Climate change

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Climate change, largely a product of human activities, is arguably the most comprehensive and dramatic challenge facing humanity. In the first decades of this century, its implications have become a major concern in anthropology. The first part of this entry shows why the contribution of anthropology is important to the interdisciplinary study of, and engagement with, climate change. Anthropology teaches us that climate change has to be related to global inequality and local diversity, and must be understood as a multi-scalar phenomenon embedded in local life, but with global ramifications. Anthropology can also show why political action to mitigate or halt climate change is sluggish and often inefficient. Tracing the origins and development of the anthropology of climate change in the late twentieth century, this entry then shows how the field has become more diverse, to include studies of resilience and adaptation, renewable energy, climate activism, as well as knowledge and discourses about climate change. While these studies are truly global by relating to a worldwide event, they retain an emphasis on local realities through ethnographic methods indicating variations in impact of and responses to climate change. They foreground that the issues having to do with climate change differ vastly across the world, from Australia to Peru, from Greenland to Mongolia. The entry ends by arguing that the anthropology of climate change represents a new approach to globalisation, one that shifts the focus from economics, culture, and politics to the ecological embeddedness of human life.

Introduction

Even if massive human impact on the climate is a recent phenomenon, the awareness that climate has an impact on human life is not new. One of the founders of medical science, Hippocrates (b. 460 BCE), wrote a treatise called *Airs, waters, places* which argued for a connection between the climate, the environment, and the human condition (Dove 2004). He held that temperament was related to climate, and that droughts, rains, heat waves, and seasonal changes in general had significant effects on health. Much later, during the Enlightenment, the social theorist Montesquieu (1689-1755) saw a close relationship between climate and social life. Notably, Montesquieu believed that cold air made people vigorous, while heat made them lethargic, with what he deemed to be important implications for cultural development. Dismissed by later social theorists as simplistic environmental determinism, similar ideas have never quite disappeared. What is new in the current age is the almost universal recognition of humanity's impact on climate and its potentially catastrophic consequences for life on the planet in the future. In this field, anthropologists are making important contributions to knowledge and policy. Before considering these contributions, however, it is necessary to provide a short review of the wider context in which contemporary concerns with climate change is placed.

Never before has humanity made its mark on the planet in ways even remotely comparable to the situation

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now. One-fifth of the way into the twenty-first century, human domination of the earth is such that the term 'Anthropocene' has become widespread as a label for the present time, not least because of the impact that humans have on global climate (see Chua & Fair 2019). This is a term which would, if widely adopted, make the Holocene – which began with the end of the last Ice Age about 11,500 years ago, and which had followed the two and a half million year old Pleistocene period – but a brief interlude in the long history of the planet. We live in an era which, since the onset of the industrial revolution in Europe, is marked by human activity and expansion in unprecedented ways. Socio-ecological change, including temperature rise due to the human emission of greenhouse gases, continues to accelerate; one could even speak of an acceleration of acceleration since the early 1990s, or simply of global overheating (Eriksen 2016). This situation represents a major challenge for all of us, whether we identify with kin groups, nations, religions, humanity, or the entire planetary ecosystem.

