



It's Our Fault: A Global Comparison of Different Ways of Explaining Climate Change

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Abstract

International surveys suggest people increasingly agree the climate is changing and humans are the cause. One reading of this is that people have adopted the scientific point of view. Based on a sample of 28 ethnographic cases we argue that this conclusion might be premature. Communities merge scientific explanations with local knowledge in hybrid ways. This is possible because both discourses blame humans as the cause of the changes they observe. However, the specific factors or agents blamed differ in each case. Whereas scientists identify carbon dioxide producers in particular world regions, indigenous communities often blame themselves, since, in many lay ontologies, the weather is typically perceived as a local phenomenon, which rewards and punishes people for their actions. Thus, while survey results show approval of the scientific view, this agreement is often understood differently and leads to diverging ways of allocating meaning about humans and the weather.

Keywords Climate change · Knowledge · Hybridity · Self-blame · Moralization

Introduction

Human relationships with weather can encompass such wide-ranging emotions as dependence, awe, and fear. Weather not only influences the way people eat, move, and dress, it has also been the basis of meaning-making, enriching spiritual and religious lives through weather interactions in the everyday. In contrast to weather, climate denotes an average weather in a certain place and/or over longer periods of time.

In European thought, the distinction between weather and climate is comparably old and vividly articulated, such as in Herodotus' writing (Bichler 2001). Travelling between Greece, Scythia, and Egypt, he speculated that climatic differences partly explain why people (including their character and culture) vary (e.g., “soft men come from soft places”). Climate has been discussed as a spatial variation for some time, yet its temporal aspect became salient only more recently, partly due to a growing awareness of “climate variability” and “climate change” since the eighteenth century, which has led to a standardization of instruments to measure rains, winds, and the sun, and resulted in the formation of the first meteorological

societies (Wege 2002). Through these long-term analyses of averages and “normal” weather patterns, identifications and descriptions of how the weather is changing are made possible. These practices not only analyze climate, but also succeed in manufacturing or constructing it as a “thing.”

Only beginning in the 1970s did a consensus emerge among the scientific community that not only is the climate changing, but humans are the cause, and that the consequences will be largely negative for the global environment (IPCC 2017). As a result, “climate change” is a commonplace term to those who have been exposed to the scientific discourse. Through media outlets, NGOs, or formal education, most people around the globe are confronted with the notion of global climate change and the term has been translated into most world languages. Annually, the UN alone spends millions of dollars to further “educate” people about climate change: for the year of 2019, the expenditures of the IPCC were expected to be approximately \$9.6 million (IPCC 2017, Annex 11). UNESCO targeted a 2018–2019 budget of \$595.2 million for its Natural Sciences Programme that includes strengthening knowledge and action in relation to climate change (UNESCO 2018: 94–95).

There are a few international surveys attempting to address how this message is being received. Since 2005, the Gallup Institute, for example, has been conducting a poll in 160 countries that represent 98% of the world's population. According to the 2010 poll, the awareness of global climate change

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differs drastically: while in some countries (e.g., Japan, Thailand, northern Europe) almost everyone knows about climate change, in others about one third of the population do (e.g., India, Bangladesh, Ghana). Moreover, about half of the world's population acknowledges a human contribution to climate change (Ray and Pugliese 2011).¹ However, the problem with such surveys is that they investigate evaluations of decontextualized “chunks” of knowledge (typically as agreements with statements) that hardly allow us to grasp the meaning people attach to the phenomena under consideration.

For example, most people agree with statements that the weather is changing and that humans are the cause. However, it is hard to know if this really means they have adopted a scientific point of view. An agreement with the two statements cannot tell us *where*, in the interlocutor's view, the weather is changing, *which* people have caused it, and since *when* this has occurred. Depending on the answers, the meaning changes drastically. Is it changing globally, or only where I live? Did members of my community cause it or did people somewhere else? Is it due to people's recent behavior, or behaviors that occurred in the past? While an individual could agree to both example statements for a given question, it might be due to a belief that the weather is only changing in the place where they live because the people in their region have recently done something wrong.

Consequently, more contextualized information is needed to better understand how people make sense of climate change. We aim to offer such an analysis, although we do not intend to unravel to what degree people disagree with the scientific view on climate change and why this is so, in the way studies of public understanding of science do (Raza and Singh 2016). We would even claim that it is not possible to find a “true knowledge” about climate change because the changes people experience and observe can be something ontologically different depending on the context in which they live (Goldman *et al.* 2016; Burman 2017; Schnegg 2019).

A key component of this analysis is to recognize that knowledge is a process and therefore does not remain fixed, separate, or immune to social meshwork (Ingold 2011). Throughout this article we use the terms knowledge discourse(s), knowledge(s), and way(s) of explaining, which are interchangeable to a certain degree but also relate to specific phenomena and processes.

When we use the term *knowing* we intentionally leave space for encompassing worldviews constructed practically and cognitively. We use the terms *knowledge discourse* and *knowledge(s)* to refer largely to cognitive processes, whereas *ways of knowing* is associated with enactment and the doing of knowledge. With ways of knowing, then, we refer to the

practices of “doing knowledge” that lead to particular, often more abstract, religious or profane, relational or isolated, knowledges. A terminological distinction that runs through the literature we compare refers to “scientific” and “local” knowledge. The latter can include all existing discourses (religious, observational, “indigenous,” “traditional,” etc.) within a certain region, whereas the former is, as Frederik Barth, defines it, the “academic prototype of ‘knowledge’” – something context-free, which “stimulates knowledge without knowers” (Barth 2002: 2) in its imagined, pure form. From the theoretical understanding we apply, both “scientific” and “local” knowledge is the result of embedded and embodied practices of producing it (Simonetti 2019; Schnegg 2019).

