; Haveman, 1993; Russo and Fouts, 1997). ENGOs and local social movements are critical for this diffusion process (Weber, Heinze, and DeSoucey, 2008; Bertels, Hoffman and DeJordy, 2014), just as they have been shown to be for recycling (Lounsbury, 1998) and adoption of pollution abatement programs (Bansal and Clelland, 2004). Nevertheless, these innovations are most often supplementary in nature and scope (Young and Dhanda, 2012). There are usually powerful market forces that impede or shape the adoption

(King and Lenox, 2000) and specific players that may position against them (Hoffman and Jennings, 2011).

Policy and negotiation around climate change seem quintessentially institutional. Policy in this area means both the formal policies of states and the informal policies (common practice, MOUs, agreements) that have evolved in specific systems (Hoffman and Ventresca, 2002; Vogel, 1996). The formal and the informal policies work as part of policy cultures or logics (Dobbin, 1994) and thus guide any specific rules and laws through accepted models. In the case of climate change, few policy models have been legitimated, which is telling. The most pervasive system is the Kyoto Protocol, yet, that agreement is hotly contested and has been partially supplanted by other more recent Conference of the Party Accords (Schüssler et al, 2013). One model that is employed as a standard tool is the "Cap and Trade" system, yet research has shown that while it may lead to lower greenhouse gas emissions, it may also lower innovation and damage returns to innovators (Liesen, 2012). In both cases, the lack of powerful regulatory organizations at the international level (e.g., the United Nations), and the patchiness of transnational ENGOs for action has made collaboration and coordinated action difficult.

Discourse and framing, climate change innovation and its determinants, and policy and negotiation, as suggested by our brief review, are linked, with research in each domain involving the other. For example, the chemical industry's innovations and regulation were affected by the logics and discourse about those innovations (Hoffman, 1997; Garud, Gehman, and Karunakaran , 2014). Policy is also strongly influenced over time by the type of discourse about the nature of climate change (Schüssler et al., 2013; Weber and Soderstrom, 2015). Similarly, findings about

chemicals, such as DDT, influence the type of discourse about their safety concerns and policies to address them (Maguire and Hardy, 2009), and policy about climate change, such as the Kyoto protocol, certainly influences both ensuring discourse about sustainability (Bansal and Clelland, 2004). Therefore, as shown in Figure 2, there are reciprocal relationships among each of these three areas of institutional study.

The Implications of the Anthropocene for Institutional Research on Climate Change

In recent work, we argued that, at the mid-theory level, new theory and empirics would need to be crafted to capture the full scope of the Anthropocene Era and Anthropocene Society (Hoffman and Jennings, 2015). Here we focus on some of the key mid-range theory adjustments discussed in that article, namely *problematization*, *institutional dynamics* (e.g., constituencies and social movements), and *normative responses* for institutional theory in the Anthropocene. In our discussion of implications for these three elements, we concentrate on discourse and framing research around climate change in Figure 1, though, as we shall below, some of this research involves innovation, and a great deal effects policy; that is, the other two linked topic areas in Figure 1.

Re-Problematizing Climate Change in Discourse. The Anthropocene requires re-problematizing the geophysical phenomena represented by the nine boundary domains and the complex systems that link them within the Anthropocene Era and Anthropocene Society. Climate change as a problem from the point of the view of the Anthropocene is just one domain among nine. As a domain, as Figure 1 showed, climate change has approached or exceeded threshold values, but to a lesser degree than biodiversity and the nitrogen cycle. However, if we

examine the amount of discourse in science and social science journals given to climate change versus these two more serious domains, as well as the other six, we see quite the opposite pattern: climate change discourse dwarfs discourse in all other domains. While overall coverage of Anthropocene topics in scientific journals as recorded within the Web of Science increased by a factor of 5.8 over the time period between 1995 and 2014, coverage of climate change increased by more than a factor of 13. Indeed, increases in climate change coverage exceed the total growth in scientific articles overall, which only increased by a factor of 2.1. In percentage terms relative to each panel's total articles, climate change discourse increased from 26% to 58% of total Anthropocene topic coverage. Conversely, biodiversity decreased from 12% to 6% of the total and geophysical (combining Nitrogen and Phosphorous) decreased from 16% to 12%. While attention to all Anthropocene domains has almost tripled (from 0.36% to 0.99% of all articles in Web of Science), the relative attention being paid to these various domains indicates that an overwhelming share is being paid to climate change.

--- Insert Table 1 about here ---

This over-weighted discourse around climate change suggests the importance of re-theorizing the Anthropocene in terms of the full scope of domains. Importantly, there is much overlap and interconnection among these domains. For example, biodiversity loss and nitrogen are both exacerbated by climate change. Many endangered habitats, such as mangrove swamps, high alpine zones, and moderate deserts, will be altered even further by the weather and climate variability due to climate change, leading to further species extinction. Similarly, increased nitrogen fertilizer run-off can be expected in the wake of the peak storm events associated with climate change, especially as droughts and winds have eroded natural soil bases.

