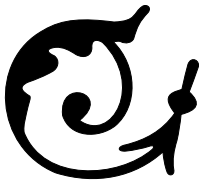
ANTHROPOLOGY AND CLIMATE CHANGE



ANTHROPOLOGY AND CLIMATE CHANGE

From Encounters to Actions

Editors

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Introduction: Anthropology and Climate Change

Susan A. Crate and Mark Nuttall

Increasingly, anthropologists are encountering the local effects and broader social, cultural, economic, and political issues of climate change[1] with their field partners. Wherever we go and work, we encounter people telling similar accounts of the changes they notice in the weather and climate. We work with Inuit in northern Canada, Alaska, and Greenland who talk about the sea ice thinning and disappearing, or about seeing insects for which they have no name in their language; we hear from reindeer herders in northern Fennoscandia about shifts in prevailing winds and the loss of precious pasture for their herds; we listen to horse- and cattle-breeding Sakha of northeastern Siberia, Russia explain how the warming of winter threatens to transform their ancestral cosmology; we research in sub-Saharan African villages facing increasing desertification; and we fail to find words of explanation as Quechua of the high Andes lament the disappearance of their glaciers, their main water source, and South Pacific islanders tell us of their fears of the rising tides that threaten to engulf their homes. Everywhere, from high-latitude taiga and tundra regions, to high-altitude mountain ecosystems, from tropical rain forests to near sea-level coastlines, there are compelling similarities in the narratives, accounts, and experiences of indigenous and local peoples who are already seeing and experiencing the effects of climate change. For them, climate change is not something that may happen in the near or far future but is an immediate, lived reality that they struggle to apprehend, negotiate, and respond to. The weather is increasingly unpredictable and people express concern that local landscapes, seascapes, and icescapes are irreversibly changing. We, with our field partners, are also encountering the local manifestations of this global phenomenon. And, like them, we are confronted with the challenge of comprehending and responding to it.

The global discourse on climate change has turned increasingly to adaptation as a priority for research and policy. Although many of us working on developing anthropological perspectives on climate change are versed in the frames of adaptive capacity and resilience, we nonetheless question whether these coping mechanisms are sufficient. Resilience, both social and

ecological, is a crucial aspect of the sustainability of local livelihoods and resource utilization, but we lack sufficient understandings of how societies build adaptive capacity in the face of change. Furthermore, we suspect that environmental and cultural change, far beyond the reach of restoration, is occurring. Combined with institutional and legal barriers to adaptation, the ability to respond to climate change is severely constrained for many people around the globe. Some of us feel we are in an emergency state as field researchers and struggle to design conceptual architecture sturdy enough to withstand the storminess of the intellectual and practical challenges before us. We are confronted with an ethical and moral issue.

And we are left with a flurry of questions, directly related to our age-old struggle as academics to reconcile anthropology's applied, public, and activist roots (Lassiter 2005, 84). What is our proper response and what is our responsibility to our research partners in these revelations? How do we translate, advocate, educate, and mediate? What are the theoretical frames that inform our queries? What insights can we gain and use from the work being done where communities are the hardest hit—where climate change is already having profound effects, for example in the Arctic, Africa, South Pacific islands, and other low-lying lands? What are the challenges faced by the current scientific models as we try to bring research to bear in a meaningful way? How do we understand the complexity of everyday life in relation to climate change? How can we transform knowledge into action, vulnerability to learning to cope and to be responsible? How do we link our expertise to this arena in such a way that we are not part of the problem but part of the solution? How do we negotiate and communicate anthropological insights effectively to influential policy makers? How do we make claims for greater participation in global discussions on adaptation to climate change?

Given the increasing effect that climate change is having on local populations across the globe and the highly charged geopolitical arena in which action must be taken, understanding anthropologists' roles in the field as we encounter, communicate, and act in response is paramount. These questions and more are considered, explored, sometimes answered, and other times left unanswered, by the contributors to this volume.

The Moving Target of Climate Change

Although there have been voices alerting the world about climate change for several decades, the new millennium has ushered in an increasingly potent stirring up of public, private, and international attention to and, in some cases, action on the issue. Numerous scientific reports compiled by international teams of experts confirm that climate change is not only happening but is very likely caused by human activity, a point clarified by *Climate Change 2007,* the Fourth Assessment Report of the Intergovernmental Panel

on Climate Change (IPCC 2007). Politicians (and would-be politicians) have brought climate change into their campaign vocabulary, framing it as one of the most urgent issues of our times. Climate change consistently makes front page stories of mainstream magazines and newspapers. The media portrayal of climate change, the excessive dramatizing of apocalyptic events, or the downplaying of scientific evidence and the critique of scientific motive are critically important for us to understand, for they have significance for how climate change is defined, understood, and legitimated. Public awareness has risen to the extent that climate change is not just a topic of conversation but a call to action to make major changes in consumer lifestyles. Popular magazines are touting green tips. Major box stores have reprioritized to embrace sustainability. Many of us ponder to what ends these actions will lead and if these efforts are merely a feel-good exercise while the earth continues to heat up and public opinion oscillates between climate change as fact or fiction. We sense a deeper calling, one that compels us to focus the anthropological gaze on vistas beyond the immediate locality and investigate the multifaceted roots of the climate crisis to understand how genuinely to address the issue.

If we frame our inquiry on the scale of global geopolitics, we see the causes and effects of climate change to be about people and power, ethics and morals, environmental costs and justice, and cultural and spiritual survival. Scholars are beginning to address the equity and justice implications of climate change (Thomas and Twyman 2005). On a temporal scale, the effects of climate change are the indirect costs of imperialism and colonization—the "non-point" fall-out for peoples who have been largely ignored. These are the same peoples whose territories that have long been a dumping ground for uranium, industrial societies' trash heaps, and transboundary pollutants. Climate change is environmental colonialism at its fullest development—its ultimate scale—with far-reaching social and cultural implications. Climate change is the result of global processes that were neither caused nor can be mitigated by the inhabitants of the majority of climate-sensitive world regions now experiencing the most unprecedented change. Thus indigenous peoples and other place-based peoples find themselves at the mercy of—and having to adapt to—changes far beyond their control. Yet climate change is a threat multiplier. It magnifies and exacerbates existing social, economic, political, and environmental trends, problems, issues, tensions, and challenges.

Environmental problems can, it is widely acknowledged, become problems for national and international security. Barnett (2003) has argued that, despite climate change being the most profound of global environmental change problems, it has received little systematic attention as a security issue. In 2007 the United Nations Security Council held its first debate on the implications of climate change for international security. The UN also estimated that all but one of its emergency appeals for humanitarian aid that year were climate related. The European Council has also considered

the impact of climate change on international security. One challenge for anthropology is to address the security dimensions of climate change. The most obvious issues include humanitarian aspects, political and security risks, conflicts over resources, border disputes, tensions over energy supply, migration, political radicalization, structural violence, and tensions between different ethnic and religious groups. However, the anthropological gaze needs to also settle on the governance of national and international security issues, and the tools, instruments, and institutions utilized by states within a broader context of policy and practice.