Against the background of the developments described above, the aim of our analysis is to show how the scientific climate-change discourse interacts with other discourses of human knowledge about the weather. We pursue this on two levels: theoretically and substantively. The theoretical aim is to discuss models that have been used in the literature to describe those epistemological dynamics. The three models we identified illustrate the most “idealized” instances of knowledge interaction and are useful for orienting this analysis. Those theoretical expectations include *hybridity*: two or more ways of knowing blend into one new, hybrid form. The second theoretical expectation is *domination/resistance*: one way of knowing might dominate all others. Here, we would expect the dominant discourse most probably to be the scientific discourse on climate change due to its position of prevalence and power. However, the local way of knowing may simultaneously prove resistant to such domination. Lastly, *pluralism*: stimulated through already existing literature in medical anthropology, we propose knowledge about changing weather conditions to be situational. Depending on the context or role actors find themselves in, they might access different explanations – and as such, a pluralism of knowledge comes into existence. This pluralism can be situational, but also strategic, depending on whom people communicate with and for what purpose.

It is perhaps not surprising that most instances of different knowledge interactions will likely result in some form of hybridity. Given this, our substantive contribution lies in isolating two salient trends occurring in the *localization* present in hybrid cases: moralization and self-blame, thus adding to the pioneering findings of Rudiak-Gould (2014a, 2014b).

To accomplish this, we mobilize a source that has been left largely unexplored in climate-change research. We employ detailed ethnographic case studies conducted over the past two decades that shed light on the internal dynamics of explaining knowledge and making sense of climate change. To our understanding, two articles have attempted a comparison of the literature before (Crate 2011; O'Reilly *et al.* 2020) and both provide comprehensive literature reviews on climate-change anthropology. In contrast, we do not focus

¹ Again, variations are rather high: “Developed Asia” (83%), US (48%), “Developing Asia” (39%), Middle East and North Africa (37%) and Sub-Saharan Africa (32%).

on providing an extensive overview of the literature and particular research results, but rather systematize what we have learned about a particular phenomenon with the theoretical gaze we propose.

While these ethnographies are a rich source, it is important to acknowledge that when analyzing knowledge discourses through the lens of ethnographic case studies this information is necessarily interpreted through the perspective of the researcher. Throughout, we consciously simplify more complicated realities in order to show trends and patterns. We are aware that not all, say, Iñupiat or Palaweños make sense of the world in a unified way – within a group of people one can expect fuzziness and, virtually, hybridity.

Because of these and related concerns, comparison itself has long been criticized and rarely used as an explicit research design (Schnegg 2014). At the same time, anthropologists never stopped comparing “their” cases in conference sessions, in edited volumes, or over a beer. As Schnegg and Lowe argued recently, the political responsibility of the discipline can hardly be met without comparing or contrasting the evidence we find (Schnegg 2014; Schnegg and Lowe 2020). Therefore, we need more reflective approaches, which unravel the potential that comparisons entail without falling into the pitfalls previous research rightly critiqued (Candea 2018).

We provide a brief description of our methodological approach, followed by a section formulating the theoretical expectations that oriented our analysis. We then discuss our findings in detail.

Methodological Approach

Our analysis is based on a selection of 28 ethnographic case studies. To arrive at this sample, we searched extensively for studies on the way people make sense of changing weather conditions in their surroundings.

As a result of our emphasis on *knowledge of causes* of climatic conditions specifically, studies that deal with different adaptation knowledge(s) or simply different weather knowledge(s) were not included. We decided to focus on this kind of knowledge to make the study more comparable. Furthermore, it is precisely this knowledge of causes that helps in examining to what degree people accept the concept of anthropogenic climate change and to identify which actors are blamed and, therefore, thought of as responsible for a changing climate. To be suitable for our purpose, we additionally needed to find evidence of an interaction between at least two knowledge discourses. We therefore sought to include all ethnographic case studies published in the last two decades addressing multiple ways of explaining climate change on a global scale. The starting point for this literature review was all edited volumes with some anthropological focus on weather and climate change published after 2000 (Strauss and Orlove 2003; Pettenger 2007; Crate and Nuttall 2009, 2016; Castro *et al.*

2012; Hastrup and Olwig 2012; Hastrup and Skrydstrup 2013; Dove 2014; Schuler 2014; Barnes and Dove 2015; Nakashima *et al.* 2018; Bennardo 2019; Stensrud and Eriksen 2019; Brüggemann and Rödder 2020). After identifying some suitable case studies here, we implemented snowball sampling and searched the references of those first case studies.

Next, we systematically searched the *AnthroSource* database using the following search terms: “climate change,” “knowledge,” “ethnography,” and “cause,” combined with “climate” in the title (16 results), “knowledge” in the title (27), and “knowing” in the title (4) as the initial search produced 1417 results, which clearly necessitated a refined algorithm. Applying a search with the keyword “climate change” resulted in 52 findings. Furthermore, we searched for suitable monographs, and applied our search terms in *JSTOR* and *Google Scholar*. We are aware that more cases worth including exist; however, having identified and analyzed 28 case studies we did not come across any more novel findings and reached a saturation of data. With this, we provide a systematic contribution, yet of course not an exhaustive review.

As we worked through the literature, it became increasingly apparent that the research design of a given case study will determine whether certain information is present or not, and a researcher may decide not to include data depending on their research purpose or manner. Since we are confined to the information presented in the case studies, we cannot state that this is a holistic perspective for a region since it is mediated through the eyes of the researcher and research design and often incorporates the views of only some of the local people. Instead, these case studies provide a snapshot of what many people experience, and we feel it is crucial to acknowledge these limits here as part of our methodological understanding.