Such linkage of climate change with the other eight domains can be observed within the scientific literature. Table 2 displays the absolute number of articles that discuss each domain and climate change in the 2010-14 period, the percentage of articles relative to the domain articles, and the percentage of articles relative to the total number of domain and climate change articles.

--- Insert Table 2 about here ---

What we see in column two is that large numbers of articles in other Anthropocene domains are linked in some way towards climate change. Further, column three shows that 23% of the articles in all other domains link to climate change, with some ranging much higher: 42% of biodiversity, 41% of land-use and 39% of ozone articles reference climate change. Finally, column four shows that, of the overall article coverage, 9.7% of all articles link the other domains with climate change, with percentages far lower for each domain. Thus, in some ways, the climate change debate very much a part of the study of these other domains. These are just further evidence of the extent to which the climate change domain has dominated the study of all others.

The disjuncture between the importance of the various domains (and in particular those that have exceeded their thresholds) and the level of discourse about them, from an institutional theory standpoint, needs further theoretical and empirical consideration. In keeping with traditional institutional claims, the rationalization of the various domains via scientific explanation has increased, as previously discussed, by a factor of 5.8 (from 74, 692 to 435,009 articles in the 20

year, five year panels) with each domain witnessing an absolute increase. But, these increases have not been path dependent with climate change coverage receiving a disproportionate level of increased coverage, responsible for 64% of total Anthropocene coverage increase.

Within the institutional literature, major shifts in path dependent change, whether it be diffusion of a practice or incremental change of a new form of organizational institution, like the United Nations, would be due to an exogenous trigger (Greenwood et al., 2011; Hoffman and Ocasio, 2001) or an endogenous conflict (Davis et al., 2002; Thornton et al., 2012). In the past twenty years, there has not been a major exogenous, biophysical event that would account for the massive shift of attention to climate change. Information about greenhouse gas increases and temperature changes were available to scientists in the earlier period and through the 1990s. Instead, the major shift may be due to endogenous forces in Anthropocene Society. The Rio Accord and Kyoto Treaty became focal points for contestation across nations and political subgroups, which have spilled into scientific studies of climate change and its knock on effects.

From a bird's eye view, if the problematization of climate change is indicative of how issues will develop in the Anthropocene, it would seem prescient to prepare for other large shifts in attention, ones disconnected from the overall picture of the planet's health. Proponents of the Anthropocene hope that institutionalization of this Era will act as an "umbrella construct" (Hirsch and Levin, 1999) or "master frame " (Gamson, 1992) that will serve to create consensus in a theoretically fragmented space, coordinate action towards seemingly disparate environmental impacts, and affect regulatory change. Ironically, the nine domains, with different thresholds, may beget even more arguments over the nature of the problem, how to focus

attention, and prioritize resources. However, if society is able to theorize, objectify and legitimize the Anthropocene such that it can withstand validity challenges and prove to be a useful unifying construct to practitioners (Hirsch and Levin, 1999), it may survive and even thrive.

Institutional Dynamics. Institutional dynamics refers to the forces behind theorization, objectification, and legitimation (as well as de-legitimation) of institutionalized artifacts, such as ideas, practices, organizations, systems, and culture. In our recent review of institutional theory, apart from the ongoing shocks which are likely to occur in the Anthropocene, we focused on field level constituencies and social movements as two traditional drivers of institutionalization and change that are often expressed in shifting discourse (Hoffman and Jennings, 2015). Constituencies refer to the various identifiable participants in a field, where a field is an arrangement of organizations bound together by both a common concern and the direct and indirect interaction around that concern. Social movements form around key issues that unite many constituencies in a field in a way that mobilizes them to act. The actual direction and ultimate outcome of that action, in institutional theory, is often not knowable in advance, even if these movements have ex ante espoused means and end.

In light of having nine, disparate domains within the Anthropocene, with varying cycles of development, one would expect wider and more fragmented constituencies within Anthropocene Society. The best way of characterizing the constituencies is unclear, but the climate change debate itself provides a useful starting point. In it, we have seen that there are constituencies organized around different institutional communities, such as the professions, state bureaucrats,

corporate and consumer groups, religious organizations and others. In an attempt to capture the level of examination in each of these constituencies about the various Anthropocene domains, we aggregated the articles in Table 1 around the disciplines of the journals within which these articles appear, using Web of Science's 'research areas' categorization. Table 3 shows the aggregate number of articles relating various disciplines for the last twenty years on the nine domains. We added one extra column for the journal, *Organization and Environment*, to capture the level of discourse among the community of scholars that study the intersection of sustainability and organizational issues.