It is difficult to think of a more urgently relevant research topic in the world today than climate change, as it threatens to undermine the conditions of human societies as we know them. The literature proliferates inside and outside of the academic world and numerous climate change research centres, academic faculty sections and task forces have been established, often with a mixed basic and applied research mission (see, for example, Fiske *et al*. 2014). Important transnational institutions, such as the United Nations, have produced authoritative examinations, appraisals, and increasingly insistent policy recommendations, notably including reports from the Intergovernmental Panel on Climate Change (IPCC). At the time of this writing (2021), five IPCC reports have been published, the first in 1990, the most recent in 2014, with a sixth report due in 2022. Climate change has not just driven scholars to coin the term Anthropocene, but also the more recent and more controversial concept of the 'Capitalocene' (Moore 2016). The latter, a term created by the environmental historian Jason Moore, explicitly blames capitalism for the global predicament, suggesting that the overuse of resources, the relentless search for profitability, the translation of nature into quantifiable 'resources', and the commitment to endless growth are not characteristics of humanity as such, but of a particular phase in our recent history. The influential multidisciplinary theorist Donna Haraway concurs with Moore in preferring the term Capitalocene to Anthropocene (Haraway 2016), but goes further by coining the concept of the 'Chthulucene', which refers to the entanglements of, ultimately, all living species in a web of life. She argues that the new planetary awareness of impending ecological catastrophe may nudge humanity towards a recognition of the fundamental mutual dependency of all life. In a contribution of comparable ambition and scope, the collective volume *Arts of living on a damaged planet* (Tsing *et al.* 2017) explores options for human and non-human life in an era tainted and transformed by reckless human activities. Neither Haraway, nor Anna Tsing and her collaborators, call for a return to a pure and uncontaminated world, but explore ways of 'staying with the trouble' (Haraway 2016).

The contemporary world of climate change has not evaded the attention of the social sciences. In general

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social theory, climate change has been discussed as a consequence of the growth paradigm and uncertainties produced by modernity. While Anthony Giddens (2002) wrote about 'a runaway world' where rapid changes were out of control, and Zygmunt Bauman (2000) argued that modernity by default produces uncertainties and instability, Ulrich Beck (2009) increasingly considered climate change the defining global risk of modernity, one that an overly successful industrialisation had inflicted on itself, and that would not be solvable through single-state solutions. Focusing on speed, rather than risk, Hartmut Rosa (2015) has argued that social life increasingly accelerates as human beings produce, communicate, and transport more and more. Thereby, global capitalism creates a situation where resources are being depleted and the environment suffers. Discussions of climate change and the Anthropocene go hand in hand, as both are partially defined and measured by the rise of atmospheric carbon dioxide concentration, linked to the use of fossil fuels (Steffen, Crutzen & McNeill 2007). Some scholars go so far as to fear societal collapse in which climate change plays a fundamental role. The archaeologist Brian Fagan (1999) has argued that El Niño events, which disrupt precipitation patterns and temperature, have shaped South American societies for centuries (Fagan 1999). In a major work, the archaeologist Joseph Tainter (1988) compares our present to the collapse of the Roman and Maya empires, citing climate change as one factor in accounting for the decline of complex societies. However, the decisive cause, as Tainter sees it, is likely to consist of decreased marginal returns on investments in energy (also referred to as EROI), owing to population growth and subsequent intensification of food production with decreasing returns, coupled with growth in bureaucratic, logistic, and transport costs. According to him, resource shortages, a direct result of human dominance of the planet, may be a more acute problem than climate change (for a similar analysis intended for a broad readership, see Diamond 2005).

The issue of climate change thus inevitably raises questions of human energy consumption. Since the late eighteenth century, we have been able to exploit unprecedented amounts of energy; at first in the shape of abundant surface-near coal deposits, and subsequently through the extraction of oil and gas for the sake of economic growth, profits for capitalists, and the general improvement of the human condition (Mitchell 2011). The fossil fuel revolution has enabled humanity to support a fast-growing global population – it has increased eightfold since its beginning. Yet the cost of exploiting fossil fuels grows as this easily accessible resource is being used up. Production relying on fossil fuels also bears within it an inevitable element of destruction (Hornborg 2019) in a dual sense, since we are simultaneously exhausting resources which it has taken the planet millions of years to produce, and undermining the conditions for our own civilisation by altering the climate and ruining the environment on which we rely.

Interdisciplinary collaboration is necessary in order to understand the full implications of climate change. While climate scientists adopt a birds-eye perspective on the planet, and archaeologists move their gaze back in time, anthropologists enter deeply into local realities in order to understand perceptions of and responses to climate change. The last couple of decades have produced a fast-growing body of

anthropological knowledge about climate change, much of which performs a double task in that it improves our understanding of society and may also be relevant for policy and action.