The selected cases were collaboratively coded by O’Brian and Sievert and unclear cases were discussed as a team. The following rules were applied while coding:

1. Hybridity:
 1. When the author(s) mention(s) “hybrid(ity)” in combination with knowledge, or “translation of scientific/climate-change knowledge” on an analytical level,
 2. or when explanations are taken from multiple discourses/sources and mixed into something new to explain the cause of weather changes,
 3. or when we find that some instance (nature/god(s)/mother earth etc.) punishes people under the logic of the scientific climate-change discourse,
 4. or when we find that scientific knowledge is mixed with pre-existing moralized/religious discourses to align with local logics, then it is a case of hybridity.
2. Domination/Resistance: When we find elements of replacement, silencing, acceptance/rejection of discourses, then it is a case of domination or resistance.

3. **Pluralism:** When we find that the same interlocutors give different explanations for the cause of changing weather triggered by varied physical settings/contexts, social roles, and wording of the question, then it is a case of pluralism.

Theoretical Expectations

In almost all cases described by ethnographers, scientific knowledge about climate change was not simply adopted as the truth, nor did it become the dominant way of knowing by local groups. The comparison reveals different knowledge systems mingled – in myriad ways. Based on our reading of the literature, we anticipated two distinct models of how two (or more) epistemologies mix. We refer to them as a) hybridity and b) pluralism. In the space between the discursive models – hybridity, pluralism, and domination – different forms of knowledge incorporate distinct aspects to varying degrees, and this fluidity is important, in particular due to the dynamic character of knowledge production itself. We outline the three main theoretical models in the following section. With an understanding of the theoretical structure of comparison via these expectations it becomes possible to illustrate two trends of the localization in hybrid cases on a global scale: moralization and self-blame.

Hybridity Will Emerge

The concept of hybridity best describes what is occurring when two different knowledge systems, e.g., a local way of explaining the weather and scientific knowledge on climate, are combined into one new way of making sense of the weather. Hybridity, sometimes also termed “creolization” or “mestizaje” / “métissage” (Eriksen 2007: 171), refers to displacement or mixing, and achieved wide recognition in anthropology in the 1990s (Orlove 2007: 631). The concept is adopted from sociolinguistics and was first applied as a theoretical framework in anthropology by Ulf Hannerz in his article “The World in Creolisation” in 1987. “As I see it myself,” he writes, “creole cultures like creole languages are those which draw in some way on two or more historical sources, often originally widely different. They have had some time to develop and integrate, and to become elaborate and pervasive” (Hannerz 1987: 552). He suggests paying close attention to center–periphery relations that explain how cultural ideas wander from global metropolis to small villages (ibid.: 189ff). Thereafter, postcolonial scholars such as Stuart Hall, Homi Bhabha, and Edward Said used cultural hybridity to examine “patterns of domination and resistance in imperial colonies and the independent nations that succeeded them” (Orlove 2007: 631).

One common point of criticism of the concept of cultural hybridity (or creolization), however, is that it would implicitly

posit “the existence of pure forms existing prior to creolization” (Eriksen 2007: 171). When we move away from this notion and keep in mind that knowledge has changed and always will be changing, the concept of hybridity can be helpful to explain why people make use of a hybrid knowledge system to make sense of, among other things, a changing natural environment.

One Way of Explaining: Science Will Dominate or Local Resistance Will Prevail

In what ways does the scientific climate-change discourse dominate explanations of weather changes, while placing other contemporary descriptions of weather relationships in its shadow? Or will it dominate at all? Discursive domination occurs when one kind of knowledge defines the discourse on changing weather, and replaces existing, alternative ways of knowing the weather and its changes (Schnegg forthcoming).

Michel Foucault theorized that discourses draw from pre-existing social rules and understandings, resulting in a double-edged force: discourses themselves produce meaning while simultaneously further cementing the social categories that helped bring them into being. Discourses not only reveal the social knowledge that contributed to their existence, but also highlight the power behind that social knowledge, which has remained significant enough to transform into a discourse. In the case of discursive domination, scientific-climate knowledge can wield enough power to replace already existing relationships between people and the weather. He states: “And not only do individuals circulate between its threads; they are always in the position of simultaneously undergoing and exercising this power. They are not only its inert or consenting target; they are always also the elements of its articulation” (Gordon and Foucault 1980: 98). In other words, individuals make up a messy web of agential modes enacting possible domination or resistance. Actions are controlled by knowledge and (re)produced by discourses and other semiotic practices (van Dijk 2012), highlighting the close interactions among discourses, knowledge, and the tangible aspect of human agency that make up daily lives.

Multiple Ways of Explaining Will Coexist

While domination and hybridity both assume that people have one way of explaining the weather and climate change, there is some evidence that different ways of explaining coexist. In these contexts, actors draw upon multiple, even seemingly contradictory explanations, and switch between them. We refer to this as the environmental pluralism model. Depending on the situation or role people find themselves in, they choose from their repertoire of knowledge to fit the physical or social context. We are especially interested in finding and analyzing

pluralism within an individual actor rather than at a societal scale. Clearly, within a society there exist different explanations: politicians might make use of a different discourse than a scientist, a farmer, or a priest. This “external pluralism” (a term borrowed from communication studies, see e.g., Hallin and Mancini 2004) is worth noting but is not the basis of our analysis. However, through examinations at an individual level we indirectly gain insights at the societal level.

