Orchestrating Global Climate Governance Through Data: The UNFCCC Secretariat and the Global Climate Action Platform

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Abstract

Since the adoption of the Paris Agreement, the focus of the United Nations climate regime has shifted from forging consensus among national governments toward animating implementation activity across multiple levels. Based on a case study of the Global Climate Action Portal—an online database designed to document nonstate actor climate commitments and implementation efforts—we trace, conceptualize, and assess how the roles of data, data infrastructures, and actor constellations have changed as a result of this shift. We argue that in the pre-COP21 negotiation phase, the United Nations Climate Secretariat strategically used the database to orchestrate and leverage nonstate actor commitments to exert pressure on intergovernmental negotiations. By contrast, in the post-COP21 implementation phase, the Secretariat, in collaboration with climate data specialists, is seeking to develop the portal to track and animate implementation activity. Given these developments, we discuss the potential and limitations of data-driven climate governance and set out avenues for future research.

During the period leading up to the twenty-first Conference of the Parties (COP21), the mobilization of public and private actors across transnational and subnational scales emerged as a key characteristic of the United Nations (UN) climate regime (Bäckstrand et al. 2017; Hale 2016; Higham 2017b;

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Hsu et al. 2015). These actors, referred to in this article as nonstate actors, comprise a diverse set of organizations, including businesses, subnational governments, financial institutions, and civil society groups. While not uncontroversial (Bakhtiari 2018), researchers have repeatedly argued that the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat (the Secretariat) has played, and should play, a central role in "orchestrating" nonstate climate action (see, e.g., Chan et al. 2015; Hale and Roger 2014; Hermwille et al. 2017; Hickmann et al. 2019). In this context, the Non-state Actor Zone for Climate Action (NAZCA), an online database set up by the Secretariat to document nonstate actors' climate commitments, has been characterized as an example of orchestration dynamics to rally for an ambitious Paris Agreement (Bäckstrand and Kuyper 2017; Chan et al. 2015).

While research has investigated the actor constellations involved in data-driven climate governance, it has not fully engaged with data as a *means* on which the Secretariat relies to influence actor preferences and governance outcomes. Our aim in this article is thus to introduce data into conversations about the role of the Secretariat and its efforts to orchestrate global climate governance within the UN climate regime. In so doing, we understand data not merely as a means of communicating information but as an intervening element that is deliberately mobilized to reconfigure the agency of, and relationships between, actors (Johns 2021). Adopting a case study approach, we empirically trace, conceptualize, and assess data-driven governance arrangements in the UN climate regime, focusing on NAZCA and its successor platform, the Global Climate Action Portal (GCA Portal).

Building on "orchestration" as a conceptual lens (Abbott et al. 2015; Abbott et al. 2016; Abbott and Snidal 2009), we engage with the following questions: Who are the actors involved in data-driven governance, what are their relationships, and how are these relationships shaped by data? How do data-driven governance arrangements operate, and which logics do they follow? And what is the potential and what are the limitations of data-driven climate governance? Engaging with these questions, this article adds to three strands of literature. First, it contributes to emerging research which has analyzed the interplay of transnational actors and intergovernmental institutions (see, e.g., Elsässer et al. 2022). Specifically, we add a new perspective to research that has investigated nonstate actor involvement in the climate regime (e.g., Bäckstrand et al. 2017; Hale 2016; Mai 2018), with a particular focus on interactions between the Secretariat and these actors (Hickmann and Elsässer 2020; Saerbeck et al. 2020). Second, our analysis offers a governance perspective that complements research on how data-collection and -processing practices, and related technologies, knowledges, and infrastructures, are relied upon to make legible and respond to planetary change (e.g., Hsu et al. 2020). And third, we contribute to an emerging field of research that has started to examine the politics of data in governing changing planetary realities (e.g., Bigo et al. 2019; Nost and Goldstein 2021).

In the next section, we begin by setting out our conceptual starting points. In the following section, we describe our rationale for adopting a case study approach and detail our methods of data collection and analysis. Next, we recount the emergence of NAZCA from the period leading up to COP21 and trace its gradual evolution into the GCA Portal. This descriptive account provides the foundation for conceptualizing data-driven climate governance arrangements. Finally, we assess the potential and limitations of data-driven climate governance, before concluding and highlighting avenues for future research.

