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climate change data and the “upstream” production of global governance objects

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Introduction

At 75° North, 36° West, 15 national flags wave in the wind that blows across the Greenland ice sheet. They have been planted in a straight line, directly into the ice sheet itself. Underneath them is 2.7km of ice, and they are the first sight to greet scientists and visitors to the science camp of the East Greenland Ice-Core Project (EastGRIP). The flags represent the nationalities of those who live and work here every summer, during the 'field season'. They are physicists, geologists, engineers, logistics experts and the most important of them all, the interdisciplinary, life-sustaining doctor/cook. No one lives permanently on the colossal ice sheet; Its remoteness, extreme temperatures, abrupt weather changes, and lack of anything but ice make it uninhabitable. But the invaluable data about past climates, which is stored in the layers of the ice sheet, and its current movements and melt patterns mean that it is host to a semi-permanent scientific presence. Ice core drilling is essential for understanding the changing cryosphere, but it is hard work, and it relies on a small group of highly specialized climate scientists, US military infrastructure in Greenland, and increasingly, also on the goodwill of the autonomous Government of Greenland. The gatekeeping exerted by these actors over *how* and by *whom* data is extracted from the ice sheet is the focus of this article.

In this article, I develop the notion of *gatekeeping* as it relates to the 'upstream' of knowledge production. Gatekeeping is a mechanism of control which forces compliance with the gatekeeper's protocol and priorities in a way that affects the contents, quality or quantity of knowledge produced. It is a form of power which is based on the gatekeeper's control of access to or utilization of raw data. By 'upstream' I mean the stage of knowledge production where 'raw' or unprocessed data is scoped, extracted, divided, and preliminarily analyzed, before it later – 'downstream' – is published and shared as results on the basis of which global climate assessments and political decisions can be made. As I argue, gatekeeping is exerted in this upstream stage of knowledge production in ways we should not ignore because it directly affects the contents and flow of climate knowledge.

I develop my argument in relation to governance object theory as formulated by Olaf Corry and Bentley Allan (Allan, 2017; Corry, 2013a, 2013b, 2024) while I also speak to contributions at the crossroad of IR and Science & Technology Studies (STS) focusing on data sovereignty and data flow (Bates et.al., 2014; Benjamin, 2009; Elbe, 2021; Hinterberger and Porter, 2015). But gatekeeping as I develop it into a theoretical concept and illustrate it in the analysis is also relevant for a wider range of debates and concerns in International Relations. These include practice theory's focus on how power works in practice and how international hierarchies are (re)produced through practice, the role of affect, sensory experience and the ‘micro’ of international politics, and the concept of sovereignty, in particular how it relates to knowledge production.

However, governance object theory is of particular relevance here for two reasons. First, it approaches knowledge production as a process to be understood and theorized in and of itself and helps us understand how already powerful actors like states and science shape the object in question with consequences for how global issues like climate change, health, war and the global economy come to be understood and problematized. Second, this theory has demonstrated its relevance by focusing on the constitution of ‘the climate’ and ‘climate change’. I continue this empirical focus, which allows me to zoom in on this upstream stage of the same ’epistemic object’.

I also seek to nuance governance object theory’s tendency to lump science into one unified actor, and one which is primarily seen to ‘assemble’ (Allan, 2017: 140) epistemic objects. As I show, cryospheric science is full of institutional hierarchies, mutually exclusive scientific interests, and power struggles ‘inside’ science with direct effects on the knowledge produced and foregone. To understand these struggles, while not losing sight of state steering, as unfolded by the governance object literature, I develop gatekeeping as a mechanism of control, which is exerted in the upstream of knowledge production

As mentioned, gatekeeping speaks also to a literature at the crossroads of IR and STS which explores life cycles, flows and sovereignty claims to data (Bates et.al., 2014; Benjamin, 2009; Elbe, 2021; Hinterberger and Porter, 2015). By asserting sovereignty over biological data, states in the Global South are redistributing power and resources in the international system. Sovereignty claims to climate data is too narrow a frame of understanding, however, for the kind of control asserted in the upstream production of global governance objects. Gatekeeping lets us see that multiple non-sovereign gatekeepers can be operating simultaneously, with specific effects on the knowledge produced, and that gatekeepers are not only states, but scientific institutions and potentially also commercial actors. Moreover, while gatekeeping can be a way for historically marginalized actors to assert control, the analysis shows that gatekeeping tends to be closely tied to historically advantaged actors, not least powerful states and powerful scientific institutions, who use gatekeeping to reproduce their own positions in political and scientific hierarchies.

To conceptualize and unfold the effect of gatekeepers, I explore ethnographically what ice core science looks like in action and ask how and by whom data is extracted from the Greenland ice sheet. The Greenland ice sheet is the second largest body of frozen freshwater in the world, only surpassed by the Antarctic ice cap. In a warming climate, the ice sheet is sea-level rise coming to a shoreline near you soon, but the ice sheet is also a layered archive of past climates. The deeper into the ice sheet scientists drill, the older the ice they reach. Through analyses of the water molecules, air bubbles, dust particles and other impurities, which are stored in the depths of the ice sheet, scientists are able to very precisely determine CO_2 levels in the atmosphere over the past 120,000 years. Ice cores can also reveal prehistoric volcanic eruptions, atmospheric changes caused by the plague in the 1300s, nuclear weapons testing of the 20th century, and perhaps also recent dips in CO_2 emissions during the Covid pandemic (Hood, 2020). Ice cores as raw data contain ‘human’ history inseparable from 'natural' history, and they cannot be replaced by data collected through remote-sensing technologies. They are, consequently, extremely valuable as scientific data and have been crucial in the efforts by Earth system science to create and convey planetary-scale environmental knowledge (Isberg, 2022). The EastGRIP project seeks to contribute insights both on past and current climate change. By drilling a 2.7km deep ice core through an active ice stream down to the bedrock of Greenland, the project seeks "new knowledge on how ice streams 'behave' thereby improving the understanding of how ice streams will contribute to future sea-level change" (EastGRIP, 2024).

The next section dives into the literatures on governance object constitution and on data sovereignty and develops the concept of gatekeeping as an effective way to understand how gatekeepers prefigure what later becomes constituted as global governance objects. The following section lays out the methodological approach of the article and discusses concept development, positionality and ethics. The analytical half begins with a brief historical introduction to US military presence in Greenland and the relation to the discipline of Glaciology. The analysis then identifies three instances of gatekeeping the Greenland ice sheet. As I conclude, through gatekeeping, gatekeepers assert control in ways that ultimately affects what we know about climate change, but we are likely to find mechanisms of gatekeeping in many other processes of knowledge production on salient, global issues.

Conceptualizing 'gatekeeping' through the science-politics of climate change

Gatekeeping as metaphor is used loosely across disciplines. It has been developed conceptually in Communication and Information Studies to understand filtering of information into the news stream.[1] Political scientists have used gatekeeping in relation to decision-making and legislative processes (see e.g. Crombez et al., 2006). Gatekeeping as developed here relates to the 'upstream' of knowledge production where data is extracted in scientific projects, and as such has no obvious connection to these conceptualizations. Yao's (2021) exploration of Antarctic science as an exclusionary device used by states in the formation of the Antarctic Treaty System comes closer. She uses the term 'gatekeeper' but without conceptualization. The concept of gatekeeping I develop here is aligned with her contention that "science constitutes an understudied source of hierarchy in international politics (Yao, 2021: 996), but the science itself remains blackboxed in her analysis, precluding an understanding of the hierarchies 'inside' scientific projects, between institutions and their relation to hierarchies in international politics.

Moreover, while 20th century Antarctic science may have been state projects from start to finish, climate science in the 21st century Arctic is different on multiple counts. It is often international in its funding and institutional sign-up, and it is carried out not for laying claim to terra incognita, but for advancing our understanding of global climate change. Hansen (2024) shows this complexity in her exploration of the Ny-Ålesund international research community on Svalbard. Ny-Ålesund can be understood as a place of idealistic research towards solving global climate challenges, as a geopolitical arena where scientific presence is a means to influence in the Arctic region, or as a

[1] See Barzilai-Nahon (2009) for a comprehensive review of 'gatekeeping' as used in different disciplines.

diplomatic arena where the Norwegian government can take prominent visitors to set agendas, e.g. in research policy. Interesting for gatekeeping, is Hansen's (2024: 220-21) discussion of the Norwegian government's decision to exclude researchers from Ny-Ålesund, not on the basis of geopolitical fault lines, but along disciplinary ones, effectively blocking social scientists from carrying out research in Ny-Ålesund.