The unique contribution of anthropology

The strengths of anthropology in explaining the connections between the local and the global in the human-influenced global climate system have been demonstrated in a number of recent monographs and edited volumes. Taking on anthropogenic climate change explicitly, some emphasise the importance of studying local responses, from the Arctic to Mongolia (Crate & Nuttall 2009). Others describe lessons that can be learnt from indigenous people and their engagement with the environment, such as Amazonian or Melanesian peoples who leave a minimal ecological footprint by not altering their ecosystem through their harvesting and production (Hendry 2014). Since anthropologists focus predominantly on local realities, their gaze and methodology inevitably produces diversity rather than uniformity, displaying locally-tailored solutions to the problems facing actual human beings rather than standardised options of the one-size-fits-all kind. For example, Amelia Moore's research in the Bahamas (2015) shows how the archipelago's dependence on airborne and resource-intensive tourism contributes to the climate change that may ultimately lead these low-lying coral islands to vanish. Herta Nöbauer (2018), carrying out research in Austrian ski resorts, studies how artificial ski slopes are being built in anticipation of snowless winters. She highlights how the Austrian winter tourism industry anticipates mild winters and invests in new infrastructure to mitigate the effects of the melting snow. Harold Wilhite and Cecilia Salinas (2019) have shown how forest peoples, many of them indigenous, are victims both to resource extraction on their territory and global climate change. Climate change threatens their livelihood through changes in precipitation and temperature, and the problem is compounded by logging, further marginalising people on the peripheries of global modernity.

There is broad agreement that interdisciplinarity must be part and parcel of an anthropology of climate change, since climate change is a physical process, handled through political processes at the national and supranational levels, yet responded to at the level of local communities. Werner Krauss (2015), for example, has shown the need for understanding various disciplines in his work on fishermen and conservationists on the German North Sea coast. Krauss collaborates with natural scientists who search for a balance between objectivity and engagement, and has a dialogue with the political authorities by arguing the need to move beyond natural science and involve the human dimension in producing policy on climate change. Noah Walker-Crawford (2021) has followed a Peruvian activist to Germany in a litigation case against an energy company, engaging with political theory, legal scholarship, and NGO activism in his anthropological explorations. David Rojas's and Noor Johnson's (2013) work on climate summit meetings draws on knowledge from various academic disciplines, ranging from international law to climatology. This enables them to show why climate policy needs to move up and down different scales, and not assume that

signed international agreements will necessarily lead to the desired changes in the physical world.

A position paper written by a group of American anthropologists lists three kinds of knowledge that anthropology can contribute to the climate change. It provides ethnographic insight, a historical perspective, and a holistic view of the problem at hand, meaning that the entirety of people's lived experience needs to be taken seriously; in other words, that no technical solutions work unless they are integrated with the world in which people live subjectively (Barnes *et al*. 2013). Anthropologists are well-positioned to make a difference as interpreters, translators, and experts on specific local lifeworlds, and can sometimes help mitigate effects or even propose deeper systemic change to combat climate change.

The growth of climate anthropology

The study of climate change has important precursors in environmental anthropology and the anthropology of energy. This theoretical approach was mainly developed in the United States, going back all the way to the nineteenth century and early studies of material culture, technology, and ecological adaptation. In fact, the pathbreaking anthropologist Franz Boas (1858-1942) already had an interest in the ways Arctic peoples survived under extreme climatic conditions. After the Second World War, Julian Steward (1955) championed the study of 'human ecology', focusing on social and political systems from a materialist perspective which encompassed both technology and ecology. Writing about 'levels of sociocultural integration', Steward saw a direct connection between the potential of ecological conditions to produce a surplus and social complexity. His contemporary, Leslie White (1949), studied technology and energy use from a social evolutionist perspective, arguing that cultural evolution could be measured as the amount of energy a given society was capable of making use of. The most culturally advanced group of people would thus be the one that uses the most energy per capita. White's theories soon went out of fashion in academic circles due to the decline of evolutionary thinking. However, his early emphasis on energy and ecology as foundational to socio-cultural life remains relevant for the current anthropology of climate change.