The Cultural Implications of Climate Change and Indigenous Peoples

From an anthropological perspective, climate change is ultimately about culture, for in its wake, more and more of the intimate human-environment relations, integral to the world's cultural diversity, lose place. For indigenous peoples around the world, climate change brings different kinds of risks and opportunities, threatens cultural survival and undermines indigenous human rights. The consequences of ecosystem changes have implications for the use, protection, and management of wildlife, fisheries, and forests, affecting the customary uses of culturally and economically important species and resources. The effects of climate change are not just about communities' or populations' capacity to adapt and exercise their resilience in the face of unprecedented change. Climate change is also about the relocations of human, animal, and plant populations to adjust to change and to cope with its implications. Such relocations, both actual and projected, entail a loss of intimate human-environment relationships that not only ground and substantiate indigenous worldviews, but also work to maintain and steward local landscapes. In some cases, moves will also result in the loss of mythological symbols, meteorological orientation and even the very totem and mainstay plants and animals that ground a culture.

Indigenous peoples themselves may argue that, despite having contributed the least to greenhouse gas emissions, they are the ones most at risk from its consequences due to their dependence upon and close relationship with the environment and its resources. Their livelihood systems are often vulnerable to environmental degradation and climate change, especially as many inhabit economically and politically marginal areas in fragile ecosystems in the countries likely to be worst affected by climate change. Massive changes in ecosystems are occurring and have in many cases been accompanied by opportunistic and often environmentally devastating resource exploitation. To indigenous peoples this means that climate change is not something that comes in isolation; it magnifies already existing problems of poverty, deterritoriality, marginalization, and noninclusion in national and international policy-making processes and discourses.

We need to be careful not to be too overconfident about our research partners' feelings about their capacity to adapt. As anthropologist Piers Vitebsky (2006, 10) remarked, "Eveny are highly adaptive. Sometimes they joke, 'This is our home. If the climate gets too hot, we'll just stay and herd camels.'" Although it seems completely plausible that such highly adaptive cultures as the reindeer-herding Eveny of northeastern Siberia will find ways to feed themselves even if their reindeer cannot survive the projected climactic shifts, as anthropologists we need to grapple with the implications of reindeer-centered cultures (or other groups dependent on species that may not adapt) losing the animals and plants that are central to their daily subsistence practices, cycles of annual events, and sacred cosmologies. The cultural implications could be analogous to the disorientation, alienation, and loss of meaning in life that happens when any people are removed from their environment of origin, like Native Americans moved onto reservations (Castile and Bee 1992; Prucha 1985; White 1983). The only difference is that the communities experiencing the effects of climate change are not the ones moving—their environment is.[2] As the earth literally changes beneath their feet, it is vital to understand the cognitive reverberations and cultural implications to a people's sense of homeland and place.

If we agree, as Keith Basso convincingly argues, that human existence is irrevocably situated in time and space, that social life is everywhere accomplished through an exchange of symbolic forms, and that wisdom "sits in places" (1996, 53), then we need to grapple with the extent to which climate change will increasingly transform these spaces, symbolic forms, and places (Crate 2008). It follows that the result will be great loss—of wisdom, of the physical make-up of cosmologies and worldviews, and of the very human-environment interactions that are a culture's core (Netting 1968, 1993; Steward 1955). Climate change leads us to ponder both literal and figurative transformations of cultures and environments and even a future of unmanageable change. As anthropologists, we need to look closely at the cultural implications of the changes global warming has and is bringing.

Despite the impact of climate change on indigenous peoples and their traditional knowledge, international experts and policy makers most often overlook the rights of indigenous peoples as well as the potentially invaluable contributions from indigenous peoples' traditional knowledge, innovations, and practices in the global search for climate change solutions. And since adaptation to climate change is something that primarily takes place at the local level, it is paramount that indigenous peoples and place-based societies themselves define the risks related to rapid change. An exemplary text, *Voices from the Bay*, published in 1997, reported on an indigenous knowledge project that originated with the Hudson Bay Traditional Ecological Knowledge and Management Systems (TEKMS) study in northern Canada. From the perspective of its indigenous Inuit and Cree participants from communities around Hudson Bay, one aim of the study

was to document their knowledge of the environment so that it could be used and incorporated into environmental assessments and policies. Another was to communicate that knowledge effectively to scientists, and to indigenous youth of the participating communities. It was one of the first attempts by indigenous peoples to put a human face on climate change, to record indigenous observations and knowledge of environmental change, and to argue the right for the inclusion of traditional ecological knowledge as an integral part of the decision-making process for the Hudson Bay bioregion. In its approach and methodology, it emphasized the active participation of indigenous communities living in the region. It was community based and community driven, involving indigenous people in all aspects of the research process: design, development, compilation, synthesis, and the production of results.

Voices from the Bay served to illustrate that local people can contribute to identifying and understanding the ecological processes and dynamics of their ecosystem. Scientists became aware of how weaker currents are changing sea-ice regimes, of the departure of belugas whales from river mouths that have become too shallow for molting, of the sensitivity of sturgeon to changing water quality and river diversions, and of the type of damage caused by freshwater diversions. As a model for how the situated and narrative dimensions of local knowledge can be combined with expert scientific knowledge, *Voices from the Bay* was cited in discussions during the early stages of the Arctic Council's Arctic Climate Impact Assessment (ACIA 2005) to ensure the recognition of the validity of ecological insight inherent in indigenous knowledge. Although it emerged from a project in Canada's north, its relevance is global.

Climate Change, Human Rights, and the Interplay of Multiple Stressors

Communities differ in the way they perceive risk, in the ways they utilize strategies for mitigating negative change, and in the effectiveness of local adaptive capacity. In our field contexts we see that the effects of climate change are prompting the adoption of different subsistence and local economic strategies to suit new ecosystem regimes or, with more rapid change, the displacement and resettlement of peoples who risk losing their homeland to environmental change. Policy responses need to be informed by a greater understanding of how potential impacts of climate change are distributed across different regions and populations.

The second part of the Intergovernmental Panel on Climate Change (IPCC) fourth assessment shows that the world's poor, already struggling to achieve their basic needs of food, water, and health, will suffer the worst effects of climate change: "Poor communities can be especially vulnerable, in particular those concentrated in high-risk areas. They tend to have more

limited adaptive capacities, and are more dependent on climate-sensitive resources such as local water and food supplies" (IPCC 2007, 9). In the same context, an important sector of the poor has been repeatedly absent—that of women (including within that IPCC summary document). Women make up 70 percent of the world's inhabitants living below the poverty line (Röhr 2006). Women, in their roles as the primary managers of family, food, water, and health, are hit the hardest and must deal very directly when the impacts of climate change are brought home (Wisner et al. 2007).

Take an example to illustrate: When a poor community in Mexico's Yucatan Peninsula is hurricane struck, there would be three to four women dead for every man (Aguilar 2008). The reason for the disparity is that women, due to the culturally specific evaluation of their gender, face different vulnerabilities and many live in conditions of social exclusion. Examples include exclusion from survival skill learning, such as tree climbing and swimming, which help during floods; restrictions on women's movement in times of crisis, including dress codes requiring lengthy garments and prohibiting women from leaving the home without a male's permission; and unequal allocation of food resources to girls and women, rendering them physically weaker in time of evacuation and crisis (Aguilar 2008).