Following Schnegg (Schnegg forthcoming) and his formulation of environmental pluralism as a way of knowing incorporating coexisting views, we aim to further bring attention to this model in combination with phenomenological theory (Schnegg 2019). We emphasize that knowledge can be a daily, performative practice subject to the transient desires and anxieties of individuals (Flachs 2019). In line with the pluralism model, knowledge is rather a constant accumulation involving an individual’s “ongoing engagement, in perception and action, with the constituents of their environment” (Ingold 2011: 159). Given this, environmental pluralism has much to offer in accounting for the incongruous coexistence of different forms of weather knowledge that make up situated life-worlds.

Explaining Climate Change, by Comparison

Dynamics of Knowing: Case Study Analysis

In most communities and in many different regions of the planet people combine knowledge from different epistemological domains in some form of hybridity (Table 1). In the following analysis, we work through the categories to give a detailed understanding of what it means when people know climate change in a particular way. Moreover, we explore whether we find common ground on how people mix science and laypeople’s ways of explaining from the changes they observe.

Hybridity

Hybridity characterizes the majority of cases we analyzed: 16 out of 28 cases could be identified as hybrid and an additional five cases showed hybridity in combination with pluralism and/or domination. This translates to 57% and 75%, respectively. The following analysis shows how people combine knowledge from different domains and highlights two common trends, moralization and self-blame, stemming from a localization across the 21 cases where some form of hybridity is present.

Scientific Knowledge Is Localized

According to most scientists, human activity originating in the Northern hemisphere during the Industrial Revolution has

contributed immensely to climate change, and global temperatures will continue to rise due to an increasing concentration of carbon dioxide and other greenhouse gases in the atmosphere. The main causes of this are the expanded use of fossil fuels, deforestation, and intensive agriculture.

In some societies, this “new” scientific knowledge does not contradict existing local ecological knowledge – as seen with the Marshallese (Rudiak-Gould 2014a, 2014b) or Palaweños (Friedrich 2017). Here, the global scientific discourse can easily become localized. “It is not difficult to see how the idea of climate change can be fitted into the longer-standing narrative framework of cultural decline” (Rudiak-Gould 2014b: 373) prevalent in the Republic of the Marshall Islands where residents ultimately see themselves and their drive towards modernization and “Americanization” (ibid.: 372ff.) as reasons for sea-level rise or extreme weather events. This blame, however, is in stark contrast to the industrial blame,² which is dominating the scientific discourse, and “a particular way of putting local subjectivity into the globalized, rationalized scientific discourse of climate change” (ibid.: 372). It shows a way of appropriating the scientific discourse with the help of pre-existing narratives. Through this appropriation, the scientific discourse is not only adopted but merged with local discourses into the predominant way of making sense of climate change on the Marshall Islands. It also shows that the Marshallese “so-called ‘traditional,’ ‘local’ understanding of the environment” (ibid.: 75) is dynamic and malleable to outside input.

When I told a man in Majuro that some people were of the opinion that the United States should carry blame for climate change, he responded unequivocally: “No. Everyone is causing it. Marshall Islanders too. Like when we cut down all the trees, it makes carbon dioxide. That’s why we need to educate.” (ibid.: 370)

Similarly, on the Philippine island Palawan, scientific knowledge is localized through identifying the causes of climate change as found within the island or at least within the country itself (e.g., through illegal logging, Friedrich 2017: 333). Furthermore, the scientific climate-change discourse can be (and is, politically) well connected with other locally prevailing discourses like a strong environmental (protection) discourse among the island’s residents fostered by political actors to facilitate tourism. A typical political narrative is one of “the needy and the greedy” (ibid.: 128), meaning that the poor and people who want to make a profit from natural resources through illegal logging (or fishing/mining) are held responsible for floods and landslides and can easily be combined with the global climate-change discourse (ibid.: 254ff.).

² Meaning the blaming of rich countries with the highest per capita emissions, an attribution of responsibility prevalent with most scientists, including anthropologists, as well as the Marshall Islands’ government.

Table 1 Distribution of knowledge configurations ($N = 28$)

Outcome of knowledge interaction	Number of cases	references
Only hybridity	16	Asiyanbi (2015): Lagos, Nigeria (urban) Boillat and Berkes (2013): Bolivia Brugger <i>et al.</i> (2010): USA/ Peru/ Italy Jurt <i>et al.</i> (2015): South Tyrol, Italy & Peru de Wit (2020): Tanzania Frazier (2019): India (Bengaluru; urban) Friedrich (2017, 2020): Philippines Gagné (2013): Rajasthan, India Henry and Pam (2018): Micronesia Moghariya (2012): Rajasthan, India Orlove <i>et al.</i> (2010): Uganda Rice <i>et al.</i> (2015): Appalachia, NC, USA Rudiak-Gould (2014a, 2014b): Marshall Islands Singer <i>et al.</i> (2016): CT, USA (Harford; urban) Skarbø <i>et al.</i> (2012): Ecuador Whitaker (2020): Guyana
Only domination/resistance	2	Crate and Fedorov (2013): Siberia, Russia Mathur (2015): Uttarakhand, India
Only pluralism	2	Marino and Schweitzer (2009): Alaska, USA Mészáros (2020): Siberia, Russia
Mixture of models	5	Mahmud (2020): Bangladesh Paerregaard (2016): Peru Rosengren (2018): Peru Schneegg (2019): Namibia Sherpa (2014): Nepal
Not applicable (yet relevant for analysis)	3	Adem (2019): Ethiopia Hill and Zhuang (2017): Southwest China Smith (2007): Global comparison

The personal responsibility of residents due to littering is another typical local political narrative whereby: “climate change is not treated as a global problem but as a means to solve local problems” (ibid.: 145).³