As early as the 1970s, discussions shifted to the study of ecological crises, which at the time was associated with resource exhaustion and pollution rather than global climate change. Gregory Bateson (1972) identified three factors that were driving these crises. Firstly, the destructive side-effects of technological progress, such as the production of pesticides; secondly, population increase leading to resource depletion; and thirdly, a set of entrenched Western cultural values and ideas that place humanity in an unhealthy relation to the environment (what he calls a flawed epistemology based on Cartesian dualism and individualism). Bateson criticised the idea that humans should strive to control the environment rather than seeing themselves as part of a larger ecological system. He also condemned the strong focus on the individual, the belief in endless economic growth (which he considered logically impossible), the assumption that we live within an infinitely expanding frontier, and the conviction that technology will

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solve any problem facing us. What Bateson calls a 'healthy ecology' amounts to 'a single system of environment combined with high human civilization in which the flexibility of the civilization shall match that of the environment to create an ongoing complex system, flexible and amenable to ongoing adjustments (Bateson 1972: 502). In this vision lies a quest for an equilibrium where humanity does not undermine the conditions for its own thriving.

Whereas Bateson identified ecological crisis as a central contradiction of contemporary civilisation, he did not address climate change explicitly. Margaret Mead, his ex-wife, may in fact have been the first anthropologist to do so (Kellogg & Mead 1980), as she convened a conference about the atmosphere as early as 1975. Whereas climate change was not yet on the agenda — in fact, many scientists at the time believed that we were heading towards a new Ice Age rather than an overheated world — the conference took on smoke, smog, and other forms of atmospheric pollution as genuinely global challenges that needed to be dealt with politically.

By the 1990s, climate change was still spoken of as 'global warming', and entered the political and research agenda. The term 'global warming' has since fallen out of fashion, as it does not emphasise the violent and erratic weather events, such as frequent hurricanes, that climate change brings with it. In anthropology, an early important contribution is that of Steve Rayner and Elizabeth Malone (1998). This interdisciplinary work, with contributors from around the world, intended to complement the natural science of the IPCC with knowledge about local livelihoods, political decision-making, and inequality. Another pioneering work was Ben Orlove's ethno-climatological research in the Andes, showing how farmers predicted interannual rainfall and temperature change, based on the visibility of the Pleiades star cluster, which in turn depended on El Niño weather events (Orlove *et al*. 2000). This work indicated that locally embedded knowledge about climate could be of great scientific and political relevance. In the 1990s, the concern with climate change was nevertheless still marginal and peripheral in anthropology.

A decade later, this was about to change. Coming from the anthropology of health, Hans Baer and Merrill Singer published *Global warming and the political ecology of health* (2009). The book investigates the impact of climate change on water, nutrition, and the spread of disease. It strongly emphasised that climate change affects different communities unequally, owing to an economic system which produces inequality. Thus it affects people in different ways, often corroborating pre-existing global inequalities. Like Hippocrates two and a half thousand years earlier, Baer and Singer showed how the proliferation of diseases, especially in tropical countries, could sometimes be attributed to climatic conditions, in their case anthropogenic climate change.

In the same year, Susan Crate and Mark Nuttall edited the widely-cited and read *Anthropology and climate change* (2009), which was a groundbreaking volume when it was published, with chapter authors working in different parts of the world. The main perspective is interpretive, and explores local responses to, and

perceptions of, climate change, in a wide range of societies, many of them indigenous, from Siberia to Papua New Guinea. Many of the contributors emphasise local interpretations of change and strategies developed to adjust and adapt. It should nevertheless be pointed out that the societies which are the main contributors to climate change – the rich OECD countries, as well as China – are sparsely represented. This shortcoming is addressed in the second edition of the book (Crate & Nuttall 2016), as well as in the edited volume *Cultures of energy* (Strauss, Rupp & Love 2013), which relates ethnographic research to analyses of the global system, showing how the affluent are the main contributors to climate change, while poorer people tend to be the main victims. A perspective from the Global North is developed in Kari Norgaard's *Living in denial* (Norgaard 2011). Based on fieldwork in a rural Norwegian community where erratic winters interfere with winter tourism, the author asks how it can be that people who are aware of, and experience the effects of, climate change continue to lead unsustainable lives. Norgaard's analysis, which draws on psychology as well as sociology and anthropology, argues that people tend to rationalise their unsustainable lives ('My driving and flying makes no difference') and to compartmentalise their actions ('After all, I do compost and take my bike to work').