Climate change brings additional vulnerabilities for indigenous peoples, which add to existing challenges, including political and economic marginalization, land and resource encroachments, human rights violations, and discrimination. Because climate change has effects on the myriad of rights necessary to lead a productive and healthy existence, including subsistence rights, economic rights, cultural rights, intellectual property rights, and the like, it is implicitly a human rights issue. Framed within the context of legal and human rights challenges, we can argue that maintaining cultural diversity and recognizing indigenous livelihood rights are prerequisites for successful adaptation in the face of change. Although most major international treaties concerned with human rights contain provisions concerned with the environment, universal recognition and protection of environmental or ecological rights continues to be a significant challenge for international human rights law. The potential threat of climate change to their very existence combined with various legal and institutional barriers, including conservation and wildlife management regimes, resource-use quota systems, trade barriers, and so on, which affect their ability to cope with and adapt to climate change, makes climate change an issue of human rights and inequality to indigenous peoples.

In parts of the world there has been a swell of advocacy by affected communities in response to the local impacts of climate change. One example is the petition to the United States by the Inuit Circumpolar Council (ICC) to consider the human rights issues of climate change in the Arctic and their intrinsic role in reducing greenhouse gases as a way to mitigate. Past chair of ICC Sheila Watt-Cloutier's testimony explicitly posits climate change as a

human rights issue: "Inuit are taking the bold step of seeking accountability for a problem in which it is difficult to pin responsibility on any one actor. However, Inuit believe there is sufficient evidence to demonstrate that the failure to take remedial action by those nations most responsible for the problem does constitute a violation of their human rights—specifically the rights to life, health, culture, means of subsistence, and property"(Watt-Cloutier 2004). A second example is the yearly restatement of the 2000 declaration by indigenous peoples at the annual COP United Nations Framework Convention on Climate Change conventions. Here is an excerpt from the 2004 convention in Buenos Aires:

> We request the urgent need to continue to raise awareness about the impact of climate change and approaches of climate mitigation and adaptation measures on Indigenous peoples and request a High-Level Segment on "Indigenous Peoples and Climate Change" be held during the 11th session of the Conference of the Parties. Panelists on this High-Level Segment shall include representatives of the UN Permanent Forum on Indigenous Issues.[3]

Clearly many indigenous groups are actively expressing their concern that the local effects of climate change may surmount their adaptive capacity and threatens survival for their communities.

Climate change issues, of course, have to be approached, understood, and resolved within a context of the interplay of multiple stressors. Human activities, industrial development, consumerism, resource-use regulations, and global economic processes have far-reaching consequences for the environment and on indigenous and local livelihoods. Indigenous and local economies are not self-reliant closed systems, and although their involvement in global networks of production and consumption may provide avenues to strengthen and extend their possibilities, it also introduces greater elements of risk and perhaps makes people and their livelihoods less resilient to coping with and adapting to climate impacts. For some people, climate change may not be the most immediately pressing issue facing them. Social, cultural, and economic change often has more immediate effects (Nuttall et al. 2005).

By exploring these field contexts, one aim for anthropology is to show the complex and multisited ways that indigenous and other marginalized peoples are shaping and being shaped by being within the world system, in order to highlight both the tenacity and the susceptibility of their cultural survival—which itself depends on an intimate knowledge of and connection to the natural world—the very relationship that substantiates their utility for adaptation and resilience. Through the investigation of local capacities for adaptation and resilience in the face of climate change, anthropology can tease out how larger-scale processes including industrial development, resource use regulations, global economic flows, and related human activities affect local environments and tend to magnify the impacts of weather and climate variations on indigenous and local livelihoods. Not only research

but policy responses should also recognize climate change impacts within the broader context of rapid social, cultural, and economic change and, in their implementation, should underscore the reality that climate change is but one of several problems affecting people and their livelihoods in many parts of the world today.

In the reflexive context, when as anthropologists we engage in climate issues, we need to consider our response when our consultants' accounts and testimonies enter our story vis-à-vis one of the main drivers of climate change being Western consumer culture. It is imminent that we radically transform our consumer culture into a culture of environmental sustainability. Our awareness and actions demand a multisited analysis to expand the context from a "committed localism" and explore the complex interactions of the larger world system that shape the local (Marcus 1998, 83). With this in mind, how then can we translate our field experience of climate change into compelling global messages of what is to come as warming proceeds and as a means towards reevaluating consumer lifestyles and moving towards a carbon-free, sustainable society? Similarly, how can the research methods we develop in the process of working with our consultants inform potential research paradigms within our home communities to begin a similar transformation?

What's Being Written on Climate Change in the New Millennium[4]

The new millennium has also ushered in a steady stream of edited volumes and several monographs addressing the sociocultural, human-ecological, and ethical issues of climate change. Many of these publications interweave a variety of interdisciplinary fields, including anthropology, geography, environmental science, public policy, business studies, economics, communication, psychology, and the like to lay the groundwork for the vital multidisciplinary dialogue we must initiate and act upon to comprehensively address climate change.

McIntosh, Tainter, and McIntosh's (2000) volume assembles papers representing the broad geographical, cultural, and temporal coverage of global change in history and prehistory and focuses on the need to bridge the social and biophysical sciences—to build "a common language to appreciate the full history and prehistory embedded in human responses to climate". The authors emphasize understanding our species' symbolic past, retained in social memory, or "the long term communal understanding of landscape and biocultural dynamics that preserve pertinent experience and intergenerational transmission; the source of metaphors, symbols, legends and attitudes that crystallize social action." Analysis of social memory clarifies how communities curated and transmitted past environmental states and responded to them, and thereby can inform the present. The editors argue that economists and policy makers need to understand how social memory works because it

a) is relevant to small-scale subsistence producers who are most vulnerable to climate change but most often left out of macro policy decisions and their effects, and b) implicates cultural conservation to the extent that indigenous social memory is a great repository of human experience and therefore a vital resource for resilience and adaptation in our rapidly changing contemporary global context. The editors emphasize the need to tap this great reservoir of human experience for legitimate, appropriate, and economically and culturally sustainable responses to climate change.

In *Weather, Climate and Culture*, Strauss and Orlove (2003) integrate understandings of two camps within anthropology, the materially grounded ecologists and the meaning-centered symbolic anthropologists, to examine how humans think about and respond to meteorological phenomena. They structure their volume around two key issues of weather and climate: how humans experience weather and climate in differing time frames and how people use language in response to weather and climate, to emphasize how both human perceptions and reactions to these phenomena are ultimately shaped by culture. In context of the worldwide concern for climate change, the volume shows how time and talk are central to both how an understanding of unprecedented climate change is increasing and to the cultural patterns centered on language that underpin international climate policy negotiations. Contributors to the volume forefront the value of using the "anthropological eye and ear" to understand how societies perceive and act in response to climate perturbations.

There are also several noteworthy volumes that focus at a regional/ecosystem level. In *The Earth is Faster Now*, Krupnik and Jolly (2002) have assembled reports of long-term research and collaborative efforts from across northern Canada and Alaska to reflect how indigenous people are seeing changes and what they are saying about those changes. The editors intended the volume to both inform public policy, through its translation of local, place-based perceptions of change, and also to balance scientific research focused on futuristic models of what might happen with local experience that shows what is happening. Contributions describe projects that are in many ways exploratory by incorporating both new methods and tools for learning and sharing about data based in indigenous knowledge and collaborative forms of research that engage multiple stakeholders and go far beyond "scientific informing."

The volume *A Change in the Weather: Climate and Culture in Australia* explores the cultural space between weather and climate and how the very climatic feature that first attracted whites to Australia, that "the sun offered a new source of light and energy to escape the gloom of Britain," is reframed in the context of climate change to serve as a reminder to its people of global responsibilities (Sherratt, Griffiths, and Robin 2005). Even the flood and drought cycles so distinctive to Australian experience and identity are now shared with the rest of the world. The editors argue that this loss of identity

and, in many ways, of innocence for the weather that once surrounded inhabitants in familiar and reassuring ways now serves as a bellwether for action from the local to the global.