This not only occurs in politically motivated discourses on the national level; traditional ecological knowledge on Palawan is also affirmed by the global climate-change discourse because of many common assumptions (ibid.: 435). Palaweños are mostly familiar with scientific terms such as “climate change” and “global warming”, “greenhouse effect” or “sea-level rise” introduced by NGOs and the media; however, their scientific meanings are not necessarily understood (ibid.: 239–240), but rather translated to a localized, understandable meaning. Other “translation regimes” (besides the media and NGOs) are political actors, the educational system, and religious communities (ibid.: 334). Through this translation, more and more scientific knowledge is integrated but follows local logics into the creation of a new, localized knowledge discourse. These examples show that when different logics and knowledge systems are not contradictory, no fundamentally different ways of making sense of the weather are needed. Likewise, Brüggemann and Rödder (2020: 20ff.)

find an overall global tendency toward a localization of climate change, rather than a “climatization.” In general, local interpretations are indicated to be more salient instead of transnational scientific-political discourses. A case study by Rice *et al.* (2015) in Southern Appalachia affirms this finding. When asked about causes of climate change, interlocutors “hardly mentioned carbon emissions or climate models” but instead “discussed a variety of aspects of local development—road building, construction of the first Wal-Mart, loss of forested lands, new residential subdivisions built on mountainsides rather than valley bottoms—as contributors to climate change” (ibid.: 258).

Moralization of Scientific Knowledge

Most Maasai in northern Tanzania, on the other hand, make sense of changing weather patterns such as a decline in rainfall with the help of a dominating local religious discourse. Their god, Eng’ai – interchangeable for some with the Christian god – is punishing society for a slow moral decay in traditional Maasai ways of life (de Wit 2020) related to changes in lifestyle such as a settled way of life, private lands and property due to globalization and “modern” ideas. Eng’ai and weather are one and the same for the Maasai, and therefore we can see

³ Original: “Klimawandel wird nicht als ein globales Problem behandelt, sondern als ein Mittel zur Lösung lokaler Probleme.”

how their belief is central to their comprehension and acceptance (or not) of the scientific climate-change discourse.

The local radio station and NGOs introduced the global climate-change discourse to the Maasai. Unlike the case on the Marshall Islands or Palawan, the idea that the Maasai are part of creating a solution for climate change because humanity caused this problem cannot be assimilated with their local knowledge. Yet some NGOs try to communicate this, which is a source of communication breakdown. For the Maasai to embrace this definition, it would require a disenchantment with the world and acceptance of the absence of god. Many Maasai accept the scientific discourse of climate change once they are exposed to it, but the notion that many scientists do not believe in god is incomprehensible in their traditional cosmology. Maasai give Eng'ai the ultimate power when it comes to the sky, rain, and air. They accept that climate scientists must have a different god rather than none. Some Maasai incorporate the belief that Western industries are responsible for creating climate change, but ultimately, they believe the future is in the hands of Eng'ai. In this way, a hybrid discourse is born that incorporates elements of different moralities (Christianity and traditional Maasai religious beliefs) with some causal acceptance of the global climate-change discourse. While this case study portrays the Maasai as using religious resistance to reject the notion of anthropogenic climate change over fully accepting the scientific climate-change discourse, we find it useful to analyze it with hybridity, as the case study demonstrates the creation of a new, hybrid form of knowledge that mixes both local religious ontologies with scientific climate-change explanations. Depending on how easily scientific and local knowledge can be integrated, we can see that the resulting hybrid form differs. In the case of the Marshallese people, it seems that a localization of scientific knowledge alone is sufficient. In the Palawan case an additional translation is needed. In order to integrate scientific knowledge into their ways of knowing, the Maasai managed to "religionize" the scientific discourse.

Even though similar forms of "religionization" cannot be found in most cases, a more general moralization is at least partially evident in ten cases. People make sense of a changing climate and environment through a prevalent discourse of a decreasing morality that again is connected to the notion of self-blame.

Self-Blame

While the term self-blame may connote a singular meaning, we define it to encompass a thicker, situated blame that may include the self. For our analysis, we use it to involve the personal blaming of the self in tandem with what our research findings revealed: people mostly speak

about situated "self"-blame in a collective sense using the plural "we." Through examining all cases where self-blame was found we identified two major trends. People either used the plural "we" (including the self) to allocate blame in their local context, or they placed blame on certain members of their local community – excluding the self yet maintaining blame in their situated context. Out of the 21 cases coded, 11 revealed self-blame to be present, and five more showed it to be partly present – taken together, in 76% of cases. Unfortunately, the data we extracted from the case studies did not allow for the evaluation of more fine-grained hypotheses such as the trajectory theory by Rudiak-Gould (2014c, 145).

The finding that communities blame themselves is a particular translation of the scientific climate-change discourse and its common phrase "climate change is human-made." While people agree that humans are the cause of climate change, this also locates "humans" as *them* or members of one's community and in the present time. In most ontologies, the forces of the weather are linked to morality and supernatural powers. Storms punish, lightning frightens. Across many cultures, weather-related phenomena are associated with specific supernatural abilities. If this is so, it is no surprise that people identify the cause of weather change with themselves. Here, many societies readily point to some of the insecurities caused by a rapidly globalized world and processes of modernization in general, as Rudiak-Gould (2014b, 2014c) convincingly exemplified. Our results also show how some lay people see themselves as inseparable from their relationship with the environment and therefore believe they are directly responsible for changes in weather.