A few years later, a very substantial body of anthropological literature dealing with different aspects of climate change had appeared, and professional interest in the field had skyrocketed. Whereas there was just a single panel at the Society for Applied Anthropology (SAA) devoted to climate change in 2006, that number had increased to twenty a decade later. Crate and Nuttall sum up the growth and diversification of the field by stating that anthropologists today are engaging research that has a concern with resilience, vulnerability, adaptation, mitigation, anticipation, risk and uncertainty, consumption, gender, migration, and displacement. Anthropologists have developed significant work on the politics of climate change, inequality, health, carbon markets and carbon sequestration, and water and energy (2016: 11).

Global diversity

The body of knowledge that anthropologists have so far accumulated is far-ranging: from critical studies of the discourses and practices of carbon offsets (Dalsgaard 2013) to comparative studies of retreating glaciers[11] in addition to a fast-growing number of ethnographies describing how communities deal with the local effects of climate change, in projects that look, in Kirsten Hastrup's evocative terms, at the 'drying lands, the rising seas and the melting ice' (Hastrup & Hastrup 2015). A political economy approach, informed by anthropological reflexivity, is provided, *inter alia*, in works by Hal Wilhite (2016) and Alf Hornborg (2019). Local responses to climate change are explored in a work I co-edited with my colleague Astrid Stensrud (2019), and anthropologists have also contributed some significant ethnographic monographs on climate issues, ranging from Jessica Barnes' research on water in the Nile delta (2014) to Linda Connor's work on mining in Australia (2016). What these studies have in common is the recognition of global-local linkages, where local lives and communities cannot be understood independently of the

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large-scale processes producing changed circumstances for future options and constraints. Climate anthropology is inherently multi-scalar, moving from the locality via government and corporations to supranational politics.

Not all environmental anthropology has a focus on climate. Important research on topics such as deforestation, mining, waste, and toxins may be only tangentially related to climate. However, it is fair to say that the broader field of environmental anthropology is being renewed and reformulated owing to the intensified attention to climate; as witnessed, for example, in the edited volume *The angry earth: disasters in anthropological perspective* (Oliver-Smith & Hoffman 2000, 2019) where, in the second, revised and updated edition of the book, nearly all contributors mention the atmospheric changes that have begun to affect the sites of their prior studies. It also deserves mentioning that the most famous living anthropologist without an anthropology degree, Bruno Latour, shifted his attention years ago to the causes and politics of climate change (Latour 2017). Building on his previous work on the production of scientific knowledge, Latour criticises the techno-scientific ideology of control and the sharp boundary, in his view misguidedly, between culture and nature, which can be traced back to Descartes's philosophy. Anthropogenic climate change is everywhere, and it is now. It is comprehensive, it brims with methodological implications, it buzzes with theoretical possibilities, and indeed, it may well be said to redefine not only the specialty of anthropological (or other) research, but raises the question of what it entails to be a human being within a new existential and conceptual framework, which will inevitably cause a reckoning with our ecological identity in a new way. Volatility and flexibility are key concepts in this exploration, which reveal inequality and an ultimately catastrophic separation of culture and nature. Climate change may retrospectively be seen as a major game-changer in intellectual and political life in general, and also in anthropological research. It is no coincidence that the increased interest in multispecies fieldwork, and the rise to prominence of the Deleuzian term ‘assemblage’ (which transcends the human-nonhuman and material-symbolic barriers), have shaped the work of many anthropologists in the present century. An assemblage, in this usage, consists in the connections that make up a particular social, cultural, and ecological configuration; it may include, for example, people, tools, soil, rain and sunshine, power relations, wild and domesticated animals, crops, weeds and discourses. The concept thereby transcends formerly rigid boundaries between things and ideas, as well as nature and culture.