Considering the prominent role that adaptation plays now and as climate change proceeds and the disparity in who it affects, Adger, Arnell, and Thompkins (2006) discuss comprehensively about the justice implications of climate change and how its unprecedented forces raise moral and ethical questions about vulnerability, inequality, fairness, and equity. Contributors emphasize that issues of justice are essential considerations in international negotiations where power relations between the rich and powerful and the marginalized desperately need to be brought into question and shifted. Fairness in adaptation is key in the developing world where the most vulnerable—the old, young, poor, and those dependent on climate-sensitive resources—can either benefit or become more vulnerable as a result of international action. This volume challenges us to think about the higher purpose to politics and law and the need to recognize and act upon the justice and equity issues of the causes of and responses to climate change.

Darkening Peaks: Glacier Retreat, Science and Society compiles essays addressing the nature, history, and consequences of the recent unprecedented retreat of the world's mountain glaciers (Orlove, Wiegandt, and Luckman 2008). The editors frame their topic using five main terms to capture each of the major aspects of glacier retreat: *perception*, *observation*, *trends*, *impacts*, and *responses*. By weaving these concepts, the authors show how human responses to glacier retreat are shaped as much by cultural attachment as by economic issues. The editors argue that, in the end, it is the cultural and iconic power of glaciers for humans who both inhabit their presence and who live afar that will be the force to motivate action on climate change.

In Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change, Moser and Dilling (2007) forefront stories of success in communication and social action on climate change. They predicate the volume on the (to date) ineffectiveness of communication that has prevented the general public from understanding and taking action against climate change to bring to light effective modes of communication to quicken those processes. They argue that effective communication that mobilizes action must engage relevant social and cognitive characteristics. The volume distills the scholarship of both practitioners and an interdisciplinary research group to offer improvement on current communication strategies that empower individuals and communities to act in response to climate change.

Several recent anthropological monographs provide insights to our present climate change crisis. Archaeologist Arlene Miller Rosen (2007) gives an in-depth understanding of how different Terminal Pleistocene through Late Holocene communities were impacted by and responded to historical climate change. Her emphasis on working within the medium to small

temporal scales of environmental change to understand the growth, development, and mutual relations of ancient societies of the Near East highlights the contemporary importance of the local scale to appreciate how, for example, small shifts in rainfall can affect people living without benefit of world market systems and international aid programs. She argues that societies do not interact directly with their environment but with their *perceptions* of that environment. The environment is only one of many actors in determining social change and plays a less important role than perceptions of nature. Accordingly, societies overcome environmental shifts in a diversity of ways and failure to do so signals a breakdown in one or more social and political subsystems. Success or failure is most often related to internal factors: social organization, technology, and the perception of environmental change.

In *Do Glaciers Listen: Local Knowledge, Colonial Encounters, and Social Imagination*, Julie Cruikshank (2005) draws some important lessons for our pursuit of defining anthropology's role in climate change. Specifically she emphasizes how glaciers, previously considered eternally frozen, largely inert, and safely distant, gain new meaning in the context of contemporary climate change concern. Glaciers of late are understood as a new endangered species as they melt and fail to reproduce themselves to serve as a "cryospheric weather vane for potential natural and social upheaval." Furthermore, Cruikshank stresses how glaciers undergoing rapid environmental change are interpreted differently. In the Andes, a long-held ritual practice involving pilgrims carrying pieces of glacier away has recently stopped to prevent the glacier's diminishing. In Asia, local men "plant" ice in opposite-gender ice fields in order to grow the glacier and prevent drought. And in Peru's Cordillera Blanca, campesinos take scientists' measuring devices because they believe those instruments are what are causing drought. In short, there are contrasting approaches to understanding climate change and they all deserve attention and consideration as we approach strategies and solutions.

In contrast to the above publications and others coming to and in press at this time, this present volume represents a novel attempt to understand what roles anthropologists have in response to climate change. The intent is to open dialogue among anthropologists to questions concerning the extent of our roles as advocates, communicators, educators, practitioners, and activists.

From Anthropological Encounters to Actions: The Chapters

This edited volume comprises twenty-four chapters, organized into three sections to explore anthropology's role(s) in climate change issues and with the objective of locating theoretical frames, research approaches, and applied

practices that can move us from impartial witnesses of our field collaborators' experiences of unprecedented environmental change into the realm of action-oriented researchers and effective academics and practitioners.

To these ends, the volume has three parts:

Part 1: Climate and Culture

This section lays the groundwork for the rest of the volume by establishing a) climate change's ultimate and direct interrelationship with human culture (historically and now); and b) anthropology's privileged position to investigate that relationship. Climate change is having impacts on culture, ways of life, spirituality, and in other arenas that are not "obvious." Anthropologists are finding evidence/effects of climate change in "unexpected" places. There are both theoretical/epistemological reasons (we see climate and culture/environment and society as inextricably linked, as opposed to the traditional natural science approach that does not deal with humans), and methodological reasons (ethnography, participant observation, collaborative research, community-based research, decolonizing methodologies, etc). This section paints a vivid picture of not only what we know, but also how/why anthropologists are witnessing dimensions of climate change that other researchers have not seen or are not seeing, or just have not prioritized.

In Chapter 1 Fekri Hassan looks at climate change and culture, emphasizing the importance of human agency from an archaeological perspective. While, he argues, we have some considerable knowledge of climate change in historical times, we lack a clear understanding of its scale and its magnitude, as well as its frequency. Nor are we certain of the causes of particular paleoclimatic events. And, significantly, we cannot say with any degree of certainty what kind of impact climate change has had on human history. Without this clear understanding of past impacts, how can we claim to devise reliable scenarios for the future? While this points to lack of specific paleoclimatical data, it also highlights the inadequacies of current methodologies and interpretation. Hassan cautions us to avoid simplistic notions of determinacy and indeterminacy, arguing that the impact of any climatic event depends on the local social and ecological setting. He advocates that it is only through long-term archaeological and historical analysis, as well as detailed examination of local and regional social dynamics that we can begin to pinpoint the differential impact of the same climatic event. Hassan reinforces the argument that we need to be attentive to considerations of human agency and different responses and strategies in any one particular locality, as well as to local and regional scales, organizational complexity, ideology, technology, and social and cultural values of local populations within an interregional context.

In Chapter 2 Nicole Petersen and Kenneth Broad argue that, based on a deeper understanding of how climate influences, shapes, and organizes

our lives, we are moving to organize this understanding in epistemologically complex ways. They survey the shifting terrain of research on weather and climate in anthropology, examine some of the narratives surrounding climate and climate change in anthropology, and provide a context for current climate anthropology. Their chapter considers the shift in theoretical and practical interests for anthropologists concerned with climate and climate change research. While earlier interests may have focused anthropological attention on local weather, seasonal variations, extreme events, and local cosmologies, current discussions about climate and weather now differ because of the attention given to both the global nature of anthropogenic climate change and the production and distribution of forms of scientific knowledge. Anthropologists may have previously regarded a discussion of climate to be necessary to frame their narratives of local ethnographic specificity, but a reaction to environmental determinism as a driver of cultural variation made some tread carefully when even thinking about the significance of climate for the people and environments they studied. Current anthropological engagement with climate and weather can perhaps be traced to the emergence of several areas of research interest, including work dealing with the social and ecological aspects of disasters, research on vulnerability and adaptation, ethnoecology, the idea of a global climate and its implications for how anthropologists carry out place-based research, uncertainty in climate modeling and forecasting, the emergence of climate as a global issue that influences shifting ideological positions, and climate change as an area of human rights and social justice.