--- Insert Table 3 about here ---

Overall, what we can see is that Anthropocene topics have been the subject of article coverage ranging from 2.26% of all articles in Business/Economics to 1.61% in Physical Science/Engineering to 0.06% in Philosophy/Religion. Within that coverage, climate change, not surprisingly, has been the dominant topic over the time period, as we also saw with Table 1. Coverage of the topic has ranged from 38% of Health Science to 79% of Business and Economics coverage. Biodiversity loss, by contrast, has accounted for only 5% to 15% of disciplinary focus. In Physical Science/Engineering, a fair amount of attention is also being paid to biogeochemical (16%) and freshwater (12%). Health Science is also concerned with biogeochemical (17%) and chemical pollution (14%). Social Science is discussing biodiversity loss and land-use changes (both at 15%). Meanwhile for Policy, Business / Economics, and Philosophy / Religion, all other Anthropocene domain capture 9% or less of overall attention.

Within the field of Organizations and the Natural Environment (OandNE), the trends are very similar as in other domains with climate change commanding 51% of the Anthropocene coverage, with land-use occupying 19% and the other seven domains in single digits. Attention to the Anthropocene domains has also increased through time in *Organization and Environment*, from 11% of all articles published 1995-1999 to 97% of articles published in 2010-2014. Again, climate change represents a disproportionate increase of that attention, from 27% of this Anthropocene discussion in 1995-1999, peaking in 2005-2009 at 66%, and dropping to 54% in 2010-2014.

In sum, climate change has been substantially amplified as an issue by the Business, Policy, and Religious communities over the last twenty year period, and, to a much lesser degree, by the Physical Science, Health and Social Science communities. This also shows that business and policy constituents in this field have been able to raise the level of awareness of the issue successfully, even if scientists themselves would seem to be more natural proponents. On the other hand, more detailed research of these constituents has shown that the number of articles is, in large measure, due to the contested public debate over the meaning of climate change and action to be taken (Hoffman, 2011); that is, within domain fragmentation.

It may be, then, that in the Anthropocene, the focus by Physical Science and Health professionals on other domains, like biogeochemicals (N and P), will be more beneficial. The number of articles in these communities for these domains is quite large in absolute terms, while the attention paid by other constituents is small. This focus by science may lead to a few, less

controversial policies being passed. Work by Maguire and Hardy (2009; 2013) on policy created for DDT and other chemical compounds has traced the discourse from science to policy and back again over a multi-year period, and shown how, through negotiation and critical events, it has managed to yield some substantive changes in regulation for those chemicals.

But what of the role of social movements in climate change and other Anthropocene domains? Traditionally, many institutions affecting whole regions and countries have been shaped by social movements, such as the Reformation in Europe between 1500 and 1700, the Enlightenment between the 1650s to the 1780s or the Progressive Movement in the US in the late 1800s and early 1900s. In the US, the environmental movement of the late 1960s led to the creation of the Environmental Protection Agency through the National Environmental Policy Act as well as the promulgation of the Clean Water and Clean Air Acts. Around the world, key constituents within industries and specific regions have also been mobilized to create change within specific domains, such as freshwater around Lake Erie, United States (Mehta and Ouelette, 1995) or forest biodiversity in British Columbia, Canada (Zietsma and Lawrence, 2010).

In the climate change domain, there have been nascent social movements, such as those represented in some of the Occupy Movements (Allison et al., 2015), and in the recent September marches in New York City (Economist, 2014). There has also been mobilization and protests around specific events, like the 2007 and 2013 COP meetings (Schüssler et al., 2013). Still, in the most recent era, constituents are linked through advocate organizations to temporary social movements, and these movements seem to be the less spontaneous action of loosely

organized groups, than coordinated, long term advocacy of movement specialists. As shown by Hoffman (2011; 2015) and Brulle (2014), the US climate "convinced" movement includes groups such as the IPCC, the National Academies of Science, the Center for American Progress, the Environmental Defense Fund, ecoAmerica, Climate Reality Project, 350.org, Climate Alliance Network, CERES, World Wildlife Fund, Friends of the Earth – indeed, almost every major ENGO. The climate "contrarian" movement is coordinated by groups such as the Heartland Institute, Cato Institute, Hoover Institute, Competitive Enterprise Institute, Americans for Tax Reform, Ayn Rand Institute, Cornwall Alliance for the Stewardship of Creation, George C. Marshall Institute, Hayek Institute, John Locke Foundation, New Zealand Climate Science Coalition, Science and Public Policy Institute, and the Tennessee Center for Policy Research. Their recent positions on climate change, as well as other issue domains of the Anthropocene, are illuminating, as can be seen in Table 4 below.

--- Insert Table 4 below ---

Both climate contrarian and convinced movements have constituents that are focused specifically on climate change (such as the convinced 350.org and contrarian NZ Climate Science) and others that are focused on broader agendas, of which climate change is a part. The (convinced) Environmental Defense Fund, for example, addresses a wide range of environmental issues, while the (contrarian) Cato Institute focuses on a host of conservative issues. On both sides, their tactics are many and varied, from raising awareness, supporting local protests/ mobilizations worldwide, leading campaigns, lobbying for regulatory and market reforms, stakeholder/corporate engagement and change initiatives. Yet, it is interesting that generalist

ENGOs, like the Environmental Defense Fund and specialist ENGOs, like the World Wildlife Fund, which had been focused on biodiversity, devote as much space as they do on their websites to climate change.