As opposed to attempts to create top-down solutions through international agreements, some of which have a perceptible element of magical thinking (Rayner 2016), the anthropological view from below and within provides a number of useful insights, owing to its reliance on patient fieldwork.

First, an awareness of variation is essential to all anthropological research. The clunky distinction between developing and developed countries, for example, which produces a simple contrast where there is really a great deal of diversity and indeed the very category of the country, does not always fit the territory. The Seychelles is not ‘a place’ in the same sense as China is ‘a place’, although both are states. The former has

90,000 residents, most of them engaged in fishing or tourism, and is uniformly affected by rising sea temperatures and erratic rainfall. The latter has 1.2 billion inhabitants and spans many climatic zones with challenges ranging from desertification to flooding, which means that climate change in China cannot be described in the same way as in the Seychelles. Moreover, there is no reason to assume that actions that have been proved successful in Namibia would work in Nepal. The challenges faced by Greenlanders facing melting ice differ from those in Bangladesh, confronted with intensified flooding, salination of the soil and mudslides, or of Sahelian nomads who witness their pastures turn to dust.

Second, any successful social change has to begin with an appreciation of local lifeworlds and has to be developed not for, but with, the people affected. In the anthropology of development, this point has been made many times (Gardner & Lewis 2015). This insight, a matter of common sense to any working anthropologist, is rarely reflected in the abstract, large-scale worlds of international climate summits or global reports on climate change. In other words, a reasonable conclusion is that climate change policy must be scaled down and informed by the situation at the bottom, and not built exclusively managed from the top. The insistence on the primacy of the local is nevertheless both a strength and a weakness of anthropology, sometimes leading to myopia and a failure to see global connections, another reason that interdisciplinarity is necessary in this domain.

Comparison is a third asset. As one of anthropology's main methods for generating knowledge and opening new theoretical horizons, as well as stimulating the political imagination, comparison generates new ideas about human worlds. For example, anthropologists have often shown that land is not necessarily subject to personal ownership, and that ‘resource management’ and ‘sustainability’ are often integrated in the taken-for-granted knowledge, not least in indigenous groups. The economic historian Karl Polanyi (1944) described land as a ‘fictitious commodity’, showing – as economic anthropologists have later done – that in pre-capitalist societies it could usually not be sold and purchased. It goes without saying, because it comes without saying, that in societies where ‘the economy’ has not been disembedded from everyday life, making people accountable to their surroundings consists of ways that are unknown and perhaps unknowable to those who own and profit from property elsewhere.

The methodological and analytical holism on which anthropologists insist, which means that any social whole needs to be understood as a web of interconnections, has often made anthropological knowledge unwieldy and unmanageable for governments and development agencies, since it goes against the segmentation of worlds into separately manageable sectors and precise measurements that bureaucratic planning requires. Yet at this point in history, more holism may be precisely what is needed. The knowledge, often contested, enabling people to navigate, interpret, and act upon the world, must form an integral part of any project, whether academic or applied, concerning the human implications of climate change.

Forms of engagement

As indicated, the professional interest in climate change has grown massively in anthropology in the present century. Many anthropologists working on the topic are determined to use their knowledge to make a difference – not just in academia, but in the wider world of policy and practice. There are nevertheless significant variations in the ways different anthropologists approach the applied implications of their research.