In Chapter 3, Carla Roncoli, Todd Crane, and Ben Orlove present a robust overview of anthropology's last decade of active involvement in climate change research to highlight both the field's recent surge of interest and projects and the field's effective epistemological and methodological approaches. They begin their exploration by showing how "being there" in the context of ethnographic fieldwork provides a distinctive lens into the dynamics of climate and culture. The chapter next explores the four levels of interpretations relevant to climate-culture interactions, including perception, knowledge, valuation, and response. The authors further encourage anthropologists to enlist a diversity of intellectual traditions to interpret and illuminate how local communities are perceiving, understanding, valuing, and responding in order to be more effective in local to global scales, as facilitators of community adaptation, and as an authoritative voice in climate change debates. This advice also comes with an important warning not to conform to value systems or compromise on our disciplines's core ideals of cultural sensitivity and social equity, in the process of reaching out into other disciplinary and institutional contexts. In conclusion the authors emphasize that the climate research and policy communities are in fact recognizing anthropology's critical role in moving forward both the policy setting and the adaptive capacity–building agendas needed to forestall climate change—now it is a matter of how anthropologists step out to meet that call.

In Chapter 4 Anthony Oliver-Smith provides a detailed analysis of anthropology's long history of and privileged role in working with human migration in response to both short- and long-term environmental change. He reminds us that throughout history humans have adapted to environmental change, and one major way they have done so is through migration, be it permanent or temporary. In the recent period, we are observing what were once temporary migrations turning into permanent ones due to both the forces of unprecedented climate change and inadequate government response. Not only do displacements due to climate and governments exacerbate local, regional, and national issues but they are also a prime cause for cross-border and international conflicts. He emphasizes the critical role of anthropologists, as climate change increasingly uproots large numbers of people, being that of action-oriented interpreters who can bring to light the complex nature of local contexts. Anthropologists must recognize that displaced communities all need to mobilize social and cultural resources to reestablish viable social groups that underpin human well-being and material life. In this era of increasingly displaced communities, Oliver-Smith calls on anthropologists to work with other social scientists to develop sound theory and methods in response.

Part 2: Anthropological Encounters

This section includes eleven case studies that work to illustrate climate change's direct interrelationship with human culture and anthropology's privileged position to investigate that relationship. Authors tell what they are encountering, how the people they are studying are responding, and how their subsistence, culture, spiritual orientation, and the like are being affected. Cases are drawn across global latitudes, longitudes, and altitudes from the Arctic, Africa, South America, the Pacific Islands, Australia, North America, and Europe. Each author discusses how they became involved in the study of climate with their field consultants, what impact they are having and with what outcomes.

In Chapter 5 Susan Crate discusses the significance of climate change for the Turkic-speaking Sakha horse and cattle breeders of northeastern Siberia. Sakha personify winter in the form of the white Bull of Winter, and stories told about it seemingly offer explanatory accounts of the temperature events of the extreme sub-Arctic winters that characterize this part of the Russian Federation. Yet as Crate argues, as they reflect on their observations of climate change, some Sakha are pondering whether the story may well become one about something that used to be, rather than an account of what is. Crate reports on local observations of change that have compelling similarities to what anthropologists working elsewhere in the circumpolar North also say people are seeing. Noticeable amongst these changes are warmer winters with more snow, and cooler summers with more rain. One of the implications of this seasonal change, argues Crate, is that people say they can no longer

read the weather. And worryingly for the Sakha, food harvests are being affected and horses and cattle are facing greater difficulty finding fodder. Crate teases out local understandings of the causes of climate change, showing how Sakha attempt to relate their perceptions of natural variability and change with their perceptions of anthropogenic influences, including technological change in Soviet and post-Soviet Siberia. In her discussion Crate focuses on climate change as being ultimately about culture. Its root causes, she argues, are in the multiple drivers of global consumer culture; its impacts are evident in the way it transforms subsistence cultures (such as that of the Sakha); and it can only be forestalled, she suggests, via a cultural transformation from degenerative to regenerative consumer behavior. For Crate, anthropologists are strategically well placed to interpret, facilitate, translate, communicate, and advocate (both in the field and at home) in response to conditions giving rise to climate change, to the cultural implications facing communities as they cope with change, and for the actions needed in response to climate change.

In Chapter 6 Anne Henshaw takes us to Inuit communities on southwest Baffin Island, Nunavut, Canada, with whom she has worked on a long-term environmental knowledge project for the last ten years, to understand how climate change can be both a threat and a welcome opportunity for place-based peoples. The chapter focuses on how sea ice, which dominates the Inuit seascape for most of the year and is a critical element of Inuit travel and hunting, has become a critical barometer of environmental change especially in terms of recent climate change. She explores this dynamic in both local and global perspectives, through the careful analysis of interviews with community members and historical records. On a local level the loss of sea ice both poses threats to travel and hunting and brings new subsistence resources. Globally, Inuit have been outspoken about how the rapid loss of sea ice and other unprecedented changes represent threats to their basic human rights. Henshaw concludes that anthropologists have a role in the climate change issue, but that often indigenous groups are their own best advocates. Anthropologists are better suited to facilitate collaborative, community-based projects that can work to mediate the complex and rapidly changing social and political environment in which climate change is taking place.

In Chapter 7 Sarah Strauss considers climate change impacts as they affect a village and its locality in the Swiss Alps. Building on her work on understanding the social lives of water and the weather, Strauss broadened the scope of her study of one local area to include consideration of climate variability and modeling in the wider context of the Swiss Alps. Glacier stories are of particular importance to her work—glaciers have historical social, cultural, and economic importance for people of the Swiss Alps, providing water for drinking and power generation, as well as ice before refrigeration. They continue to be powerful attractions for tourists, and they act as markers of environmental change. Strauss also describes how glaciers have

local significance as repositories of lost souls. Siren tales are told of entrapped souls that call out to the living, reminding people to stay close to home and not wander too far into the mountains. The cautionary nature of these tales reveals local perspectives on the dangerous nature of glaciers, as well as the importance of following local religious traditions. While glaciers have been an integral part of culture and social life in the Alps, Strauss discusses how concern over their retreat and demise is forcing people to think about the implications of an ice-free future. Local people are considering what may happen if their glaciers disappear. While some are not too perturbed about a glacier-free scenario, others are anxious about water supplies and electricity generation, a decline in tourism and its consequences for the local economy, and hazards from flooding and avalanches. While locally specific, these concerns highlight issues that also have implications for people who live far beyond this narrow Alpine valley.