Turning to the deniers, we see that all are greatly involved in actively promoting climate change skepticism. On the Heartland Institute's website, it boasts that it is "the world's most prominent think tank promoting skepticism about man-made climate change [as noted by *The Economist*, May 26, 2012]." Yet, through their support of skeptical research and writing, the contrarian organizations have focused criticism, doubt, and debate around climate science (Oreskes and Conway, 2010). By continuing this contestation and controversy the more generalist ENGOs are increasingly sucked into the debate, perpetuating a vicious cycle of over-focus on the cause, to the detriment of finding meaningful solutions (Hoffman, 2011).

This cycle of contestation and increased attention to climate change, per Hirsch and Levin (1999), might lead to avoidance and a lack of theorization of the Anthropocene Era as a unifying construct within future, possible Anthropocene Societies. Or, alternatively, the contestation around climate change may galvanize support for the notion of the Anthropocene and the importance of a different Anthropocene Society, especially if elite opinion leaders stop arguing publicly amongst themselves. The most important factor in influencing public opinion on climate change, however, is the elite partisan battle over the issue. The two strongest effects on public concern are Democratic Congressional action statements and Republican roll-call votes, which increase and diminish public concern, respectively (Brulle, Carmichael, and Jenkins, 2012: 185).

Normative Responses to Climate Change in the Anthropocene. Normative responses to institutional change, while not strictly mid-range theory elements, are directly or indirectly implied by existing research work. As noted by Scott (2001), two of the pillars of institutionalism are the normative and the regulative. Work involving either often involves not just description and analysis, but adjustment. In the era of the Anthropocene, the institutional responses of greatest importance relate to the evolution of Anthropocene Society in response to the various domains of the Anthropocene, both singularly and as a composite. Given that the current course of Anthropocene Society has led to critical thresholds being approached or overshot in three of nine domains, one of the important responses is to develop alternative institutions that can arrest this evolution and steer it in another direction. These institutions are viewed as being created in increasingly complex fields, due to the many domains of the Anthropocene and the multilevel nature of the issue. While local, subfield responses are critical, so is some degree of coordinating policy and action across them, likely at the transnational level.

In the area of climate change, normative institutional responses are already quite evident. Much attention has been focused on Kyoto and COP as policies for changing national practices around greenhouse gas production. The bulk of the research on the treaty and the accords has declared them to be of marginal success, because the former has not been ratified by or does not have binding targets for the largest polluters, which includes the US, China, Russia, Japan, Australia, and Canada (UNFCC, 2005). Also, the various COP accords have required the upward adjustment of GHG levels in order to garner support, though the science behind GHG emissions has not warranted those adjustments (Jacoby, Prinn, and Schmalensee, 1998).

Nevertheless, the success of many EU nations, such as Germany, Norway, Sweden, and Denmark, as signatories, in reducing greenhouse gases has been examined as a regional experiment in a variety of ways. The local policies in these nations have been lauded (IEA, 2007), as has their commitment to the development of alternative sources of energy, especially of renewables (Winter, 2013). Along with renewables as an institutional field for study, others have examined power utilities as an industry to determine whether and how they have remixed their energy technologies (Delmas, 2002; Haveman, 1993; Russo and Fouts, 1997). The investigation of fields and technology mixes have made it clear that particular organizations that have made progress with curbing emissions and developing new technologies, like Statoil and Siemens. Consistent with Figure 1, these innovative organizations and their practices have gained prominence in discourse on climate change. In some circles, they have been lauded as local heroes (Economist, 2013), but yesterday's heroes often become today's villains, as we have seen with BP after the Deep Water Horizon disaster (Hoffman and Jennings, 2011).

In Anthropocene Society, then, would we wish to see replication in each of the other eight domains of these current normative institutional efforts to respond to climate change? Institutional studies of bureaucracies (e.g., March and Olsen, 1989) have long noted the importance of superordinate goals, slack resources, and internal capacity to deal with institutional problems around bureaucratic organizations, whether they be single organizations, like a university (Olsen and March, 1984), an organization set embedded in a community (Selznick, 1949), or national level, multi-unit organizations (Downs, 1967). Otherwise, the competing goals of subunits, the fight over scarce resources, and the lack of search and absorption under uncertainty will lead to idiosyncratic choices about policies and technologies

(March, Schulz and Zhou, 2000).

It would seem that without some coherent, accepted conceptualization of the Anthropocene, the allocation of resources to understanding Anthropocene's Society's relationship to the evolution of the era, and the development of cross-domain capacity, the variety of domains, the clamor for attention, and the excessive within-domain specialization will lead to unfortunate institutional policies and practices. Ironically, if we do not re-orient climate change research and responses towards the broader Anthropocene issues and the management of these issues in Anthropocene Society, the myopic attention to climate change would seem to generate these idiosyncrasies.