Gatekeeping, as I conceptualize it in this section, allows us to explore who controls access to and utilization of important data on the changing Arctic climate, and by showing its merits as a concept in the analysis, this also supports the argument that it is important for theoretical work on global governance objects as well as scholars concerned with the 'life of data' to extend their scope to include this upstream stage. With a starting point in questions about global order, globalization and by theorizing 'global polity' as a new form of political structure, Corry first presented the idea of a global governance object, the climate being one such object (Corry, 2013a, 2013b). A governance object "should be understood minimally as an 'object' or assemblage constituted as distinct, malleable and politically salient" (Corry, 2013a: 87). Building on this, Allan (2017, see also Allan 2018) has since then zoomed in on the constitution of what he calls 'epistemic objects', highlighting that these are co-produced by scientists and the state, and he identifies three *processes* that underwrite Corry's (2013a) three defining *features* of governance objects (i.e. distinction, malleability, salience).

Drawing on the notion of co-production (Jasanoff, 2004), Allan (2017) identifies first, *designation* during which an entity, such as the climate or international trade, is distinguished as a phenomenon which is not 'weather' and not 'domestic trade', respectively. A "knowledge-based group" (Allan, 2017: 137) carries out this designation, but do not, as a group of knowledge producers, necessarily belong in the same discipline. Second, *translation* renders the object "legible to states and publics" (Allan, 2017: 137) in standardized and abstracted ways that enable different knowledge-based groups and publics to engage with the object. And finally, the process of *problematization* through which the object is tied to political interests of the state, often by presenting it as a (solvable) problem to the identity, security or power of the state (Allan, 2017: 138). Scientists "maintain authoritative jurisdiction over the modes of expertise necessary to assemble epistemic objects" (Allan, 2017: 141) while states steer the co-production of global governance objects along its desired paths and contents (Allan, 2017: 152-4). In a recent special issue on "objectual international relations (O-IR)" (Esguerra, 2024), Corry has revised his own and Allan's theorization by arguing that "designation and translation both primarily help make an object distinct and socially "real" across place and time" (2024: 5), while *problematization*, in this revision, is an aspect of *salience*, and the ways in which a governance object can be problematized, depends on how weakly or strongly it can be governed (Corry, 2024: 7).

These theoretical developments thus take science into account in the constitutive stages of global governance object formation. However, absent is what is for science and scientists the proof in the pudding: physical data and its extraction. The process of *designation*, in particular, is presented as if it runs prior to (though overlaps with) *translation* and *problematization*, but it is unclear what the basis of *designation* is. Allan notes that "[s]cientists and experts are central to designation because they wield a form of productive power that authoritatively classifies and orders physical and social phenomena" (2017: 141). But his theorization leaves out a key component of such physical and social phenomena by overlooking the unprocessed data of science, how it is extracted, and who controls it.

The upstream provides a view into the actors, their interactions and the politics involved in the production of climate science, which is difficult to discern once results are in published and translatable form further downstream. The inside of science is not free of hierarchies and political priorities, and to assume that scientists merely 'assemble' objects, while states 'steer' risks overlooking key mechanisms of control which shape the extraction and utilization of raw data. Further, state steering happens through different types of state actors with different objectives, ranging from the military to departments of science and higher education, and these are not necessarily involved to steer the scientific output itself, however, may still exert significant control in the process.

If we want to understand the "imprint" left by science and politics on the "form and content of objects" (Allan, 2017: 140), then we should identify much more carefully how, why and which actors – more precisely than 'states' and 'science' – leave these imprints from the point of extraction of unprocessed data. The upstream of knowledge production presents both a unique and detailed view into the range of actors involved in the production of epistemic objects, and, as I now turn to, by understanding gatekeeping of this upstream stage, we can also come to understand how these actors exert control of knowledge production in ways that can halt, shape or redirect what becomes constituted as governance objects further downstream.

The upstream-downstream metaphor suggests, like the water cycle, that what happens downstream in terms of climate synthesis reports and international agreements, feeds back into the upstream as – to stay in the metaphor – evaporation, condensation and precipitation, i.e., as new directions and priorities for science. Identifying gatekeeping of knowledge production as it happens upstream can reveal the power exerted as control over raw data and the effects on the flow and content of the knowledge that preconditions *designation*, *translation*, and *salience/problematization*. This is not to propose a fourth process of object formation, but rather to argue for 1) more careful attention to what happens at the very beginning of what Allan call's 'co-production of epistemic objects' (see figure in Allan, 2017: 140), and 2) to conceptualize a consequential mechanism of control, which prefigures epistemic object formation.[2]

Gatekeeping is characterized by three elements, all of which must be present for gatekeeping to be exerted:

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[2] A number of research agendas have developed approaches and notions tangential to or partly overlapping with *gatekeeping*. Within STS an 'obligatory passage point' (Callon, 1984) shows the structuring of power around those who have managed to mobilize the necessary allies into a specific research question, whereas gatekeeping explores the wider context of knowledge production, where gatekeepers are prepositioned, irrespective of the particular research project, and may have no interest in the science itself. The 'assemblage' vocabulary of Actor-Network Theory could also be used to examine how human and non-human elements are constantly (re/dis)assembled in networks of relations (see e.g. Mayer, 2012) and as a scientific-diplomatic-military compromise (De Pryck, 2020) in the production of climate knowledge. Gatekeeping takes into account ontologically the non-human, but it does not assume that knowledge is compromise or that human hierarchies are flat – quite the opposite. Finally, the inside/outside gatekeeping by EastGRIP's big nations could be seen as 'boundary work' (Gieryn, 1983; for a climate science example see Beck and Mahony, 2018) demarcating EastGRIP's science from non-science, whereas gatekeeping illustrates not how the authoritative position of science is guarded, but how access and use of its raw data are both guarded and controlled.

1. Exclusive control over the gate makes a gatekeeper: A gate, which must be opened to obtain raw data, exists and an identifiable actor has exclusive control over this gate. The gatekeeper determines how the gate can be opened (the key), and there is no viable alternative to passing through this gate if one wants to participate in the upstream of knowledge production.

2. A key is obtainable: It is possible to get a key. The key is not private, classified or monopolized, but the key is rarely only material or tangible. It tends to come with more or less explicit requirements of experience, willingness to adapt and follow hierarchy, protocol, and orders determined by the gatekeeper.

3. The key is revokable with severe consequences for the gate-passer: The key can be withheld or revoked with the effect that the gate remains or is closed. This has severe consequences for those needing to pass through; it affects the quantity, quality or changes the scientific priorities of the project, while it only has minor consequences for the gatekeeper. Withholding or revoking the key may be a way to achieve political ends for the gatekeeper. Because the key is revokable, the gatekeeper's power remains as long as their gate is part of the knowledge production.

Consequently, a large research fund is not a gatekeeper; The gate is not exclusive (other funding options exist) and the key cannot be revoked – funders will require reporting and approvals of bigger changes, but the funding, once awarded, cannot usually be revoked. Table 1 identifies three gatekeepers of the Greenland ice sheet and its climate data. To gain access to the EastGRIP ice cores, a scientific institution and its scientists must pass through all three gates.[3]

Table 1: Gatekeeping the Greenland ice sheet

Gatekeeper	Gate	Gives access to	Key to gate	Revokable?
US Air Force & National Science Foundation	Infrastructure (ski-equipped cargo planes)	The ice sheet as terrain/domain	Fee per flight. Plus: Good relations, operational experience and understanding of USAF-NSF relations	Yes. If fee is not paid, weather is bad, planes are needed elsewhere or protocols are not respected.
EastGRIP 'big nations'	Inside/outside EastGRIP's climate science	Ice cores as climate data	Co-sponsoring EastGRIP (burden-sharing) Plus: disciplinary position and understanding of scientific hierarchies (scientific veto powers)	Yes. If project co-sponsoring stops.
Autonomous Government of Greenland	The boundaries of the National	Ice sheet as territory	Expeditionary permit (symbolic fee).	Yes. If Greenland's autonomy is disrespected and

[3] Those who want to just observe the project (e.g. author, media, politicians) do not have to pass through the gate kept by EastGRIP's big nations.