Tim Finan's aim in Chapter 8 is to consider what the role of anthropology is—and indeed can be—in understanding what he calls the twisting trail of the impacts of climate change. While acknowledging the sophistication of the science that informs climate change reports and impact assessments, most notably the IPCC reports, he nonetheless criticizes these reports for failing to address the impacts on human systems. The IPCC exemplifies the scientific tradition of portraying climate change without a human face. Anthropology, he argues, provides an appropriate lens that allows a sharper focus on how best to assess adaptation, vulnerability, and resilience, and provides both the theoretical concepts and the methodologies needed to shift the focus to the dynamic interface of natural and human systems under change. Finan draws on his work on shrimp aquaculture livelihoods and sea-level rise in coastal Bangladesh to illustrate his argument that anthropology can assemble the necessary toolkit to understand how changes in the natural system will revise current terms of engagement at the level of communities and households. In Bangladesh, moderate flooding is, from a livelihood perspective, important for fertility and the replenishment of freshwater fish stocks. Excessive flooding, however, is catastrophic, causing death and disruption to livelihoods. Finan argues that the natural and human systems have negotiated an uneasy balance. People's livelihoods are dependent upon the annual renewal of the resource base, yet extreme events can be devastating. Finan shows how livelihood stress introduced by global warming is manifest in severe cyclonic events, storm surges, and excessive flooding. However, the vulnerability of coastal livelihoods in this deltaic system is not determined by climate change alone, but by a complex interplay of environmental, political, social, and economic systems distributed across a vulnerable landscape.

Benedict Colombi's concern in Chapter 9 is with the cultural history of human interactions with the Columbia River basin in the northwest United States. He discusses Nez Perce relations with the environment, particularly the significance of salmon for cultural and ecological sustainability. Fish and water are of central importance to Nez Perce social and cultural life,

with salmon bringing the energy of the ocean inland to plants, animals, and people. Without the salmon, say local people, the river would die. Salmon are a keystone species, argues Colombi, but also fundamental to the ideological and material foundations of Nez Perce culture. Within the discourse of climate change, they are also cast in the role as an indicator species of the health of the Columbia River and its ecosystems. Colombi discusses local concern over what the effects of climate change on ecosystem regimes will mean to cultural and subsistence rights. Climate change is not only perceived as a threat to salmon—and thus to local and regional biodiversity—but also to indigenous rights. The effects of climate change already experienced, and the worries about what may happen, are prompting local discussion about adaptive strategies and the building of sustainable indigenous economies within a context of the intricate relations between people, environment, and salmon. But while it is feared that climate change will contribute to the transformation of people's relationships to place, Colombi draws attention to the need to understand this with reference to two centuries of social and ecological change brought about by settlement, commercial growth, urban and agricultural development, and the impacts that timber cutting, grazing, fire suppression, and hydroelectric development have had on the ecosystems of the northwest.

In Chapter 10 Jerry Jacka documents the effects of climate change for Porgerans, several thousand Ipili and Enga speakers in the western central highlands of Papua New Guinea. The author illuminates the importance of considering medium-term climatic trends, in this case more frequent El Niño events, and how local peoples perceive how these trends affect the moral, agricultural, environmental, and cosmological dimensions of their livelihoods. Through his careful anthropological analysis of development, migration, and land cover change, Jacka shows how the last twenty years of gold mining development, which has brought increases in population and deforestation to the Porgeran homelands, has affected indigenous subsistence practices and, perhaps more profoundly, his consultants' cosmological orientations. Daily the Porgera people comment about how the physical manifestations of environmental change are signs of the world's end, an understanding based upon an enduring cosmological belief system. Through his analysis, Jacka clarifies the importance of taking into account local perceptions and understandings of what the local effects of climate change mean, in this case, the "societal breakdown between native Porgerans and the rituals oriented toward more powerful spirits that control the cosmos."

Beth Marino and Peter Schweitzer explore in Chapter 11 how anthropologists conducting climate change research can either make or break their investigation depending on whether they use the term *climate change* explicitly in their field inquiry or not. Working in five Inupiaq villages of northwestern Alaska, the authors show how the use of the phrase *climate change* alters local-level patterns of speech. In part this phenomenon is a

result of the world's overdocumentation of and myopic focus on climate change centering in the Arctic, and especially in Alaska and Canada. As a result of this overemphasis, not only do most global inhabitants directly identify climate change as something going on only in the Arctic, but the Alaskan and Canadian Arctic is inundated with what Marino and Schweitzer refer to as the "photo snatchers," who, in addition to snatching the world's images of climate change, also leave behind certain specific ideas and concepts about the global process for the local inhabitants. The authors found that when they used the term *climate change*, consultants responded by giving summaries of information they had gleaned from scientific and other media outlets. However, when they asked about change in the context of the local environment, consultants shared their personal experiences based on daily and seasonal activities. Marino and Schweitzer conclude their piece by suggesting that perhaps the anthropological investigation of climate change will proceed much farther if "we stop talking about it."

In Chapter 12 Donna Green documents how historically highly adaptive and resilient cultures are often rendered highly vulnerable in the face of climate change due to the interplay of an accelerated rate of environmental change and profound government mismanagement and neglect. Working with Torres Straits Islanders, living between mainland Australia and Papua New Guinea, who are seeing the most immediate effects of climate change due to sea-level rise and inundation of their islands, Green explores the extent to which traditional environmental knowledge (TEK) can both guide appropriate local-level adaptation strategies and provide needed historical observations for climate scientists. The author discusses how Torres Straits Islanders are adapting by building houses on stilts and away from lower areas—but that it seems that eventually relocation will be inevitable. She emphasizes the need to fund more projects focusing on TEK and climate change because, based on her experience, when people have information and see change occurring around them, they act. Although the government funded the initial studies, they are not forthcoming with more funds to continue the work.

Inge Bolin takes us to the high Peruvian Andes to the rapidly changing world of the Quechua people in Chapter 13. She reveals how highly adaptive and resourceful people are unequivocally challenged by the impacts of climate change, in this case, due to the unprecedented retreat of glaciers that supply all their drinking and agricultural water. Issues of water scarcity are not new to the Quechua but are an issue that humans of the Andean Cordilleras have found ways to adapt to since the time of the first inhabitants. Myths, legends, and both historical and contemporary spiritual practices show this continuity. Bolin explores how water scarcity due to the rapid melting of mountain glaciers affects not only contemporary Quechua physical survival but also their spiritual practices. She describes how locals reinstate ancient Inca water-conservation practices to some success. These include a) the Inca practice of

terraced gardens, both preexisting and newly built, to prevent water run-off and erosion; b) the pre-Columbian practice of conservation tillage, which also lessens water loss; and c) the revival of ancient Andean subterranean water channels to transport water to dry areas. Despite these and other local and regional efforts, Bolin argues that much more must be done and largely on an international level to ensure that the Quechua, and others who make up the one-sixth of the world's population that relies on glaciers and seasonal snow pack for their water supply, will be able to continue to inhabit, much less survive, in their ancestral lands.

Heather Lazrus draws on rich ethnographic material from her research in Tuvalu and illustrates in Chapter 14 how people perceive, understand, interpret, and cope with changes they notice and experience in their South Pacific island homes. Lazrus argues that while Tuvaluans draw on locally based traditional knowledge to understand atmospheric and climatic disturbances, their understandings and responses to climate change are, despite their apparent remote geographical location, nonetheless also informed and enriched by different forms of knowledge derived from their participation in broader transnational networks. Local knowledge about ocean currents, wind, and precipitation intersects with scientific and universal ways of knowing about anthropogenic influences on the atmosphere. The scientific consensus is that climate change will dramatically transform this small South Pacific country, a mix of atolls and table reef islands. Local concern is with sea-level rise, increases in sea surface and subsurface temperatures, acidification of the ocean and coral bleaching, coastal erosion, an increased intensity (but decreased frequency) of rainfall, and increased frequency of extreme weather events including drought. Lazrus places the discussion of climate change in Tuvalu within a context of anthropological engagement with global debate about the avoidance and amelioration of problems associated with it. She identifies three areas in which anthropology can play a role in this debate: by contributing to the understanding of how impacts of climate change are constructed, how agency is retained, and how governance can promote autonomy and sovereignty as necessary for dealing with climate change and its impacts.