An examination of the current policies at the international and national level shows that, surprisingly, we may be part of the way down the road towards recognizing the Anthropocene. Table 5 shows the policies, measured as major agreements, accords, treaties, conventions, acts, and regulatory standards, enacted at the international level and within two progressive nations, Germany and the US, by date of first enactment (in brackets). As can be seen in row one of the table, many current international and national policies revolve around climate change, particularly recently. These policies notwithstanding, there are a large number of resource-oriented policies as well such as policies oriented towards biodiversity of marine life, transboundary air pollution, the international transportation of dangerous goods, and the prevention of and response to nuclear accidents. In Germany and the US, particulate, chemical and freshwater pollution have also been the focus of federal policies for a number of years

--- Insert Table 5 about here ---

In fact, as a particularly encouraging normative response, Germany has signed and ratified a large number of major multinational environmental agreements (Neumann, 2010). Federally, the constitution of the former GDR (1949) proclaims prevention of pollution and protection of flora, fauna, and natural beauty as a public as well as a personal responsibility (Engelhardt and Umwelt, 1990). The constitutions of each federal state, called *Länder* since 1919, also specify protection of the environment as an objective (Neumann, 2010). Since reunification, Germany has promulgated many acts/ordinances to promote the development of a range of renewable energies and greenhouse gas emissions trading as part of other consolidated environmental regulations within its country. Indeed, rather than taking an eco-centric or human-centric perspective with its environmental regulation, Germany appears to be taking a systems perspective that encompasses both. One example of this is Germany's annual review of the proportion of urban to forested areas, which governs the allowable changes to its land use.

In contrast, the United States has focused on the creation of renewable fuel standards and mandatory reporting of greenhouse gas emissions through the EPA, an agency under executive branch control. Other major federal environmental regulation were established long ago: Rivers and Harbors Appropriation Act (1899), National Environmental Policy Act (1969), and the Clean Water Act (1977) as an amendment to the Federal Water Pollution Control Act (1972). Chemical pollution and radioactive contamination is covered by federal regulations such as: Comprehensive Environmental Response, Compensation, and Liability Act (or Superfund, 1980), Resource Conservation and Recovery Act (1976), Community Reinvestment Act (1977), Superfund Amendments and Reauthorization Act (1986), and the Marine Protection, Research,

and Sanctuaries Act (1988), among others.

The multi-agreement, flexible, coordinated system of agreements in Germany seems, in principle, like a good starting policy model for responding to the Anthropocene. In general terms, we advocate that rather than relying on any one (potentially myopic) over-arching regulatory scheme, societies adopt "principles for crafting innovative institutional structures that can help key stakeholders navigate … hard governance and value problems better at the intersection of energy, environment, and health" and hybrid governance structures that "combine multiple institutions or actors… across levels of governance and the public/private divide." (Osofsky, 2014: 269-270). This is particularly true, given the complex, volatile nature of the different Anthropocene domains, which would require more flexible and resilient systems of organizational response (Perrow, 2008).

Conclusion: Re-Orienting Institutional Research on the Natural Environment

The purpose of this paper has been to re-orient some of the midrange institutional theory and research on the natural environment – especially climate change – in light of the new concept of the Anthropocene. We have tried to do so by focusing on research and insights about the constituencies, discourse, meaning, and framing of climate change. Our overview has shown how the strong focus on climate change has been at the expense of work on the other eight domains in the Anthropocene, and that a large part of this skewed attention has been due to the heavy contestation of the meaning and implications of climate change in countries around the world.

While we agree that it is important to continue studying climate change, we think that organization and natural environment (OandNE) theorists should examine this heavy emphasis on climate change relative to other domains of the Anthropocene as an institutional outcome, and consider its antecedents in order to adjust the outcome in the coming years. While some researchers are skeptical of ecological modernism's optimism in technical and business solutions (i.e., Foster, 2012), others are more hopeful. One approach, as suggested by Winn and Pogutz (2013), is to take an ecosystem approach to organizational theory by considering the interdependencies between humans and nature, organizational ecosystem embeddedness, system resilience and the associated implications for defining business risks and strategic responses such as cross-sectoral initiatives.

But, to our point in this paper, climate change is merely one marker among nine (and likely more) of the broader shifts in our geophysical reality. The disproportionate attention paid to this one marker distracts our attention from the root ideological and institutional nature of the issue before us; namely that we are living in an era of environmental volatility where the underlying vector of change is human activity. In short, humans are now leaving a permanent and unprecedented geological marker in the stratospheric record of the planet (Crutzen and Stoermer, 2000) and the Anthropocene Era represents an emergent awareness of a fundamental change in the intellectual, cultural and psychological conceptions of who we are as humans and how we relate to the world around us (Hoffman and Jennings, 2015). While technological and economic activity may be the direct cause of environmentally destructive behavior, it is our individual beliefs, cultural norms, and societal institutions that guide the development of that activity (Bazerman and Hoffman, 1999). So, as humankind embarks on this new reality of assuming a

guiding role in the operation of the world's natural systems, we must begin to ask what this means for the institutions of society and how we understand them. In order to properly address climate change as a social shift, we must attend to the deeper social, cultural and ideological causes and broaden our attention to the inter-connected system of outcomes exemplified by the nine planetary boundaries.