	Park in Northeast Greenland		Plus: Knowledge of Danish-Greenlandic diplomacy, bureaucratic processes and post-colonial politics.	bureaucratic processes are not followed.

Gatekeeping lets us see how power and political interest become part of the scientific process before results are published and used in decision-making. And it highlights how gatekeepers derive their control from a variety of infrastructural, disciplinary and sovereign-like 'gates' which pre- and post-date the scientific project itself. Gatekeeping as a concept therefore also speaks to contributions on the 'life of data' (Bates et al., 2016) at the crossroads of STS and IR. Inspired by Edwards (2010), scholars are paying attention to the role of 'data friction' (Bates et al., 2016; Elbe, 2021) in obstructing the flow of data between sites of processing and publication. Sovereignty claims on behalf of nation states and post-colonial populations constitute effective interventions into data flows within the life sciences in the form of 'genomic sovereignty' (Benjamin, 2009) or 'viral sovereignty' (Elbe, 2021; Hinterberger and Porter, 2015). In this way, the increasing value of biological data for developing new medicines and effectively responding to epi-/pandemics provides the Global South a mechanism towards redistribution of hierarchy in the international system.

Sovereignty claims to biological material underline that what unfolds "inside of scientific laboratories also cascade upwards into the macro-political play of security, power and sovereignty in international relations (Elbe, 2021: 672). Gatekeeping can be a way to play sovereignty games, as I touch on in the analysis. But gatekeeping as a mechanism of control which can be exerted by non-state actors or by different state actors simultaneously also indicate that sovereignty is actually too narrow a frame for understanding how control of raw climate data is exerted. Instead, by expanding the analysis to not only 'the flow' or 'life' of *data* specifically, but a broader 'upstream' stage, we can see how a host of non-sovereign actors exert control that has effects not just for knowledge flow, but also its content. Moreover, 'viral' or 'genomic sovereignty' has been understood through a prism of control-as-ownership over 'national' resources (Hinterberger and Porter, 2015). The power of gatekeeping lies not in 'owning' physical data and negotiating the conditions under which it can cross sovereign borders, but in affecting the knowledge produced in terms of quantity, quality and scientific priorities through control-of-access and control-of-utilization.

What underlies this power is the physical materiality of the unprocessed data. Extracted data may become digital instantly, but it still relies on e.g. biological samples or geophysical material. Moreover, the specific type of data – such as dust particles or water isotopes – extracted from an ice core is a direct reflection of scientific priorities and struggles inside the scientific project, underlining the effect of gatekeeping on not just flow, but also content of climate knowledge. This knowledge is what further downstream enters e.g. the assessment reports of the Intergovernmental Panel on Climate Change. To gatekeep is to have the power to influence the contents and the flow of knowledge in a much more direct and immediate way than what otherwise happens in terms of state steering and scientific assembling (Allan, 2017). Gatekeeping is thus a mechanism of control that is exerted, and it prefigures important aspects of the data that goes through the three constitutive processes involved in governance object formation.

The power of a gatekeeper is constituted by the control exerted in the gatekeeping itself, and in gatekeeping, scientific and political hierarchies are (re)produced because the gatekeeper forces compliance with their protocols and priorities. This control may have the *effect* of halting, shaping or redirecting the flow and the contents of knowledge from the upstream to the downstream, while the control itself is found in the ability to provide one or more of the following: ***access*** to the research site of the raw data as political space (e.g. territory) and as domain (land, ice, water, air, outer space), ***access*** to raw data as physical (i.e. not virtual or data points) and ***utilization*** of raw data for analyses before any processing/cleaning happens.

Gatekeeping understood in this way let us see how states, but also scientific or commercial actors can exercise the power of gatekeeping. Being in a position as the only viable provider of access to a research site or in a position to control the utilization of raw data are of course positions that are often constituted and shaped by historical backlogs of colonial expansion, unequal scientific-institutional developments and military-strategic competition. One does not simply become a gatekeeper from one day to the next. Nevertheless, not all gatekeepers are well-established scientific institutions, former colonizers or big powers in military terms, as the Greenland example shows. Gatekeeping is not static or inherent to the gatekeeper but depends on a number of much broader international developments. In the following, I unfold how I have studied 'the upstream' of knowledge production methodologically and how I have conceptualized gatekeeping.

Following 'the upstream': Methods, positionality, and conceptual development

I approach the EastGRIP project through a principle of symmetry, so as not to privilege ideational or discursive factors over material ones (Aradau, 2010; Connolly, 2013; Mayer, 2012), and I have followed the EastGRIP ice cores and scientists around (Latour, 1987) in key upstream sites of their knowledge production process (see Figure 1). In other words, I followed the project in sites where climate data is scoped, accessed, extracted, transported, analyzed, stored, and where the next data collection is planned, logistics are discussed, and preliminary results are debated, and I did so through participant observation and semi-structured interviews during multi-sited fieldwork. I describe this process here, because my own access negotiation was the first indication of the role of gatekeeping in this knowledge production.

Beginning in Nuuk in April 2023, I attended a 3-day public conference, where an EastGRIP project leader presented preliminary results. EastGRIP ran from 2015-2024 and the conference presented a view into the downstream translation of the project's results and presented a chance to discuss access to the upstream stage of data scoping, collection and analysis with this project leader. I was invited to the 2023 annual EastGRIP Steering Committee Meeting, held at the Alfred Wegener Institute's (AWI) premises in Bremerhaven, Germany, over the course of four days. The Steering Committee is the overarching decision-making body of EastGRIP and consists of one scientist from each of the participating 'nations' (EastGRIP, n.d.-b). Apart from the project's home at the Niels Bohr Institute, University of Copenhagen, and the major US partner at the University of Colorado Boulder, AWI itself is a major project partner and sponsor. In Bremerhaven, the project's scientific consortia[4] reported on the past field season, results and publications, and planned for the upcoming field season's scientific priorities, logistical requirements, personnel allocation and budgets.

Figure 1: Following ice cores and ice core scientists around.

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https://pixabay.com/illustrations/world-map-map-of-the-world-earth-2169041/

After further access discussions, I was initially invited to join the EastGRIP ice sheet camp for a week during the 2024 field season. But budgets were running low, so instead I was invited to follow the project from its logistical hub in Kangerlussuaq. Here I followed one team of scientists for three days as they prepared to fly into camp, flew with them to EastGRIP camp, and returned to Kangerlussuaq on the same day, now with the homegoing team of scientists, which I followed for two days. In

[4] In addition to being structured into national groups, based on the sponsoring institution's location, the project is also structured into scientific consortia, cross-cutting national and institutional affiliations. There are a total of 14 consortia, each headed by two chairs. For an overview, see EastGRIP (n.d.-a).

Kangerlussuaq, I conducted semi-structured interviews with seven participants, representing a range of roles, levels, nationalities, institutions and disciplines. The final stop on the ice core trail, was a half-day visit to the freezer facility of the Niels Bohr Institute, located in Brøndby, Denmark in August 2024. Here the 'ice core curator', as he calls himself, showed me the ice core 'archive', consisting of samples from all deep ice cores drilled in Greenland and Antarctica with Danish participation.

It is a limitation of the research design, that I did not trail EastGRIP continuously for a longer period in the classic ethnographic sense, but as Eggeling (2023) argues 'the field' is not necessarily one (geographic) site but may be better understood as a process to be followed. What matters in doing fieldwork is to employ an ethnographic ethos of "*showing interest, engaging empathetically* and *committing (over) time*" (Eggeling, 2023: 1344 original emphasis). I practiced this ethos by showing up and showing interest in multiple sites for more than a year and familiarized myself with the people as well as the technical aspects of ice core science.

A factor in both access negotiations and empathetic engagement was my own background. The project is international, but also – as the analysis shows – significantly anchored in Denmark. Being a Danish citizen, Danish speaking, and affiliated with Danish institutions made my access much easier than it would have been for non-Danes due to the natural rapport from common cultural frames of understanding. I was, for instance, naturally included in a Danish 'we' whenever Danish scientists were telling me about the cooperation with 'the Americans' (i.e. the US Air Force). At other times, however, I was an outsider from 'social science'.