Based on his extensive work in the Kalahari Desert, Robert Hitchcock discusses in Chapter 15 how the San of Botswana have slipped further into poverty as a result of economic and environmental changes that have occurred over time in southern Africa. To meet the challenges arising from these changes, San have employed a range of often ingenious strategies, which include diversifying their subsistence bases, utilizing water control techniques, and depending on other groups or, in some cases, governments and international agencies for food and support. The periodic but all-too-frequent experience of hunger and privation arising from climatic events, the infestation of pests, and the outbreak of diseases such as malaria demonstrates the vulnerabilities to which San livelihoods are exposed in this

vast "sand-sea" ecosystem. Nearly all the San with whom Hitchcock and his colleagues have worked over the years recognize that environmental change is occurring. For some, environmental change is nothing new, but its character is now different than many remember. While some San report that environmental and socioeconomic conditions are getting worse in the Kalahari, these changes are exacerbated by the fact that the options San have to deal with them are increasingly limited, and that the strategies traditionally employed to cope with environmental stress are no longer effective. Hitchcock's chapter reveals a diversity of understandings and explanations that San have for why the environment is changing. Most San seem to agree that they are witnesses to seasonal shifts and uncertainty in the environment, yet not all attribute this to climate warming and some argue that the local areas in which they live are actually getting cooler. Yet all agree that the changes are affecting their well-being and that the biggest challenge they face is environmental variability and risk.

Part 3: Anthropological Actions

This section includes nine chapters exploring what anthropologists are doing and can/need to do both in their field research context, in the larger anthropology community, and to reach out to wider audiences from the local to the global. The authors explore various research approaches, conceptual dilemmas, practical actions, and professional orientations that anthropologists can take, including appropriating field research agendas in order to effectively address climate change, finding and using effective methods of communicating at home and abroad about the issues and necessary actions to forestall climate change, actions to transform consumer culture, engaging campuses in sustainability initiatives, building decentralized resilient communities, affecting policy, working with and within business, and the like. Granted, these themes overlap, as they rightly should. Perhaps the biggest challenge is how we can act to make change, and how to take on so big a change.

Richard Wilk contributes a thought-provoking piece questioning anthropology's role in interpreting and addressing the issue of consumer culture as it pertains to climate change. In Chapter 16 he begins by critiquing the commonly accepted perspective that Western consumers just need to "tighten up their belts" to effectively counteract climate change. His argument lies in the fact that, contrary to popular belief, the majority of greenhouse gas emissions are not due to individual consumption but rather to pivotal political and historical decisions. In the end, they are rooted in the variety of "cultural ideals about justice, comfort, needs, and the future." In this light, anthropology, as a discipline that has always considered these factors in its research program, is uniquely situated. In the same breath the author critiques anthropologists' lack of engagement with other anthropologists, unions that Wilk claims could be pivotal in developing a comprehensive

and sophisticated theory of consumer culture, useful to policy makers and laypersons alike. Wilk concludes by encouraging anthropologists to play a more proactive role in the work of creating a more sustainable economy by first and foremost creating new models of comparison and collaboration so that the whole truly may be more than the sum of the parts.

Shirley Fiske's aim in Chapter 17 is to explore the opportunities for how anthropologists can engage with the policy concepts in US national legislation, as well as internationally, that are influencing and shaping the implementation of strategies for global carbon markets and emissions trading. She discusses policy debates in the US Congress, highlights policy questions, and provides examples of how anthropologists have analyzed the link between local communities and policy instruments, such as carbon offsets and sequestration. She draws on unique experience of climate change policy gained from her positions as observer and participant in its discussion and development in legislative and executive branches of the US government. She describes her own roles, but also considers the changing nature of dialogue about climate change and various attempts to make it a legislative priority. Her experience has given her fascinating insight into the shifting terrain of the negotiation of policy questions about mitigating and controlling carbon emissions. Here is fertile ground for the anthropologist, she argues, and she urges us to take a closer look at domestic policy debates, raise questions about the process, comment on legislative provisions, and focus on (and deconstruct) the language and careful phrasing of policy concepts, such as cap and trade. The domestic discourse in the US, Fiske argues, revolves around reducing emissions, cap and trade, carbon taxes, credit allocation, carbon reduction technologies, and so on. Framed and viewed as a problem of and for technology, rarely is it discussed as something that has consequences for people, families, and communities.

In Chapter 18 Mark Nuttall drives home the importance of grappling with the interplay of climatic, social, economic, and political factors when anthropologists work in indigenous communities confronting climate change, or how the "regional texture to climate change means [that] changing environments are perceived and experienced differently." Based on his long-term research in Greenland, Nuttall illustrates just how climate change means different things for different people. In the context of Greenland's Home Rule government, politicians see climate change as an opportunity for mining and hydrocarbon development that for them translates to greater political and economic independence from Denmark. Conversely, Greenlandic peoples interpret climate change not as a change to some environment outside themselves but as a change to their personhood, illustrating how climate and culture in many indigenous worldviews are inextricably linked. Although these same communities have a historical precedence for adaptation to environmental change, Greenlanders' capacity to adapt to change is highly

dependent on the strength of their sense of community, kinship, and close social associations. Similarly, the last one hundred years of changes in marine resources, both from climate change and the politics of resource rights, have affected the Greenlandic fishing industry and translated into varying degrees of social and economic consequences for communities. Nuttall concludes by emphasizing that communities' ability to adapt to climate change has more to do with issues of autonomy—their capacity to make decisions on their own and to continue to exercise their ancestral way of *becoming* with the environment around them in order to adapt and be flexible in coping with climate variability and change.

In Chapter 19 Pamela Puntenney helps us to focus on the complexities and complications inherent in developing and implementing the multilateral agreements and other policies needed to tackle the climate change issue in the global policy arena. The author argues that the three most serious threats to our world ecosystem—climate change, loss of biodiversity, and urbanization—can only be addressed through the creation of comprehensive agreements founded on principles of sustainability, equity, and justice. She discusses the growing concern and sense of urgency to bring the human-cultural dimensions of climate change to the policy forefront and then turns to how social scientists can affect decision-making. The most vulnerable countries need action now. She reminds us that with our anthropological training comes the irrevocable responsibility to assume our "anthropological footprint" and engage ourselves in discussions and directives on international policy making, debates, policies, decision-making, the building of sustainable enterprises, and plans of action, each of which is increasingly focusing on how issues of culture are central.