The cultural ecological perspective, which looks at objective, measurable aspects of humanity's engagement with, and exploitation of, the environment, is less widespread in anthropological research today than in other fields. A main focus of recent anthropological research has rather been on cultural perceptions and responses to climate change. Crate is a spokesperson for this perspective, in that she recommends a cultural interpretive approach to climate change, arguing that anthropologists need to 'listen, share, and accommodate our research partners' way of knowing and observing and construct cultural models of how they perceive the local effects of global climate change on their world and worldview' (2008: 574). In order to avoid being met with resistance and resentment, social change must engage with resources already in place where change is to be implemented, including knowledge and skills possessed locally. This is as true of the Global South as it is of the Global North, as nobody likes outsiders who come in and tell them what to do and how to think. Many policymakers, NGOs, and donor agencies hold that they already do so, which is doubtless the case. However, the quality of ethnographic knowledge collected over a sustained period of time is superior to that obtained through focus groups and interviews, and can be revealing of hidden and unexpected dimensions.

After the Great Acceleration of economic, technological and communicational change that has taken place since the Second World War (McNeill & Engelke 2016), and which has accelerated further since the early 1990s, our collective ecological footprint seems to have gone beyond the point of no return. According to the IPCC 2014, continued emissions of greenhouse gases will increase the likelihood of severe, pervasive, and irreversible impacts for people and ecosystems.[2] Even if anthropogenic emissions should be stopped, climate change will impact life on the planet for centuries, according to the panel. On this background, some anthropologists connect insights into local effects on climate change to a systemic critique of the global economy.

Among the most consistent critics of the global economy from a climate perspective is Alf Hornborg (2019), who argues that in a world of limited resources, standard economic models presupposing growth are not viable. He argues that the capitalist fossil fuel economy is inherently destructive in that it consumes nonrenewable energy. Also invoking natural science, Hornborg refers to the second law of thermodynamics in order to show that the fossil fuel-based energy dissipates into heat, which is useless for further production and contributes to climate change.

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The anthropological relevance of this analysis lies in Hornborg's emphasis on inequality and the exploitation of human labour as being inherent to the capitalist economy. He argues that capitalism is parasitical on both human and natural resources owing to the growth imperative, which relentlessly searches for resources and labour to turn them into profitable commodities. Hornborg's critique is thus dual, derived both from a Marxist analysis of surplus value production and from an ecological analysis, showing that we live in a world of limited resources.

Related to Hornborg's perspective is Baer and Singer's *Anthropology of climate change* (2nd edition, 2018). They provide an overview of extant research, while also developing a vision for climate anthropology which is fundamentally critical of global capitalism, seeing climate change as one of its major contradictions since the search for profits in their view neglects ecological limitations. Their alternative is a downscaled economy where economic activities aim to satisfy human needs rather than generating profits.

Also premised on political economy, but drawing on local ethnographies, the late Harold Wilhite (2016) focuses on consumption. Having previously worked in Kerala, India, he wrote extensively about the relationship between the fossil fuel society and consumption habits. Wilhite argues that deep reductions in energy use and carbon emissions will not be possible within our current political economies, which are driven by the capitalist imperatives of growth, commodification, and individualisation. In order to deal with climate change at the most basic level, he argues that it is necessary to understand the relationship between capitalism and the emergence of high energy habits at the level of family and household that are formed in a material world designed and built for high energy use, e.g. by replacing wooden houses with airtight concrete dwellings dependent on air-conditioning, or by marketing huge refrigerators where a smaller ‘icebox’ would do (Wilhite 2016). This view is shared by Richard Wilk (2016), whose anthropology of consumption is engaged in that it explores the deeper meaning of consumption and questions its feasibility, both ecologically and as a source of well-being.

Other research, which refrains from addressing the entire global economic order, explores the possibilities of changing the energy system in a renewable, sustainable direction. In a creative and productive juxtaposition of two complementary perspectives on climate change, Dominic Boyer and Cymene Howe have published a duograph (as opposed to a monograph) based on fieldwork in a huge, but ultimately failed, Mexican windpower park. In their twin volumes, they focus, respectively, on the political economy of wind power (Boyer 2019) and on the destabilisation and reshaping of human/non-human relations (Howe 2019). Boyer coins the word ‘energopower’ to capture the complex relationships between energy, economics, politics, and local communities. The term calls attention to a dimension of social life which had fallen out of favour generations earlier following the tendencies to energy determinism in Leslie White's aforementioned work; namely, the ‘power of power’, the fundamental necessity of energy for human life, and indeed the high energy consumption necessary for the global system as we know it. Howe, in her part of the duograph, looks beyond the human world, investigating the impact of wind turbines on nonhuman

life in the region.