In this way, the inclusion of self-blame when making sense of knowledge about the weather coming from somewhere else is a process of making the abstract personally relatable, and thus renegotiating new knowledge into existing cosmologies. Once an element of self-blame is linked with changes in the weather, there opens space for a worldly reorganization in which individuals relate to the weather with some combination of their own reference-point rather than solely via a discourse originating elsewhere. Their corresponding cosmological order helps explain what is occurring subject to their beliefs as to who holds the power for world maintenance. This also indicates that blaming oneself can be a way to regain agency over processes that seem hard to control (Rudiak-Gould 2014b; Friedrich 2018).

We expected to find mostly hybrid ways of explaining climate change; however, some cases did not fit neatly into this model and revealed something else. Our study was mostly limited to the analysis of a chapter-length article that only presents a small window of the local reality. However, even with this limited window we were able to find two other forms of knowledge interaction.

Domination/ Resistance

In two cases domination – or resistance – best describe the dynamics the ethnographer reports. The first case is in the central Himalaya, Uttarakhand, India and focuses on divergent narratives of human–animal conflict between local people and the Indian state (Mathur 2015). In highland Uttarakhand, local people experienced increased conflict and attacks by large animals with varied explanations for why this occurred. The Indian state sought to strengthen its hold on local governance through propping up an explanatory narrative of climate change and labeling any counter-narratives as conspiracy theories.

This case causes us to consider the subjective nature of a discourse and how “[e]rasing or silencing speech through the projection of a seemingly apolitical concept of climate change and the characterization of natives as absurd conspiracy theorists is self-evidently problematic” (Mathur 2015: 89). In this way, not only is the scientific discourse of climate change introduced as a new discourse to the region, backed by expert/state authority, but by dismissing counter-narratives as “conspiracies” is presented as the concrete truth compared to the more “unbelievable” tales of the locals. Delegitimizing counter-narratives creates ample space for a single discourse to be propped up politically and can simultaneously weaken any emerging counter-narratives.

Most likely, specific circumstances contributed to the domination of the climate-change discourse. Notably, the villagers identify as “mountain people” (ibid.: 91) who oppose the “internal colonialism” by the “plains people” (ibid.) and as such are a marginalized people, engaged in politically charged relationships with their district authorities, who are responsible for translating their experience to higher levels of the Indian state. Additionally, close by, we find a large “protected zone” with much attention to conservation and the degradation of biodiversity, which feeds into the views of the local district authorities and their eagerness to embrace the scientific climate-change rhetoric. Moreover, district authorities view the region as “backward” and “remote” and wish to “escape” (ibid.) to the urban plains where they can live more fully equated with their social status and entwined with modernity.

The second case is situated in northeastern Siberia (Crate and Fedorov 2013) and stands in stark contrast. Despite having had contact with the scientific discourse, the Viliui Sakha did not consider climate change to be the cause of the changes they observed, such as a changing quality and quantity of snow, increasing floods, and disrupted rain patterns, leading to droughts in spring and dampness in harvest times (ibid.: 340). The changes seemed incongruous with scientific knowledge, and hence local understandings remained resistant to the new knowledge claims. Only after anthropologists Susan Crate and her Siberian colleague undertook a systematic knowledge exchange in the region did the Sakha begin to

combine the previously abstract global discourse with local knowledge. In a way, this might also be an example of a hybrid way of knowing. However, we find the context prior to the implementation of the knowledge exchange relevant. Especially, as the case study shows because the institutionalized effort to “educate” people only partly succeeded.

Our sample did not reveal a case of resistance to the scientific climate-change discourse in the manifestation of skepticism. However, we came across a study (qualitative, not ethnographic) located in Montana, USA, where local ranchers showed strong skepticism of the notion of anthropogenic climate change. Most believe that the climate changes continuously and the region goes through cycles and periods of drought (Yung *et al.* 2015: 288). They regard it as arrogant to think that humans could possibly affect nature: “humans aren’t significant enough to change the climate” (ibid.). The authors stress the fact that “ranchers saw drought as a local change or stressor rather than part of a global process like climate change” (ibid.: 290).

Pluralism

It was quite challenging to find case studies as examples of explaining climate or environmental change in a plurality of ways. Since we hypothesize that actors situationally choose different explanations, one reason for this could be that most ethnographies on climate change only interviewed informants in one specific role that prompts them to recall one way of knowing. Two studies undertaken in Alaska and Siberia are exceptions.

A study of the Iñupiat in western Alaska shows the impact of the use of scientific terms like “climate change” or “global warming” on the way (lay) people explain changes. For the Iñupiat, their local discourse on weather change and the scientific discourse are separate discourses. They are well informed on the global discourse on climate change and hold detailed scientific knowledge due to their exposure to numerous journalists, photographers, scientists, and politicians who have “inundated” Alaska over the past 20 years, mainly to get a “photo opportunity with the first victims of climate change” (Marino and Schweitzer 2009: 212). Unlike the examples of hybrid ways of explaining, where different discourses are mainly compatible, Iñupiat knowledge and daily observations of the environment are far from matching the generalized scientific knowledge. However, they can readily apply both ways of knowing depending on their situation.

When asked about climate change, Iñupiat informants report what they have heard from the media or their frequent visitors about greenhouse gases or the ozone layer, and not about what they personally experience. “On the other hand, [...] conversations about change and the local environment elicited long, painstakingly detailed explanations” (ibid.: 213). Therefore, just by avoiding scientific terms like “climate

(change)” or “global warming,” they chose a different, emic way of explaining. This study shows how people can have plural ways of knowing that do not explain exactly the same thing. Depending on whether the situation requires their scientific knowledge or their own empirically based knowledge, people can choose between these multiple ways of explaining.

A study on Sakhas in Yakutia, Northeast Siberia, directs our attention to the fact that there might be different ontologies or realities to a particular phenomenon and reveals how people manage to shift between these realities (Mészáros 2020). Since the Soviet era, lakes (and rivers) in Yakutia are increasingly polluted, particularly in recent times due to a changing climate.⁴ For the Sakha, the lakes are ill.