Gregory Button and Kristina Peterson discuss, in Chapter 20, the efforts of the people of the community of Grand Bayou in Louisiana to forge collaborative partnerships with social scientists and physical scientists in the wake of Hurricane Katrina. Their analysis focuses on a participatory research project and the importance of such an approach for the validation of lay knowledge, a necessary prerequisite for the synthesis of local ways of knowing with science. This, they demonstrate, not only increased the community's understanding of environmental disasters and climate change, but also contributed to local people's empowerment and enhanced community approaches to adaptation to dramatic environmental change. While Button and Peterson discuss the importance of understanding the environmental setting of Grand Bayou as a way of assessing vulnerability to environmental disasters, they draw attention to the sociopolitical and economic relations that also play a part in making a community vulnerable to risk. Grand Bayou residents have been witness to the dramatic topographical transformation of their locality over the past few decades, a transformation attributable in part to the digging of the Mississippi Gulf outlet, increased

coastal erosion resulting from clear-cutting of cypress, the building of transportation canals for the petrochemical industry, and oil and gas development. Environmental change and socioeconomic and geographical marginalization not only exposed people to the impact of Hurricane Katrina—it also hid them from the sight of federal officials offering aid for debris clean-up afterwards. The essence of Button and Peterson's chapter is to show that vulnerability to disasters can be reduced if communities are empowered, and if they are including in the planning process for disaster preparedness, response, and mitigation.

In Chapter 21 Noel Broadbent and Patrik Lantto discuss climate change from an Arctic cultural perspective. The Saami people of Sweden are facing similar dilemmas as other indigenous peoples not just elsewhere in the circumpolar North, but elsewhere globally. However, Broadbent and Lantto argue that the Saami are boxed in by national narratives and welfare-state policies that have redefined their rights and identities. Among the problems they face is the fact that the Swedish government has not recognized them as indigenous people in accordance with United Nations policies. In recent court cases Saami land-use rights have been challenged and lost. The Swedish nation-building process incorporated myths about the origin and the nature of both Swedish and Saami identities, and these cultural and political myths still influence environmental and cultural policies. Archaeological evidence is nevertheless opening the door to new interpretations regarding Saami territories and identities, and yet recent government policy reports do not allow archaeological evidence to be used in court cases. Broadbent and Lantto discuss the role of anthropology in helping to contextualize contrasting narratives and unraveling the complex webs of discourse emerging from them. At the national level, they argue, historical narratives and social policies can either enhance or limit societal responses to climate change, particularly when indigenous minorities are involved. Based on this, they conclude that the Saami may well survive as fully acculturated Swedish citizens but face major political obstacles to sustaining land-use practices and traditions that make them part of the indigenous world.

In Chapter 22 Peggy Barlett and Benjamin Stewart ask how anthropologists employed in institutions of higher education can contribute effectively to educating about climate change. Their interest, however, is not just with making students aware of climate change and its causes and consequences, but with expanding awareness and galvanizing action within the life and culture of the institution. They draw on their work concerned with institutional change and sustainability and focus on efforts at Emory University to promote cultural change on campus as part of climate change teaching strategies. Their starting point for discussion is that, while institutions of higher education have a major role in contributing expertise for climate change research, debate, and policy, colleges and universities are huge operations that also leave their own large carbon footprints. Higher education

institutions, and the people who study and work in them, are consumers of energy. Even an academic who favors the use of chalk instead of high-tech equipment in classrooms is still nonetheless implicated in transnational networks of production and consumption. Barlett and Stewart discuss strategies for teaching and educating students about climate change, but also about human agency and engagement with the local, regional, and global challenges associated with it. But they also stress the importance of emphasizing the personal moral dimensions of climate change. How much do we care, they ask, about biodiversity and polar bears? Do we care enough to sacrifice the daily comforts of heating or air conditioning? The critical rethinking of priorities and values—those we hold as individuals, but also those of institutions—is a fundamentally important response to climate change.

In Chapter 23 Lenora Bohren explores anthropology's role in "car culture," based upon her own experience as an anthropologist working as director of the National Center for Vehicle Emissions Control and Safety (NCVECS) at the University of Colorado. She first chronicles the late-nineteenth-century development of the car, with its beginnings in Europe and its standing as an expensive proposition and mainly a status symbol and high-ticket item for the wealthy. It was in the twentieth century, when Ford designed a car for the average American, that the industry took off. Despite the fact that the rise of the car lessened the issues of waste and housing for horses, it also brought with it a myriad of resulting environmental and cultural problems. These included the need for proper roads, traffic congestion, exhaust problems, disruption of community life, and the increased costs to car owners for insurance, fuel, repair, maintenance, and health issues. These issues prompted a series of emissions regulations in the US beginning in the late 1960s and up to the 2007 Executive Order directing the EPA to develop regulations for CO_2 emissions. Bohren next illustrates how cars are a cultural phenomenon, represented and understood differently in different countries. It is to this extent that anthropology has a role. By highlighting the interface between culture, technology, and environment, anthropologists can facilitate culturally appropriate and long lasting change.

In Chapter 24 Nicole Stuckenberger discusses her work curating the museum exhibition Thin Ice at Dartmouth College's Hood Museum, focusing on communicating the diversity of local understandings and perceptions of climate change to an audience oriented to a largely Western scientific knowledge base. Because the development of effective policies depends upon the engagement of a multiplicity of stakeholders, including local residents, regional and national governments, scientists, policymakers, and indigenous groups, the exhibit serves to underscore the importance of cultural perceptions and understandings by exploring past and present Inuit perceptions of environmental change. In order to convey the holistic Inuit perspective to museum visitors, the exhibit avoids displaying each domain of life in isolation but rather integrates various elements via the use of the indigenous teaching

method of storytelling. Stuckenberger describes the challenges of designing an exhibit to communicate indigenous ways of knowing and worldviews to a mostly Western audience. In the end the author emphasized the important role of anthropologists in cultivating this and other visual and experiential perspectives on climate change in order to enrich and inform larger-scale perspectives and reach a greater public.

Together these three parts comprise a whole that is by no means to be considered a final assessment of the state of anthropology and climate change at the beginning of the twenty-first century, but rather a preliminary reading of a novel, rapidly expanding, and crucial dialectic and an invitation for increased dialogue and collaboration. From the first roots of this book project, in Susan Crate's conversations with Jennifer Collier at the 2006 Society for Applied Anthropology meetings, through several double paper panels and policy forums at SfAA and AAA annual meetings on the topic, it is clear that anthropology has a multitude of roles to play and offers a privileged set of ways of knowing, keys to understanding, and avenues of action related to our affinity for issues of culture. It is also clear that we have much to learn and explore across the scope of this volume, from encounters to actions.

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Notes

1. We are using the term *climate change* throughout this introduction to refer to the contemporary phenomenon of anthropogenic global climate change, as distinct from natural climate variability. Whereas *climate variability* indicates changes in climatic conditions that scientists consider to be due to natural mechanisms and processes, and as such are entirely unrelated to human activities, climate change is defined as a variation in climatic parameters and is attributed directly or indirectly to human activities (Lange 2005, 365). Such variations in climatic parameters occur in addition to or despite natural climate variability. *Climate change* and *global warming* (the enhanced greenhouse effect and the trend in the increase of mean global surface temperatures) are often used interchangeably, particularly by the media, resulting in a confused understanding of the terms, but climate change can result in the cooling as well as the warming of the earth's near-surface atmosphere.
2. We take poetic license here by saying that "the environment moves." It works well within the analogy. We fully acknowledge that the environment cannot move but that it changes.
3. http://www.tebtebba.org/tebtebba_files/susdev/cc_energy/buenosaires.html. For the original indigenous declaration on climate change, see http://www.treatycouncil.org/new_page_5211.htm (accessed June 1, 2006).
4. By the time this book is in the readers hands, there will invariably be as many new volumes and manuscripts on the topic.

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