How access and rapport would have looked for a Danish-speaking Greenlander is not possible for me to sense. I asked, in every interview, about Greenlanders' participation and about the role of indigenous knowledge in the EastGRIP project. In essence, I was told that this was a challenge for different reasons, including the non-existence of a (geo)physics degree program in Greenland, the lack of Greenlandic students in the Danish programs, and the fact that locals have always lived at the coast, away from the dangerous and uninhabitable ice sheet, limiting what might be dubbed 'indigenous knowledge' of the ice sheet. A senior Danish project leader summarized the situation: "[W]e try to bring as many Greenlanders with us as we can – cooks, and doctors, and mechanics, and things like that. But it's not impressive what we can do in the project." This epistemic inequality is part of a much bigger story of Danish colonial exploitation and post-colonial education policies. As I show in the last section of the analysis, however, the miniscule Greenlandic and indigenous participation 'inside' EastGRIP should not be conflated with a Greenlandic lack of power in the upstream of climate science. It is exactly because the Greenland ice sheet contains unique and unparalleled insights on global climate change that the Government of Greenland can exert gatekeeping to control who benefits diplomatically from the scientific significance of the ice sheet.

The process of identifying and conceptualizing gatekeeping was abductive. The multi-sited fieldwork reconstructed in Figure 1 should be seen as a rewinding or unwinding, allowing me to understand how EastGRIP extracts raw data and turns it into published scientific results. The sequence of these site visits matters less for exploring the upstream of knowledge production. What matters is to be allowed to observe and ask questions about what happens before the blackboxing of ice cores into climate facts. Had I only observed EastGRIP at the conference in Nuuk, I may have discerned the gatekeeping exerted through US military infrastructure, but I would have missed the *effects* this has on the scientists and their knowledge production by setting limitations on quantity of data collected and placing heavy logistical burdens on them, detracting from their research time. Moreover, I would have been blind to both the gatekeeping of the inside/outside of EastGRIP and the gatekeeping exerted by the Government of Greenland.

The abductive approach involves, in line with Timmerman and Tavory, entering the field "theoretically sensitized" (2012: 173), but not theoretically subscribed and being receptive to surprise during fieldwork. It involves revisiting fieldnotes and interview transcripts multiple times as the concept develops and as peers react to it. This process should not be seen as a reduction of ethnographic 'reality'. Inscription enables a defamiliarization which is not possible in the field and facilitates the identification of larger patterns, salient themes, and mechanisms abductively (Timmermans and Tavory, 2012: 176-77). Seeing and developing the concept of gatekeeping required a defamiliarization with my own immediate field impressions; to gain some distance to and start processing my own 'raw' data.

The mechanics and ethics of fieldwork and interviews followed standard prescriptions. Informed and written consent was obtained from all interview persons, and information about my project and presence was shared widely; I presented and discussed my project with the entire EastGRIP consortium in person during the Bremerhaven meeting, and I was announced in meetings and internal documents multiple times. Throughout, I have encouraged participants to reach out with concerns, questions or to opt out. Names have been changed in vignettes in a way that ensures anonymity but remains close to the person's culture and gender in general terms. Interview persons are referred to by their role in the project and occasionally by nationality in a way that ensures their anonymity. No specific dates are given for interviews as that could compromise anonymity between project scientists, reflecting my main ethical responsibility to participants, namely, to avoid exposing them in ways that could damage their careers. This discretion has been important in the selection of vignettes and interview extracts.

Gatekeeping the Greenland ice sheet and its climate data

Here I introduce briefly the historical backdrop of US infrastructural and scientific presence in Greenland, both of them military in nature. During the Cold War, Greenland became a central piece in US deterrence strategies, and this resulted in the expansion and consolidation of a significant network of military bases and radar installations. Much of this infrastructure exists today, including one active US military base, the Pituffik Space Base. The remaining, active infrastructure functions predominantly as support for science, not least climate science.

The small town of Kangerlussuaq (point 3, Figure 1) and its inter-continental airport is the most important node in this land-based network of science support, operated by the US military.[5] Throughout the Cold War, Kangerlussuaq airfield operated as a US Air Force base. In 1992 it was transferred to the Greenlandic Government for civilian use and ceased being a military base. Nevertheless, American military presence in Kangerlussuaq remains semi-permanent. The New York Air National Guard's 109th Airlift Wing, under the US Air Force, operates a specialized Hercules airplane (the LC-130) out of Kangerlussuaq, equipped with skis to enable landing on snow and ice in Greenland and Antarctica. These are the only ski-equipped cargo planes in the world. During the summer months, 75-100 airmen operate four such 'skibirds' out of Kangerlussuaq in support of the US National Science Foundation (NSF). The other half of the year is spent flying resupply missions to US research stations in Antarctica. The Greenland mission has two purposes: Train airmen to operate the LC-130s, thus demonstrating power projection into austere environments, and to support NSF's scientific station on the ice sheet (Scaringe, 2024). Additionally, they transport ice cores, people, and cargo to and from the EastGRIP camp against a fee.

US Cold War activities in Greenland also involved experimental military scientific projects on and in the ice sheet to explore its use as construction material. In the late 1940s, it became clear to the US military that Glaciology as a discipline was fragmented and driven by the expeditionary spirits of individual adventure-scientists. In a 1950 report, the military concluded that the discipline's "fundamental knowledge of the properties of snow, ice, and permafrost in polar regions [was] "unsystematic and unsatisfactory"" (Martin-Nielsen, 2016: 102). In response, the US military started investing money, technology, and expertise in this field of research in Greenland.[6]

Part of this prioritization, systematization, and up-scaling of Glaciology as a discipline included the construction of Camp Century in 1959-60, in itself a feasibility study for the proposed and secret Project Iceworm, conceptualized to hide nuclear weapons inside ice sheet tunnels (Martin-Nielsen, 2016: 103-5). It turned out that glacier ice is much too dynamic a material to hide weapons of mass destruction in, but a very important scientific development did result: the drilling of the Camp Century ice core, which revealed "rapid, unexpected variations in Earth's past climate, key evidence for interpreting climate change" (Doel, 2016: 41). The scientific sub-field of ice core science was born. These infrastructural and disciplinary developments affect how gatekeeping of the ice sheet happens today, and which actors are in gatekeeping positions.

Gatekeeping through military infrastructure

The 109th Air National Guard, under the US Air Force (USAF), is the most noticeable gatekeeper of the Greenland ice sheet. The 109th works closely with NSF, an independent agency under the US government and a major source of scientific funding. EastGRIP interviewees describe their relation to the 109th as being "completely dependent on them. There's really no alternative for us to work up

[5] Scientific projects along the coast of Greenland are heavily supported by the Joint Arctic Command of the Kingdom of Denmark.

[6] Running in parallel to this disciplining of Glaciology was the development of computational power during the 20th Century, which has been vital in 'discovering' climate change (Edwards, 2010).

on the ice sheet". This is echoed across interviews, and one interviewee elaborates that this dependency is caused by the logistical demands of drilling an ice core and running a camp on the ice sheet for several months. The drill, cutting equipment, on-site analysis, and transport of the ice core itself are just some of the scientific transport needs, in addition to camp infrastructure, heavy machinery, fuel, food and personal luggage.

From EastGRIP's point of view, USAF and their planes, cannot be meaningfully separated from the NSF, because NSF is both a science partner and a major US science actor with significant sway in relation to the Air Force. Consequently, EastGRIP maintains close collegial relations to both NSF and USAF. An interviewee, who is central to this relationship, explains,

> we from Denmark have gone in and been leading the Greenlandic ice core projects that the US has been partners on, both scientifically but also logistically through the Air Force. So in that way, we've had a very strong and direct collaboration with the National Science Foundation for many years.

The EastGRIP scientists must understand, navigate, and nurture their relations with this military-scientific gatekeeper because the gate they control (the planes) is a crucial access point for EastGRIP's operations on the ice sheet. One interviewee, who is heavily involved in the logistics of the project, gives an example of the scientists' dependence on this gate and the consequences for 'the actual science' when the gate does not open:

> [Y]ou can't press through and get your way with the US Army [Air Force]. I mean…come on…then you need to be NSF. NSF can. (…) sometimes things are solved way above our paygrades, when something just is not doable. We had one example last time where a plane had to fly back to the US early, and that meant that the mission, I mean, the actual science couldn't be done.