Through mass media and public education, people in Siberia are “very much aware of the new perspective of Western environmental knowledge” (ibid.: 6). In certain situations, and while practicing certain activities Sakha recall this knowledge, but not always. For example, they regard some of the lakes as not only freshwater reservoirs but also living entities called *ebe* (grandma) (ibid.: 7–8). At certain times, they provide gifts to *ebe* and communicate with her. Sakha villagers believe that “lakes are actively involved, as spiritual forces, in climatic and ecological changes” (ibid.: 13). The lakes are considered able to sense how people interact with them, and punish villagers for their misbehavior. However, due to climate change, lakes are acting increasingly unpredictably to the Sakha. Some even stopped referring to them as “grandma” as they felt less connected to them due to this new unpredictability. “[T]he lakes now refuse to communicate with them” (ibid.: 14). Despite this “mess” (ibid.: 15) people can adapt and switch between their different realities, or ontologies, while engaging in different practices and being in different roles:

Someone who teaches national culture in the local school can easily be the leader of rituals; rangers employed by the Ministry of Environment can carry out sacrifices to the lakes; and lakes are sometimes live entities, kind grandmas, or just freshwater reservoirs. (ibid.: 16)

Both case studies show that knowledge is often situational. Either certain words or physical settings can trigger people to react in accordance with a given situation. Actors, by switching their social roles and contexts, recall different ways of explaining, as one “thing” is not necessarily the same in another situation.

Schnegg (2019) proposes that the difference in perception between the scientific construction of a weather-related event

and that of a pastoralist can be so extreme that it might be useful to think of them as different entities. If this is so it is no surprise that it requires different explanations to make sense of the phenomenon (Knox 2015; Goldman *et al.* 2016, Burman 2017; Schnegg 2019.).

Discussion

Our analysis showed that a general agreement with a scientific understanding of anthropogenic climate change is by no means an indication that people have fully adopted the scientific view of climate change. When people across the globe agree that human behavior is the cause of a changing climate, the meaning attached to that behavior and how human–environment relationships are understood in different contexts varies widely. This matters in light of the immense financial effort directed at climate-change education. The *why* and *how* of anthropogenic climate change goes beyond arriving at the node of attributing responsibility to human action, which is uneven itself. In identifying these differences and with deeper analysis of discourses of diverging ways of explaining the weather, we were able to distinguish two trends stemming from the localizing effect of hybridity, which offer insights in understanding how the scientific climate-change discourse is received and transformed, while simultaneously agreeing on its anthropogenic origin: moralization and self-blame.

Therefore, even though most scientists and lay people in the case studies believe in anthropogenic climate change, on closer examination, both positions identify different people and meanings as the cause of the changing climate. This reveals a reordered spatial perception of where blame is directed. Scientists largely place blame in systemic and globalized processes rather than a personal and/or moralized cause and effect, while we identified the emergence of moralization and self-blame in the mixing of weather knowledge, thus pointing to personal responsibility and a close spatial configuration.

The question of how “objective” a scientist’s way of knowing really is warrants a closer look. Although we found no case studies about scientists and their knowledge of causes of global warming, Cristián Simonetti (2019) in a study of geoscientists at a Scottish university questions the scientifically prevalent weather/climate distinction and offers a noteworthy insight: “[S]cientists claim knowledge about climate to themselves by contrasting it to the ephemerality with which non-scientists experience variations in weather” (242). However, as Simonetti points out, the Scottish geoscientists also “localize” their ways of knowing, at least on a temporal dimension: “views of the past that climate scientists perform are not purely objective images of long-term history but depend on scales unfolding at the level of sentient experience” (245).

⁴ Due to state modernization efforts in the last 100 years (e.g., relocation, collectivization, or centralization), Sakhas are increasingly distanced from their environment and consider lakes as sentient beings less frequently.

As we have shown, in most case studies, people have adopted certain scientific explanations, but not all, and therefore aligned with the discursive hybridity model. These findings are not limited to “remote,” “indigenous” villagers, as within the corporate middle class in Africa’s second largest city, Lagos, peoples’ explanations and knowledge of climate change are hybrid (Asiyanbi 2015; see also Singer *et al.* 2016; Frazier 2019). Nor is this way of making sense of the weather limited to the Global South (Brugger *et al.* 2010; Jurt *et al.* 2015; Rice *et al.* 2015; Singer *et al.* 2016).

On a theoretical level, the hybridity we find can partly be explained by the material embeddedness of knowledge and the practices bringing it forth. If knowledge also lies in the relationships with our environment we establish by using it, part of this knowledge will not change if we remain in place and keep doing similar practices. Consequently, the abstract scientific knowledge about climate change traveling with NGOs and state agencies around the globe can hardly substitute all ways of knowing in the places where it is localized. It might replace what is in our mind, but not entirely what is embedded and embodied through doing and living with the weather and the environment (Schnegg 2019).

Notions of morality (mostly a decreasing morality) seem accentuated with hybridity cases. A changing climate, in cases to the disadvantage of local people, is explained through self-blame and a decline in morality which, in turn, often leads to punishment by some “religious” entities. Skarbø *et al.* (2012) note that: “[C]limate change not only involves technical and political economy discourses, but also for some people ideas and debates with moral and religious dimension” (119). The prevalence of self-blame raises some important questions: what does this lead to? Are people more likely to actively fight climate change or to feel helpless and react passively? Self-blame has been shown to be an opportunity for empowerment and a way out of victimhood (Rudiak-Gould 2014b; Friedrich 2018). Friedrich argues: “By providing meaningful local explanations of why environment and weather patterns are changing, [this] self-empowerment enables people to maintain their agency in a changing environment” (*ibid.*: 80). Further research is needed to excavate how self-blame affects different social constellations at a global scale and how it can become a vehicle to maintain agency.