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Figure 1:
Crossing Planetary Boundaries (Rockström et al., 2009)

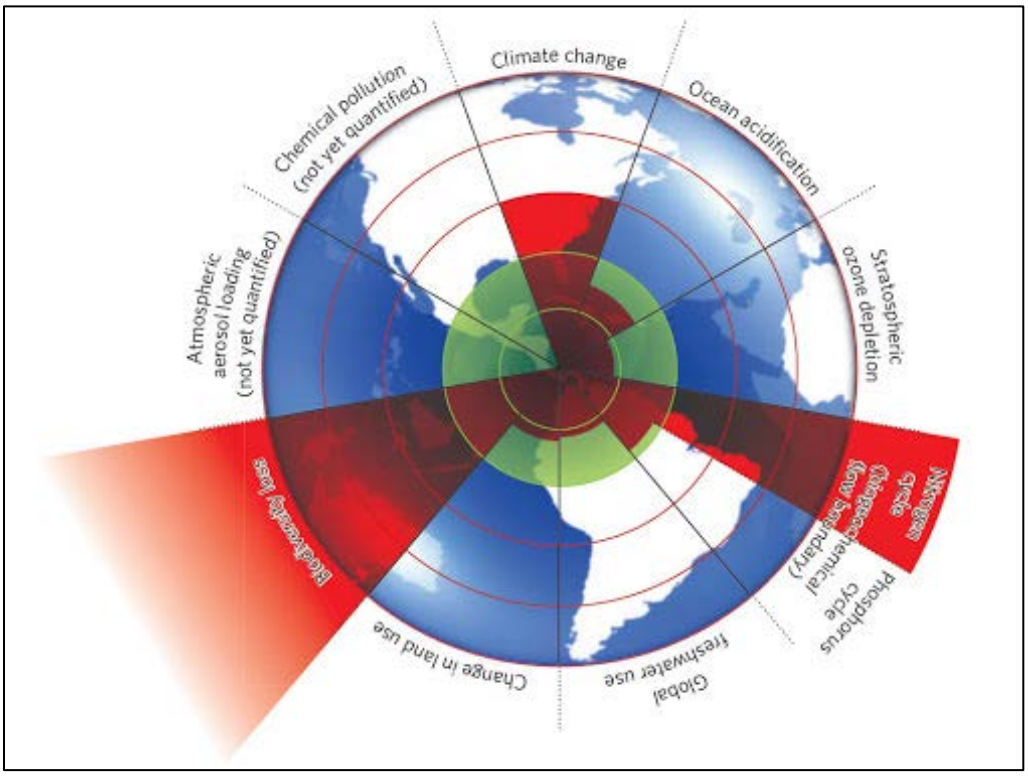

Figure 2:
Current Institutional Research on Climate Change

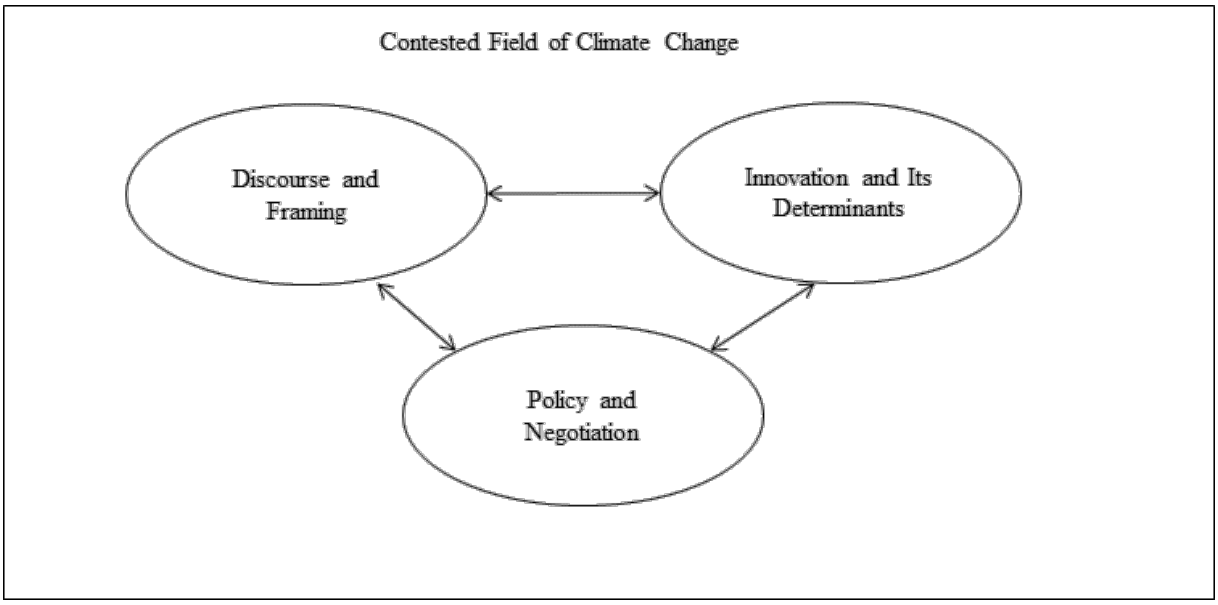

Table 1:
Number of Scientific Articles Referring to Anthropocene Domains, 1995-2014