On EastGRIP's behalf, the logistics contractor to the NSF "appealed up her chain of command, and NSF forced the 109th to let one of the planes stay another day" and the 'mission' was completed. This example shows the revocability of the key to this gate. The interviewee concludes, "you have to understand what you can achieve by personal relations and talking to each other nicely". Nurturing this relationship, however, goes much beyond the diplomatic effort suggested by this statement. Leading EastGRIP figures spend a considerable amount of the field season – and their research time – cultivating the EastGRIP-USAF relationship:

> [W]e invite them [USAF] for barbeques and stuff to show that for us they're not just a service provider. (…) sometimes it gets almost awkward how direct we – for a Dane, especially – how much we kind of verbally have to stress how grateful we are. But it works.

These efforts at socializing and showing gratitude extend to how scientists in charge of the relationship dress and make personal gifts for the USAF crew. Echoing an anthropologist's rapport-seeking, one scientist explains how he, *purposefully dresses in an outdoorsy, military-inspired way here in Kangerlussuaq, so that he doesn't create distance between himself and the 109th crew. (...) On the last day, before he flies back home, he goes to the 109th – to his 'American colleagues' – with a fresh loaf of bread, which he has baked himself, and a nice bottle of something* (fieldnotes, 07.06.24, Kangerlussuaq).

EastGRIP spends approximately half the budget on these flights (the monetary key to the gate), but the attention given to the relation goes far beyond a simple transaction, underlining how critical it is for EastGRIP that his gate remains open and that the key is not just monetary.

From the EastGRIP perspective USAF/NSF controls a crucial gate, and their relation has been built over decades, relying to some extent on individual scientists from the Niels Bohr Institute. But the effects of this gatekeeping do not only show in the social relations between scientists and military personnel, but also in what it requires from EastGRIP 'operationally'. Obtaining the key to this gate involves, beyond the fee itself, compliance with USAF protocols, schedules, and procedures. This requires EastGRIP to run much like a military operation and sets strict limits on the quantity of ice cores, scientific equipment, and scientists that can pass through this gate.

Figure 2: Ready for take-off with the LC-130 'skibird'. Photo edited to anonymize one person. Photo: Author.

In preparation, the project's cargo is organized on a large Air Force pallet – a process that takes many hours of hard manual labour for the scientists before each flight. The pallet is weighed to comply with USAF restrictions and must be sturdy enough to be 'combat dropped' out of the plane while it is still moving on the ice sheet runway. Other times, USAF practices their own operational readiness by dropping the pallet in-air via parachute. The gatekeeping exerted by USAF also involves a literal checkpoint when all passengers must line up outside the 'KISS' hostel, short for Kangerlussuaq International Science Support, at 15.00 the day before takeoff to have their passport checked by a uniformed USAF officer. It's a perfectly friendly process during which these scientists, many of whom are Danish citizens, have their passports controlled by a uniformed American officer in a civilian area of Greenland.

The seniors on the project have been doing this for years, some for decades, and run this part of EastGRIP much like a military operation. Being a seasoned climate scientist, however, does not give you control of the weather, and on the day of take-off, Kangerlussuaq is covered in clouds too low hanging for the safety protocols of USAF. I follow the replanning from the EastGRIP field office (the FOM office), inside the KISS hostel. The FOM office is the center of coordination between USAF, Copenhagen, and camp. They are running an 'operation' or a 'mission', in their own words, and this office is their command center through which they keep updated on the cloud cover and relay onwards USAF's flight postponement

> *In the FOM office, Rasmus is talking, in turn, with Lars, his colleague in the 'control tower' in camp, and with USAF here in Kangerlussuaq. It's a bigger puzzle and coordinating it is not for newcomers. Part of the issue is that Raven (DYE-2),*[7] *which is a back-up landing spot for the planes, in case they suddenly cannot land in Kangerlussuaq, is also too cloudy. And due to the weight of the EastGRIP cargo, they don't have enough fuel to make it to a Canadian landing strip as a second back-up. (...)*
>
> *A decision is made by Rasmus in dialogue with the 109th to postpone the flight till the next day. Now everyone can do something more productive (or relaxing) with their day, rather than being on short alert. Rasmus puts on music in the FOM office. Sarah suggests a walk after lunch, perhaps to the pups at the nearby sled dog kennel. We're hanging out in the FOM office, talking about lunch, checking emails, refilling coffee mugs. Some work on research articles and funding applications. Rasmus looks at Alfred's screen and asks, tongue-in-cheek, 'what's that on your screen, Alfred? Science!?' We all laugh* (fieldnotes, 06.06.24, Kangerlussuaq).

This little joke about Alfred – surprisingly – doing some science is telling of just how much time the EastGRIP scientists spend planning, waiting, replanning, hoping for take-off, and all at the mercy of USAF's flight protocols and the everchanging weather in Greenland. As I learn later, the decision to postpone the flight was also taken in consideration of the USAF personnel, who now get a half-day off, even though the homegoing EastGRIP scientists must then stay in camp another day. Such consideration towards USAF is an important element in maintaining close relations, but it also shows the comprehension these climate scientists have of how this part of the US military functions. They know not just the written protocols of USAF in terms of cargo weight, measurements, passport control, flight schedule, but also understand how to run their own scientific project as much like a USAF military operation as possible, also if it means sacrificing research time, equipment or leaving their own colleagues on the ice sheet longer than planned.

The gatekeeping exerted by USAF has the effect that climate scientists spend much of their research time on logistics and protocol. More importantly, the upper limits to weight of equipment, ice cores and number of scientists in camp are set not by what is scientifically desirable, but by the flights affordable and by protocols of the US military, which remains the infrastructural spine – the gate – through which all ice core science in Greenland must pass.

<u>Gatekeeping the inside/outside of science</u>

On the following day, the clouds eventually lift enough for the Hercules plane to fly us into camp:

[7] The network of DYE radar stations was part of the Distant Early Warning (DEW) line across North America, installed during the Cold War. Later, ice cores were also drilled at these sites.

We land with a soft bump on top of 2720 meters of ice at 75°38.05'N, 036°00.22'W. (…) The propellers are still running, and I step on to the ice sheet in roaring noise and blinding light from the ice itself. I'm icestruck and for a moment forget that I'm supposed to find Mette, who will give me a tour of the camp, including the science trench, where they drill the core. There's only two colours here: blue and white. But then the line of flags catches my eye (fieldnotes 07.06.24, Greenland ice sheet).

Figure 3: The flags at EastGRIP Camp in order of appearance: US, UK, Switzerland, Sweden, South Korea, Norway, Japan, Italy, Iceland, Germany, France, China, Canada, Denmark, Greenland. Photo: Author.

The human senses work differently in extreme cold, high altitude, and in 24-hour sunlight, reflected also by the ice sheet itself. I realize this back in Kangerlussuaq with the homegoing crew, who have been in camp for more than a month:

We step onto the tarmac, I go and stand with Lars and Mette, and they both note how great it is to smell things again. As they explain, there's nothing to smell in camp; there's no animals, no plants. Only themselves and the food they eat. (…) The dryness, minus degrees and the lack of flora and fauna cause that (fieldnotes 07.06.24, Kangerlussuaq).

This is also a blessing; Hard physical labour and showers rationed to twice a week would certainly produce unpleasant odors elsewhere. The lack of olfactory sensations on the ice sheet, also, of course, make the flags stand out even more as a visual sensation. They present an easy, almost festive, overview of the nationalities of the participating scientists (see Figure 3). A leading figure in the project explains that it is to "flag that we really are an international project, and we're really proud of being an international project. So this is the first we want to present when people arrive to our camp".

The flags can be interpreted as so-called 'science diplomacy', as symbolizing human occupation of the ice sheet, or as a direct translation of state interest and investment into Glaciology and cryospheric climate science. I interpret the flags as mimicking and representation. EastGRIP mimics the structure of the international system and its governance logics by organizing itself in 'nations' and making agreements between those nations, while simultaneously and inadvertently displaying a direct representation of global inequalities and hierarchies in climate science.

The project consists of scientific institutions from 14 states – referred to as 'nations'. To organize these 'nations', a governance structure with rules and decision-making procedures has been established 'inside' the project. This is the Steering Committee and the Scientific Consortia, and their most important agreement, negotiated prior to any drilling, is the division of the ice core itself. Some parts of the ice core are more valuable as data than others; The outer parts, for instance, are not as pure as the inner parts. The cutting scheme (see Figure 4) applies across all field seasons and all 2.7 km of core, and it "imprints" (Allan, 2017: 140) the negotiated scientific priorities of EastGRIP directly on the 9.8cm diameter core, to determine the climate science to come out of this 10-year project.