Our analysis points to the frequency of self-blame stemming from the localizing effect of hybridity found in many case studies and might be due to an understanding that everyone “makes” their own weather locally. This also helps recognition of why the question of morality is so important in many contexts. When people tend to feel responsible and inseparable from their weather a decreasing morality presents a logical explanation for climatic “abnormalities.” Moral decay is often seen as closely connected to the notion of increasing modernity, as Rudiak-Gould (2014b, 2014c) persuasively argued. Therefore, in the majority of cases, modernity is not

considered to be positive. Only in three instances did people believe new technological discoveries were the solution for their problems and would bring about positive change. In most cases, however, local people blame modernity and people’s drive towards modernity as the root of environmental and social problems. This idea of moralizing weather-making is mostly absent from scientific climate-change discourses, insofar as weather is localized to the extent of being connected to the moralized actions of the local people. In weather-making, everyday responsibility and blame lie in the hands of the individual, with direct consequences. A localized weather relationship mixed with knowledge from somewhere else holds important repercussions for how people’s relationship with “their weather” shifts in relation to global changing climates, and what self-blame, as a symptom of this mixing, reveals about disseminating climate-change knowledge from a scientific standpoint.

The localization present in hybrid cases exposed the trends of moralization and self-blame, which contribute to making sense of how new scientific discourses are received. These trends point to a larger phenomenon of how people translate discourses from somewhere else to fit their ontologies and offer further insight into how people insert themselves into a discourse in order to accept any part of it. Our analysis also alludes to the fact that there is a strong tendency toward feeling responsible – and therefore to blame – for the weather in one’s own place, which can be an ascription of agency when it comes to weather-making. This has consequences for the ways scientific climate change knowledge is disseminated and questions the efficacy of funding projects of “climate-change education.” Self-blame, as a cognitive process affecting behaviors, emotions, and motivations, has an impact on the way people perceive and respond to stressful situations yet also holds potential for inciting action when the environment is perceived as inseparable from the self.

As a study that is based on secondary sources, our analysis has some methodological limitations that cannot be overcome. Using other researchers’ work in relation to these models means certain phenomena are over-represented and others are under-represented. For example, because pluralism requires ethnographic details such as the setting in which interviews took place and the social role the interviewee has their community, it is likely present in many cases yet undetectable to us. In this way, hybridity is likely over-represented as a discursive model as it is more flexible and broader while pluralism as a discursive model is likely under-represented here. The methodological structure of published case studies largely did not account for a thorough description of the setting or role of research subjects. Because environmental pluralism is difficult to capture methodologically, this might also explain why we find comparably little evidence for this model.

In summary, hybridity, pluralism, and domination should be recognized as orientations on a spectrum, as forms of

idealized knowledge interactions that we were only partly able to analyze. Certain moments focus on certain aspects of knowledge interactions and we clearly are not able to grasp all these situations. Although all realities are blurred, nonetheless conducting a close examination via these theoretical orientations of knowledge interactions allowed us to uncover specific findings on the different ways in which discourses are mixed and explained.

Conclusion

We present an analysis of what occurs when different ways of explaining climate change interact. To explore this relationship, we began with three overarching models of how these interactions have been described: hybridity, discursive domination and/or resistance, and pluralism. Our results confirm a prevalence of hybridity in published case studies. In further unpacking the hybridity model, we highlight two trends of this model that people employ in order to make sense of less tangible scientific discourses – moralization and self-blame – that contribute to the prevalence of hybridity’s localizing effect and are part of its construction in particular and impactful ways.

Our findings show how localization, moralization, and self-blame in relation to the cause of climate change fit into people’s ontology in vastly different ways. Further understanding of how this is done for the scientific climate-change discourse will be useful in determining ways in which people live, think, and act in accordance with a changing climate on their own terms. As the weather itself is a local phenomenon, and weather-related entities have moral functions, the changes in weather are explained through people’s wrongdoing and the related punishment they receive. Therefore, perhaps most importantly, people across many societies and varied climatic zones localize, moralize, and center humans, mostly themselves and their local community, as the cause of the weather transformations they associate with climate change. This contributes to the nuances of anthropogenic climate change and problematizes the effect of mass effort and spending by global Western organizations to spread the scientific climate-change discourse. We argue this is because people have different understandings of human–environment interaction – how their own behavior influences their world directly – and therefore also “their” weather.

If the “weather”, including rain, air, winds, or ice is something different – local, animated, life-giving – it is not surprising that a different explanation is required when it changes. One of the discussions our article can stimulate is if we should not be more open to this ontological difference and ask whether the phenomena scientists and lay people experience are really the same. If this is not the case, it would inform a different way of communicating about science (Roncoli

et al. 2002) and climate change and for dealing with the discrepancies we observe that is more responsive and attentive to local ontologies (Schneegg 2019).

When people are exposed to the scientific message of anthropogenic climate change this message is subsequently understood differently. Our research points to how people do not fully adopt this discourse and how, often, when melding parts of it to fit their personal ontology, it results in moralization and self-blame. Even though this seems to be an unintended effect of climate-change education – even a mistranslation of scientific “facts” – one can also build on these results for a more fruitful dialogue with respect to temporality, scale, or different ways of explaining climate change.

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Declarations

Conflict of Interest The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Ethical Statement All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

Informed Consent The research did not involve Human Participants and/or Animals.

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