Domain	1995-1999	2000-2004	2005-2009	2010-2014
1. Climate change	19,176 (26%)	42,659 (31%)	106,942 (46%)	250,531 (58%)
2. Biodiversity loss	8,784 (12%)	13,173 (9%)	20,476 (9%)	26,964 (6%)
3. Biogeochemical (N, P)	11,858 (16%)	33,923 (24%)	37,006 (16%)	53,524 (12%)
4. Ocean acidification	111 (0%)	330 (0%)	949 (0%)	10,089 (2%)
5. Land use	5,008 (7%)	8,940 (6%)	14,647 (6%)	22,421 (5%)
6. Freshwater	13,702 (18%)	21,415 (15%)	32,144 (14%)	45,905 (11%)
7. Ozone depletion	2,181 (3%)	2,091 (2%)	2,035 (1%)	2,160 (0%)
8. Particle pollution / Atmospheric aerosols	1,124 (2%)	1,645 (1%)	2,361 (1%)	5,790 (1%)
9. Chemical pollution	12,748 (17%)	15,060 (11%)	15,874 (7%)	17,625 (4%)
TOTAL	**74,692**	**139,236**	**232,434**	**435,009**
Percentage of total articles in each Time period	**0.36%**	**0.52%**	**0.66%**	**0.99%**

Source: Web of Science, absolute number of articles using domain key words, for each period
Note: We searched article key words, using the three most commonly used terms for each of the nine planetary boundaries: Climate change*, global warm*, greenhouse gas*; biodiversity loss, species extinct*, engendered species; biogeochemical, eutrophication, nitrogen cycle; ocean acidification, carbonic acid, coral bleaching; land use changes, deforestation, clear cutting; freshwater use, aquifer, water consumption; ozone depletion, ozone hole, stratospheric ozone; particle pollution, atmospheric aerosol*, smog; chemical pollution, toxic substance, radioactive contamination.

Table 2: Overlap of Climate Change (CC) Science Discourse with Science Discourse in Other Anthropocene Domains, 2010-2014

Domain	CC x Domain	CC x Domain/ Domain	CC x Domain / Domain and CC
1. Climate change	na	na	na
2. Biodiversity loss	11,333	42.03%	4.08%
3. Biogeochemical (N, P)	7,891	14.74%	2.60%
4. Ocean acidification	1,574	15.60%	0.60%
5. Land use	9,175	40.92%	3.36%
6. Freshwater	11,333	24.69%	3.82%
7. Ozone depletion	849	39.31%	0.34%
8. Particle pollution / Atmospheric aerosols	281	4.85%	0.11%
9. Chemical pollution	156	0.89%	0.06%
TOTAL	**42,592**	**23.09%**	**9.79%**

Source: Web of Science

Table 3:
Disciplinary Discussion of Anthropocene Domains, 1995-2014

	Physical Science/ Engineering/ Architecture	**Health Science / Medicine**	**Social Science / Humanities**	**Policy**	**Business / Economics**	**Philosophy / Religion**	***Organization and Environment***
1. Climate change	365,213 (46%)	88,656 (38%)	19,222 (55%)	12,795 (74%)	12,756 (79%)	303 (72%)	198 full text (51%) (14 keyword)
2. Biodiversity loss	61,457 (8%)	27,660 (12%)	5,201 (15%)	1,628 (9%)	758 (5%)	98 (5%)	31 full text (8%) (2 keyword)
3. Biogeochemical (N, P)	128,010 (16%)	40,414 (17%)	1,506 (4%)	334 (2%)	363 (2%)	0 (0%)	17 full text (4%) (1 keyword)
4. Ocean acidification	12,977 (2%)	5,101 (2%)	260 (1%)	52 (0%)	35 (0%)	2 (0%)	8 full text (2%) (0 keyword)
5. Land use	47,404 (6%)	8,558 (4%)	5,210 (15%)	1,174 (7%)	1,165 (7%)	13 (3%)	73 full text (19%) (1 keyword)
6. Freshwater	97,592 (12%)	28,328 (12%)	1,577 (4%)	493 (3%)	696 (3%)	0 (0%)	20 full text (5%) (0 keyword)
7. Ozone depletion	15,026 (2%)	1,733 (1%)	196 (1%)	134 (1%)	76 (1%)	5 (1%)	23 full text (6%) (0 keyword)
8. Particle pollution	13,190 (2%)	2,051 (1%)	273 (1%)	135 (1%)	84 (1%)	0 (0%)	12 full text (3%) (0 keyword)
9. Chemical pollution	45,259 (6%)	32,139 (14%)	1,695 (5%)	482 (3%)	168 (3%)	0 (0%)	9 full text (2%) (0 keyword)
TOTAL	**786,128**	**234,640**	**35,140**	**17,227**	**16,101**	**421**	**391 full text (18 keyword)**
Percentage of total articles in each disciplinary domain	**1.61%**	**0.38%**	**0.41%**	**0.79%**	**2.26%**	**0.06%**	**42.32% full text (1.95% keyword)**

Notes: For columns two through seven, we categorized the articles identified in Table 1 by the publication type within which these appeared to determine which research communities are discussing the various Anthropocene domains. These are not mutually exclusive, as some publications span several categories, such as a *Nature* article discussing the science of smog, the health implications, and potential policy prescriptions. For the sake of comparison, we searched *Organization and Environment* full text and keywords using these same terms in column eight.