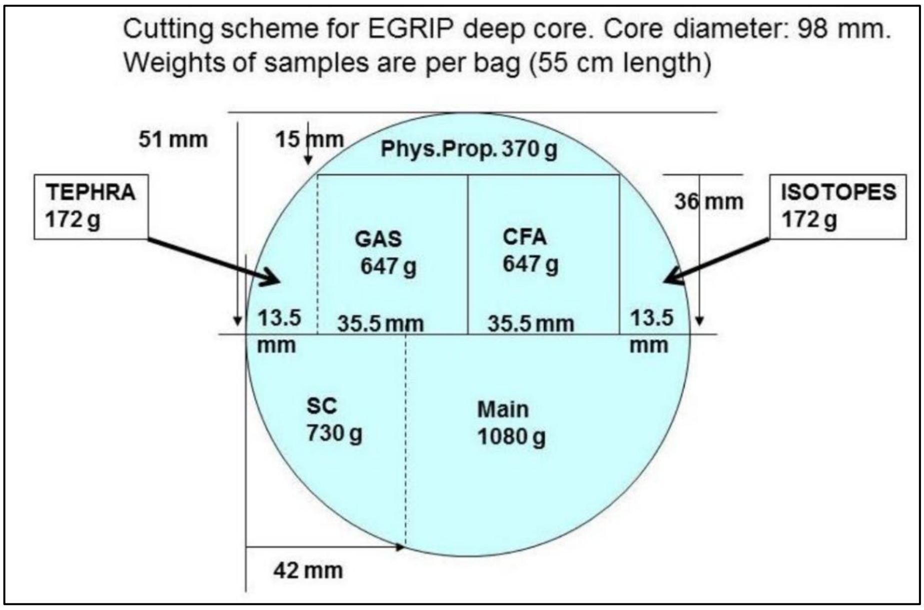

Figure 4: Cutting scheme for cross section of the EastGRIP core. Screenshot from EGRIP 2017 Field Season Plan (Dahl-Jensen et al., 2017: 15).

The upper half is divided between the scientific consortia, e.g., the Gas Consortium or the Physical Properties Consortium. The bottom half is divided between the Steering Committee ('SC'), and the archive piece ('Main'). The latter is stored in Brøndby, Denmark, for future (re)analyses, and the SC piece is allocated to additional projects, as evaluated and decided upon by the Steering Committee. The governance structure of the project and its governing agreement is thus reflected directly in the division of the ice core.

But how has this cutting scheme been negotiated, and what kind of power dynamics underlies the division of the core? It is worth remembering that in the processing and analysis of the ice core, it ceases to exist as raw data because it is melted, making the cutting scheme central to what kind of knowledge EastGRIP produces. The monetary key to gaining access to the core is a straightforward economic rationale; the data you get as a 'nation' (i.e. scientific institution) is proportional to your financial input. This means that in principle any 'nation' can unlock the gate to this important climate data, exemplified by the participation of the Chinese State Key Laboratory of Cryospheric Sciences. This gate opens simply when an institution contributes funding to EastGRIP.

But like the key to the USAF planes, the key to the inside of EastGRIP is also more than monetary. Each scientific institution has particular scientific priorities, which can produce disagreements about which research questions and measurements to pursue and which to forego. The consortia structure is a way to coordinate research interests across institutions. But "crises" or "fights" over the division of the core do occur and these disagreements provide a view into how scientific hierarchies enable some 'nations' to gatekeep and assert their scientific priorities directly into the ice core cutting scheme.

The biggest contributor is Denmark (i.e. funding awarded the Niels Bohr Institute), followed by the US, then Germany. The 'Danish' funding alone is app. 55% of the whole budget. One interviewee, based at the Niels Bohr Institute, makes the point that actually 'Denmark' gets too little 'science' out of it. But the interviewee acknowledges that the 55% buys something else:

> [I]t's actually fair to everybody but the Danes – I mean, we get much less science out, compared to what we pay for, but in return we get a lot of, you know…we're part of the network, we get a lot of co-authorships, and we're involved in a lot of things, because other nations also recognize that we're pulling a lot of weight.

Pulling this weight includes maintaining the relation to USAF/NSF, the ice archive, the warehouse in Kangerlussuaq, organizing the Steering Committee meetings, and contributing experience, manpower and research time. But these are not only responsibilities. They are also means of exerting control as a gatekeeper over the project, including its raw data and its scientific direction. It is this network of infrastructure, relations, publications, and involvement across data extraction, transportation, processing, analysis and archiving which puts the Niels Bohr Institute in a position to gatekeep. This position is also a product of the disciplinary development of Glaciology in Greenland, with heavy involvement and leadership from Danish institutions and scientists since the Camp Century ice core.

Gatekeeping access to and utilization of the ice core is, however, not exerted by 'Denmark' alone. An interviewee, based at the Niels Bohr Institute, explains how the inside of the project is also governed by a logic of veto power. I ask how the ice cores are divided between participating institutions:

> In practice, it's a very complex process. In theory, it's very easy – you can read the policy on the webpage. But what happens is…of course the big nations – those that contribute most in terms of personnel and money – they get to be choosers. So they get to say, what they want to do. And that is very early in the project…being defined; you know, which nations are the lead nations in different types of investigations.

The interviewee elaborates what this means in case of conflict between the different 'nations' over the division of the ice core:

> [I]f there is a conflict and people really want the same, it comes down to who is the biggest contributor. But it never gets to…that somebody sits and does the math, because Denmark is the biggest contributor. So we jokingly say – but it's not only a joke – that 'it's a little bit easier to vote when you hold more than half of the votes'. So, it also means that there is rarely open conflict, because everybody knows that Denmark, US, and Germany – which are the three biggest contributors – if they agree…yeah, then there isn't much to do.

Some 'nations' – in the project's own lingo – within EastGRIP are endowed with a veto-like power in the division of the ice core and in the overall scientific priorities of the project. That 'there isn't much to do' if these three agree means that the scientific direction set by the most powerful scientific institutions is accepted by the remaining institutions, in recognition that this is the non-monetary part of the key. This veto is not codified anywhere but works intangibly to quell conflict before it arises. If 'everybody knows' that certain institutions (in Denmark, the US, and Germany) hold a form of power which is not solely derived from their financial contributions, then this becomes a gate to which the key is aligning your research priorities with those of the 'big nations'.

In their UN-like line-up on the ice sheet, the flags make EastGRIP's participating institutions appear visually equal, but despite the non-hierarchical and alphabetically organized line of flags planted in the ice sheet, this is not a reflection of the organization inside the project. Worth noting also is all the flags that are not present. Like much climate science, EastGRIP is largely a Global North affair (including Japan, South Korea, and China), and in this way, the flags present a visual image of inequalities in (climate) science. The notion of the 'big nations' indicates the hierarchy inside this area of climate science and how it maintains some institutions in gatekeeping positions through which they can exert control of particular projects, while the line of flags also indicates global scientific inequality. One flag in the line-up stands out, however, because there is no scientific participation from this nation. This is the Greenlandic flag, Erfalasorput, which is actually the very first to greet visitors. The analysis now turns to the role of Greenland, its relations to Denmark and the US, and how the upstream of knowledge production cannot be understood in isolation from these increasingly tense relations.

Gatekeeping the ice sheet, gatekeeping Greenland

EastGRIP has received many prominent visitors over the years. In 2022 Norway's Crown Prince Haakon visited and so did several documentary crews. But the minutes from the 2022 EastGRIP steering committee meeting also mentions a failed visit: "August 2022: DK Climate minister and UK COP26 leader and DK TV2 - not permitted by GL Self Rule" (Koldtoft, 2022: 22). At the Steering Committee meeting in Bremerhaven a project scientist (who is not based in Denmark) starts telling me about this:

> *The Danish Minister of Climate, Energy and Utilities, Dan Jørgensen, and the Head of COP26 in Glasgow wanted to visit the project, he tells me. All was planned and ready from EGRIP's and Copenhagen's side, but the Government of Greenland said 'no' last minute because "their ministers were on summer holiday" and therefore couldn't participate in the visit to EGRIP* (fieldnotes, 02.11.23, Bremerhaven).