This dual approach expresses clearly what is a main division in contemporary anthropology, including that of climate change: the contrast between a political economy perspective, where power, inequality, and global economics are at the forefront, and a localised perspective, which insists on the primacy of the local and rejects epistemologies which tend to render everything comparable with everything else. The duograph shows how these perspectives can be complementary and shed light on different dimensions of climate change. Boyer and Howe show that a shift towards renewables is not a straightforward exercise. In their joint preface, they state that 'renewable energy can be installed in ways that do little to challenge the extractive logics that have undergirded the mining and fossil fuel industries (Boyer & Howe 2020: xii) Yet, they also suggest that renewables may in fact be part of the solution if implemented in the right way.

As these examples indicate, the anthropology of climate change is both multi-scalar (it shifts between a global and a local perspective), interdisciplinary (relying on natural science for some of its facts) and methodologically diverse (ethnographic and comparative). It is also clear that different climate anthropologists, by virtue of their differences in empirical focus and analyses, and also owing to different political views, advocate different solutions, whether implicitly or explicitly.

Climate anthropology as a new departure

What is new about the anthropology of climate change is not its global purview, but the recognition that climate change has enormous consequences for humanity and, in a slightly longer term, for life on the planet. As Moore (2015: 35) says, 'Anthropogenic climate change has possibly surpassed biodiversity loss as the most widely recognized form of global transformation'.

The global dimension of climate change is indisputable, but it is also necessary to show in what ways climate change is always local in its implications and has to be understood as such: ecologically, socially, politically, culturally. Whereas politicians until recently might write off concerns of urgency by calling for more research, it is by now abundantly clear that the natural science knowledge needed to act has been available for many years. Yet, while the natural sciences have long documented the facts and global perils of climate change, it is by no means evident that the human dimension of climate change is understood sufficiently well. A simple question may be why so little is happening, since nearly all countries are signatories to a series of climate agreements, beginning with the Kyoto Protocol in 1997 which specifies the steps that need to be taken to mitigate the impact of changes that are already taking place. Later reports from the IPCC have been increasingly insistent about the need to take action immediately. Yet, global emissions continue to rise and are nowhere near to reaching the targets agreed initially in Kyoto and affirmed in later summit meetings.

Coal, and its close relatives oil and gas, the salvation of humanity for two centuries, are now becoming our

damnation, and there is no easy way out. The lesson from cultural history may be that lean societies, decentralised and flexible, with less bureaucracy than farming, fewer PR people than fishermen, are the most sustainable in the long term. As Tainter puts it in his book about the collapse of complex societies: 'Complex societies … are recent in human history. Collapse then is not a fall to some primordial chaos, but a return to the normal human condition of lower complexity' (1988: 198). This insight, taken from an archaeologist, may serve as a reminder of the potential importance of climate anthropology. Providing a view from within and from below, anthropologists can not only report from and produce analyses of the multi-scalar linkages of climate and society, but they are also in a position to stimulate the kind of intellectual imagination needed not only to understand and explain, but also to deal with the challenges from anthropogenic climate change. This does not mean that anthropologists ought to advocate a return to pre-industrial life, but that they are in a unique position to strengthen the intellectual and political imagination by showing, as the discipline has always been prone to doing, that there are indeed many alternatives.

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[1] See Ben Orlove's website, https://glacierhub.org

[2] Intergovernmental Panel on Climate Change (IPCC) 2014. *Climate change 2014: synthesis report. Contribution of Working Groups I, II and III to the fifth assessment report of the Intergovernmental Panel on Climate Change*. Geneva: IPCC (available online: https://www.ipcc.ch/report/ar5/syr/).

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