Table 4:
ENGO/ NGO Positions on Anthropocene Domains
(Climate Specialists, Generalists, Specialists in Other Issues)

	Climate Change "Convinced" ENGOs			Climate Change "Contrarian" NGOs		
	1) 350.org	**2) Environmental Defense Fund (EDF)**	**3) World Wildlife Foundation (WWF)**	**1) NZ Climate Science**	**2) Cato Institute**	**3) Heartland Institute**
History, Focus, and Tactics	Founded in 2008 by McKibben. Supports grassroots divestment mobilizations worldwide against fossil fuels, opposes Keystone XL and other pipelines.	Founded in 1967 to preserve natural systems. Guided by nonpartisan science and economics, to find practical and lasting solutions. US focused policies, with international partners.	Founded in 1961 as international fundraising organization to support existing conservation groups. Worldwide focus, projects, publications.	Founded in 2006 by NZ scientists concerned about science that misleads re: so-called anthropogenic climate change.	Founded in 1974 as an American libertarian think tank to defend individual liberty, free markets, and limited government.	Founded in 1984 for the discovering, developing, and promoting of free-market solutions to social and economic problems.
1. Climate change	Climate change divestment/protests is its exclusive focus	Lobbying for climate change regulation and removing market barriers for renewables.	Raise awareness of climate change, assess habitat vulnerability, and promote sustainable investment.	Providing alternative/skeptical opinions and information on climate change science.	Opposes any CC regulation. Supports individual investment of CC technology development.	Global warming is not a crisis; the primary American organization pushing climate change skepticism.
2. Biodiversity loss		Restoring aquatic and wildlife habitats.			The biggest polluter is the government, which subsidizes polluting industries. People should be free to secure their preferences about the consumption of clean land, air or water. Likewise they should be free to make decisions based on their own risk tolerances; those directly affected by pollution are best able to deal with it.	
3. Biogeochemical (N, P)		Work with farmers and corporations to reduce fertilizer use.	Discuss effects of reactive nitrogen on habitat loss.			
4. Ocean acidification	Mentions acidification as side-effect	Focus on overfishing and coastal restoration, not acidification.	Discuss effects of acidification on habitat loss.			
5. Land use	Mentions improving land use as mitigation	Proposed carbon emission credits with Reducing Emissions from Deforestation and Degradation (REDD).	Developed Forest Stewardship Council (FSC) certification, improving policy, promoting responsible consumption/production			
6. Freshwater		Rebalancing water use.	Protecting ecosystems, coordinating governance and management.			
7. Ozone depletion		Defending existing clean air standards. Working to reform Toxic Substances Act	Discuss effects of air pollution on habitat loss and human health.			
8. Particle pollution / Atmospheric aerosols						
9. Chemical pollution						

Table 5:
Number of Multinational Agreements and Regional Policies Involving Different Domains (Year of First Introduction)

	Major Multinational Agreements [a]	German Environmental Protection Policies [b]	US EPA and Other Federal Environmental Policies [c]
1. Climate change	2 (1992)	Signed int'l agreement (1992) 9 (2000, promoting renewable energies, GHG trading)	35 (2010, mostly renewable fuel standards)
2. Biodiversity loss	53 (1946, mostly fisheries)	Signed int'l agreement (1992) 2 (2000)	1 (1973)
3. Biogeochemical (N, P)	0	Signed int'l NOx agreement (1991)	1
4. Ocean acidification	0	0	0
5. Land use	3 (1972)	*Länder* constitutions (1919) 2 (1999)	0
6. Freshwater	1 (1992)	*Länder* constitutions (1919) Signed int'l agreement (1992) 1 (1957), 3 (2001)	9 (1899)
7. Ozone depletion	2 (1985)	Signed int'l agreement (1985)	1 (1990)
8. Particle pollution	32 (1957, transboundary pollution) – particle and chemical pollution addressed jointly	Signed int'l air pollution agreement (1979) – particle and chemical pollution tend to be addressed jointly	5 (1970)
9. Chemical pollution			16 (1969)?

Sources:
a. http://en.wikipedia.org/wiki/List_of_international_environmental_agreements#Topic_order
b. http://www.bmub.bund.de/en/topics/strategy-legislation/acts-and-ordinances/
c. http://www2.epa.gov/regulatory-information-topic