'Summer holiday' seems like an (un)diplomatic excuse for something else, so I ask my interviewees what happened and receive different explanations. For EastGRIP this was a very important political visit, which turned into "a clusterfuck", according to one interviewee. He assumes that "it was a miscommunication somewhere either in the University or the Danish Ministry of Foreign Affairs that failed to do things in the right order. But don't take my word for it." Another interviewee thinks that someone forgot to invite the Government of Greenland, who is usually always invited, when VIPs visit camp. A third interviewee, who handles these visits, thinks it was caused by bureaucratic reinterpretation of 'the rules' for issuing expedition permits for the ice sheet and the national park – the largest in the world – in which the EastGRIP camp is located. Every year EastGRIP must apply for an expedition permit, issued by the expedition office of the Government of Greenland, including in this application names of expected participants:

> IP: [I]t has not really been a problem some of the other years that we have added guests on during the project or later, after we have gotten the permit, but there was new people working in the expedition office down in Nuuk, and maybe some of the old ones were looking through the fingers, or were not, like, into all the rules on this. So it has nothing to do with the guests themselves. It was some Greenlandic rules.
>
> L: So they have become more strict?
>
> IP: Yes, I will say they have become more strict.

Greenland is increasingly working towards full sovereign independence from Denmark or, at least, a loser association with increased Greenlandic autonomy. Being a part of the Kingdom of Denmark with an autonomous government (the Naalakkersuisut), a parliament (the Inatsisartut) and devolved powers in a number of policy areas, post-colonial tensions between Greenland and Denmark are increasingly a factor in all interactions, also scientific endeavors in Greenland. Research and higher education is a devolved policy area, and in 2022 the Government of Greenland launched its first ever national research strategy (Naalakkersuisut, 2022), indicating increasing attention among decisionmakers in Nuuk towards research policy and politics.

The strategy launches initiatives towards integration of local and indigenous knowledges, a national register of research projects, and ethical guidelines for research in Greenland. Moreover, the strategy contains many pictures from and references to EastGRIP's ice core drilling, the LC-130s, the camp, and the line of flags, indicating that EastGRIP is considered a prestige project by the Greenlandic government.[8] Decisionmakers in Nuuk are keenly aware of Greenland's importance for international climate science, and EastGRIP is an important showcase for the Government. But this first research strategy is also an act to underline that Greenlandic authorities are in charge of regulating and authorizing this same science.

This political signal becomes gatekeeping through the Greenlandic government's control of – what is for all scientific projects and expeditions into the national park – the key, namely, the expedition permit. In this case, however, the denial of the Danish minister and the COP president takes on multiple extra dimensions. First, it shows the effect of a gatekeeper withholding the key, and how this withholding can be a way to achieve a particular political end. Effectively preventing a Danish minister from visiting a part of Greenland – a part of the Kingdom of Denmark is to play post-colonial sovereignty games with Denmark,[9] bringing into question who controls the Greenlandic territory. The minister's failed visit may not impact EastGRIP's climate science, but it shows the Greenlandic Government's ability to stop ice coring or halt specific scientists from going to the ice sheet. If a Danish minister can be denied access, so can any climate scientist.

Second, by withholding the key, the Government of Greenland denies the Danish minister the chance to profit diplomatically and internationally from this prestige visit in a COP context, indicating a very clear political connection between upstream knowledge production and downstream IPCC assessments and COP negotiations. Spectacular scientific projects, showcasing national competence in climate science can be a way to earn diplomatic points and powerful negotiation roles further downstream, underlining the connection explored by Yao (2021) between scientific presence and international hierarchies.

Third, with repeated offers from the US to buy Greenland, direct threats to 'take control over' Greenland and the simultaneous dismantling of US climate science, this diplomatic flex[10] from the Government of Greenland speaks to the future relations between Greenland, Denmark and the US. While the sovereign state is the Kingdom of Denmark, it is the Government of Greenland that by an executive order (Ministry of Justice, 2010) grants admission to the ice sheet and the national park (with exceptions for military and police forces). However, the 1951 Defense Agreement and its 2004 amendment between the US, Denmark and Greenland, has sustained American military presence in

[8] For images of EastGRIP, see pages 28-29, 38-39, 42, 46-47, 54-57, 70-71 (Naalakkersuisut, 2022).

[9] A rich literature on 'post-colonial sovereignty games' has explored how Greenland and Denmark play such games in international fora and institutions, including the Arctic Council and the EU (Adler-Nissen and Gad, 2014; Gad, 2014; Gad and Adler-Nissen, 2012; Jacobsen, 2020), in order to outmaneuver the other party in a game where sovereignty is recognized as a defining and binary feature, separating states from non-states.

[10] This diplomatic flex could be seen as a form of 'liminal agency', which Greenland practices in different spheres and with the potential to change structures in international politics (Gad and Kristensen, 2025).

Greenland for more than 80 years, and the defense of Greenland is in effect a shared responsibility between the US and Denmark. 'Sovereignty' as control over territory leaves no clear answers in a Greenlandic context and prevents adaptation of a concept like 'genomic sovereignty' (Benjamin, 2009) or 'viral sovereignty' (Hinterberger and Porter, 2015; Elbe, 2021). Gatekeeping lets us see instead, how questions of sovereignty are tied up with climate science in ways that require a broader conceptualization than e.g. 'glacial sovereignty' and reveals how power is here constituted by control of access and utilization, less than control-as-ownership of raw climate data. Ironically, the 'control' referred to by the Trump Administration sounds more like ownership – not of data, but of entire nations and the land they live on – even though the US retains wide-reaching control-of-access to Greenland.

Conclusion

The major scientific discovery of EastGRIP – so significant that "the textbooks" will have to be rewritten in the words of interviewees – is the finding that the Northeast Greenland Ice Stream moves as one giant block of ice towards the ocean, without any internal deformation. EastGRIP's knowledge production will undoubtedly provide important new knowledge on global sea-level rise and paleoclimatic comparison. When I argue that we need to pay attention to the upstream of knowledge production and those who gatekeep it, it is not to detract from the scientific expertise, curiosity, and logistical effort that go into Arctic climate science.

Understanding gatekeeping is important because it has direct consequences for access to and utilization of raw data, thus affecting what later becomes constituted as 'the climate' and the governance efforts levied at it. The cutting scheme for the EastGRIP core is a clear example of this, and it shows how co-funding and institutional hierarchies inside science directly affect the climate knowledge to come out of the project. The line of flags suggest equality among the participating scientists and institutions, but inside EastGRIP, the 'big nations' exert control based not only on their project contributions, but also on historical trajectories and disciplinary developments, which have put some states and some scientific institutions in gatekeeping positions.

Gatekeeping is historically and materially enabled, but it is not static or inherent to the gatekeeper. New gatekeepers, such as the Government of Greenland, can challenge established hierarchies in post-colonial relations. Moreover, the control of a gatekeeper dissipates, in theory, once data has been extracted and analyzed and the gate-passer no longer needs to pass through the gate(s). In practice, however, scientific institutions and sub-disciplines often rely on the same types and sites of data collection for the next project.

Gatekeeping will look different in other contexts of knowledge production – also in other cases of climate science – and as such it is a concept which will need careful and critical application to other instances of upstream knowledge production. Gatekeeping in other contexts may be more subtle and difficult to identify. However, it can be 'tested': If a gate must be passed in order to participate in the upstream stage of knowledge production – and if the key to this gate can be withheld or revoked with effects on the knowledge produced – gatekeeping is being exerted as a control of access or control of utilization of raw data.

What gatekeeping lets us see is how knowledge production is shaped from its point of extraction by powerful actors such as militaries, bureaucracies and leading scientific institutions who in their gatekeeping ensure compliance with their protocols and priorities – whether these are diplomatic, scientific or operational. What later becomes designated, translated, and problematized – in the vocabulary of governance object theory – is prefigured by what happens at this upstream stage of knowledge production. The disparate gatekeepers of the Greenland ice sheet are all in positions to close their gate, affecting a much longer process of knowledge production, both in terms of who gets to participate and in terms of the shape, flow, and content of this knowledge.

Finally, when gatekeeping is instrumentalized, i.e. when the key to the gate is withheld or revoked, it can be wielded to achieve political objectives, which may seem otherwise disconnected. A hypothetical, but not unimaginable, instrumentalization of gatekeeping with consequences across scientific projects relying on US military support is a situation in which such projects must align themselves with political priorities in the White House in order to maintain this infrastructural support. With the ongoing dismantling of US federal climate science, conducted by the NSF and the National Oceanic and Atmospheric Administration (NOAA), climate science is already under severe pressure. This has consequences far beyond the US, and a particularly precarious situation would be a stop to all collaboration between climate science and the US military in Greenland in an effort to simultaneously obstruct climate science and demonstrate who is 'in control' of Greenland. The Greenland ice sheet will continue, of course, to flow into the ocean, regardless of the number of gates that are closed in the name of 'control'.

References

Adler-Nissen R and Gad UP (2014) Introduction: Postimperial sovereignty games in the Nordic region. *Cooperation and Conflict* 49(1): 3–32.

Allan BB (2017) Producing the Climate: States, Scientists, and the Constitution of Global Governance Objects. *International Organization* 71(1): 131–162.

Allan BB (2018) From subjects to objects: Knowledge in International Relations theory. *European Journal of International Relations* 24(4): 841–864.

Aradau C (2010) Security that matters: Critical infrastructure and objects of protection. *Security Dialogue* 41(5): 491–514.

Barzilai-Nahon K (2009) Gatekeeping: A critical review. *Annual Review of Information Science and Technology* 43: 1–79.

Bates J, Lin YW and Goodale P (2016) Data journeys: Capturing the socio-material constitution of data objects and flows. *Big Data and Society* 3(2): 1-12.

Beck S and Mahony M (2018) The IPCC and the new map of science and politics. *Wiley Interdisciplinary Reviews: Climate Change* 9(6): November.

Benjamin R (2009) A Lab of Their Own: Genomic sovereignty as postcolonial science policy. *Policy and Society* 28(4): 341–355.

Callon M (1984) Some elements of a sociology of translation: Domestication of the scallops and the fishermen of St Brieuc Bay. *The Sociological Review* 32(1): 196-233.

Connolly WE (2013) The 'New Materialism' and the Fragility of Things. *Millennium: Journal of International Studies* 41(3): 399–412.

Corry O (2013a) *Constructing a Global Polity: Theory, Discourse and Governance*. New York: Palgrave Macmillan.

Corry O (2013b) The rise and fall of the global climate polity. In: Stripple J and Bulkeley H (eds) *Governing the Climate: New Approaches to Rationality, Power and Politics*. Cambridge: Cambridge University Press, pp. 219–234.

Corry O (2024) Making the Climate Malleable? "Weak" and "Strong" Governance Objects and the Transformation of International Climate Politics. *Global Studies Quarterly* 4(3), ksae062, https://doi.org/10.1093/isagsq/ksae062.

Crombez C, Groseclose T and Krehbiel K (2006) Gatekeeping. *The Journal of Politics* 68(2): 322–334.

Dahl-Jensen, D, Kirk M, Larsen, LB, Popp T, and Steffensen JP (2017) Field Season 2017. Field guide, EastGRIP, Copenhagen, Denmark.

De Pryck K (2020) Intergovernmental expert consensus in the making: The case of the summary for policy makers of the IPCC 2014 synthesis report. *Global Environmental Politics* 21(1): 108–129.

Doel RE (2016) Defending the North American Continent: Why the Physical Environmental Sciences Mattered in Cold War Greenland. In: Doel RE, Harper KC, and Heymann M (eds) *Exploring Greenland. Cold War Science and Technology on Ice*. New York: Palgrave Macmillan, pp. 25–46.

EastGRIP (2024) About EastGRIP. Available at: https://eastgrip.org/About.html (accessed 14 August 2025).

EastGRIP (n.d.-a) EastGRIP Scientific Consortia. Available at: https://eastgrip.nbi.ku.dk/science/ (accessed 14 August 2025).

EastGRIP (n.d.-b) EastGRIP Scientific Steering Committee. Available at: https://eastgrip.nbi.ku.dk/partners/ (accessed 14 August 2025).

Edwards P (2010) *A Vast Machine. Computer Models, Climate Data, and the Politics of Global Warming*. Cambridge, Massachusetts: The MIT Press.

Eggeling KA (2023) Embracing the 'inverted commas', or How COVID-19 can show us new directions for ethnographic 'fieldwork'. *Qualitative Research* 23(5): 1342–1358.

Elbe S (2021) Bioinformational diplomacy: Global health emergencies, data sharing and sequential life. *European Journal of International Relations* 27(3): 657–681.

Esguerra A (2024) Objects of Expertise. The Socio-Material Politics of Expert Knowledge in Global Governance. *Global Studies Quarterly* 4(3), ksae060, https://doi.org/10.1093/isagsq/ksae060.

Gad UP (2014) Greenland: A post-Danish sovereign nation state in the making. *Cooperation and Conflict* 49(1): 98–118.

Gad UP and Adler-Nissen R (2012) Introduction: Postcolonial Sovereignty Games in the Margins of Europe. In: Adler-Nissen R and Gad UP (eds) *European Integration and Postcolonial Sovereignty Games: The EU Overseas Countries and Territories*. London: Routledge, pp. 1–24.

Gad UP and Kristensen KS (2025) Liminal Strategies in the Margins of International Politics: The State-Like Power of Non-State Greenland. *International Political Sociology* 19(1), olae045, https://doi.org/10.1093/ips/olae045.

Gieryn TF (1983) Boundary-Work and the Demarcation of Science from Non-Science: Strains and Interests in Professional Ideologies of Scientists. *American Sociological Review* 48(6): 781-795.

Hansen TV (2024) Geopolitics, diplomacy, or idealistic research? Framing the research community in Ny-Ålesund. *Polar Journal* 14(1): 212–228.

Hinterberger A and Porter N (2015) Genomic and viral sovereignty: Tethering the materials of global biomedicine. *Public Culture* 27(2): 361–386.

Hood L (2020) How ancient ice cores show 'black swan' events in history – even pandemics. *The Conversation*, 3 September.

Isberg E (2022) Frozen archives on the go: ice cores and the temporalization of Earth system science. In: Dodds K and Sörlin S (eds) *Ice Humanities. Living, Working, and Thinking in a Melting World*. Manchester: Manchester University Press, pp. 266–283.

Jacobsen M (2020) Greenland's Arctic advantage: Articulations, acts and appearances of sovereignty games. *Cooperation and Conflict* 55(2): 170–192.

Jasanoff S (2004) The Idiom of Co-production. In: Jasanoff S (ed.) *States of Knowledge: The Co-Production of Science and the Social Order*. New York: Routledge, pp. 1–12.

Koldtoft I (2022) Minutes of the 8th EGRIP Steering Committee ZOOM meetings November 21st and 22nd, 2022. Report, Copenhagen, Denmark.

Latour B (1987) *Science in Action: How to Follow Scientists and Engineers Through Society*. Cambridge, MA: Harvard University Press.

Martin-Nielsen J (2016) Security and the Nation: Glaciology in Early Cold War Greenland. In: Doel RE, Harper KC, and Heymann M (eds) *Exploring Greenland. Cold War Science and Technology on Ice*. New York: Palgrave Macmillan, pp. 99–118.

Mayer M (2012) Chaotic Climate Change and Security. *International Political Sociology* 6(2): 165–185.

Ministry of Justice D (2010) Executive Order on Access to and Conditions for Travelling in Certain Parts of Greenland. Available in Danish at: https://nalunaarutit.gl/-/media/lovfiler/2010/rigslovgivning/bekendtgoerelse-nr-138-af-08022010da.pdf (accessed 14 August 2025).

Naalakkersuisut G of G (2022) Research – the road to progress. Greenland's National Research Strategy 2022 — 2030. Strategy, Government of Greenland, Greenland, December.

Scaringe M (2024) New York's 109th Airlift Wing Begins 2024 Greenland Missions. Available at: https://www.nationalguard.mil/News/Article-View/Article/3788640/new-yorks-109th-airlift-wing-begins-2024-greenland-missions/ (accessed 14 February 2025).

Timmermans S and Tavory I (2012) Theory construction in qualitative research: From grounded theory to abductive analysis. *Sociological Theory* 30(3): 167–186.

Yao J (2021) An international hierarchy of science: Conquest, cooperation, and the 1959 Antarctic Treaty System. *European Journal of International Relations* 27(4): 995–1019.