Conceptual Starting Points

Researchers investigating international organizations and multilateral processes have explored how nonstate actors gain access to, participate in, and influence intergovernmental institutions (Betsill and Corell 2008; Elsässer et al. 2022; Tallberg et al. 2013). In this context, international bureaucracies have been described to engage with transnational actors to animate more ambitious policy- and lawmaking (Betsill et al. 2015; Chan et al. 2015; Reinalda and Kille 2016). Contrary to skeptics (e.g., Drezner 2007), a growing number of authors have argued that international bureaucracies—such as intergovernmental treaty secretariats—have gained a relative degree of autonomy vis-à-vis principal nation-states that goes beyond the provision of technical assistance and administrative services (Biermann and Siebenhüner 2009; Jinnah 2014; Trondal et al. 2010). Using their limited mandates in innovative ways, international bureaucracies—and international organizations more broadly—rely on intermediary support to target actors over which they lack direct, hierarchical control (Abbott et al. 2015; Abbott and Snidal 2010; Hickmann and Elsässer 2020). This indirect mode of governance has been conceptualized as "orchestration" (Abbott and Snidal 2009): an orchestrator with limited governance capacity (e.g., in terms of budget and/or staff) mobilizes an intermediary party with appropriate resources to govern third parties. It is through intermediaries that orchestrators *manage* or *bypass* target actors and reach their governance objectives (Abbott and Snidal 2009, 564). In the context of the climate regime, the Secretariat has been described as an orchestrator that, in the period leading up to COP21, sought intermediary support from nonstate actors to exert pressure on intergovernmental negotiations (e.g., Bäckstrand and Kuyper 2017). By contrast, following the Paris Agreement, nonstate actors have been described to "give substance to the aims, objectives, and modalities prescribed in the Paris Agreement", including by demonstrating implementation options, providing finance, enhancing representation, and contesting dominant policy practices (Bulkeley et al. 2018, 74–75). This shift in the role of nonstate actors raises questions of *how* the Secretariat has intervened to orchestrate nonstate actor activities in the pre- and post-COP21 periods, including by relying on data as a means of governance.

Our analysis thus takes as a starting point that with the adoption of the Paris Agreement, the UN climate regime has begun to move from "negotiation" to "implementation". While the negotiation phase, initiated by the Durban mandate in 2011, primarily focused on forging intergovernmental consensus to adopt a new, legally binding instrument,[1] in the post-COP21 implementation phase, the primary focus moved to "implementing what states have agreed" (Held and Roger 2018, 527). Accordingly, the adoption of the Paris Agreement marked a "turning point" in the development of the UN climate regime (see also Higham 2017a; Kinley 2017): it ushered in "the beginning of a new era … that offers the chance of more durable international cooperation" (Falkner 2016, 1108). After years of delay and almost collapse (Dimitrov 2010), the multilateral process produced a global, long-term, and durable legal framework that promises to end continuous renegotiation of governance aims and processes (Bodansky 2016). However, in practice, the shift from negotiation to implementation arguably unfolded as a gradual process. Even before COP21, specific aspects of the climate regime, such as Workstream II of the Durban Platform, were designed to animate and support implementation activity (see Higham 2017b),[2] and the negotiation of the "Paris Rulebook"—the ensemble of COP decisions setting out the operational details of the Paris Agreement—only began following COP21. Nevertheless, with the long-awaited finalization of the Rulebook, "the UN climate change regime can now focus on implementation of the Agreement" (Rajamani and Bodansky 2019, 1025).

Case Study Approach and Methods

Based on our conceptual starting points, we set out to empirically describe, conceptualize, and assess data-driven governance arrangements that have evolved around NAZCA and the succeeding GCA Portal. To do so, we investigate the evolution of the portal as a single case (Gerring 2004). While NAZCA was not the only nonstate actor data platform emerging in the lead-up to COP21 (see Widerberg and Stripple 2016), it has significantly outgrown its competitors. As of early 2022, its successor, the GCA Portal, listed more than 26,309 "climate actions" (United Nations Framework Convention on Climate Change [UNFCCC] 2022). Furthermore, as we explain in the following section, the portal has been continuously updated and formally recognized in intergovernmental climate negotiations. No other data platform compares to its size, resources, and political relevance. Accordingly, the GCA Portal offers an appropriate single case. For our within-case analysis, we use a process tracing methodology (George and Bennett 2005) to reconstruct the evolution of the portal between

1. UNFCCC, Decision 1/CP.17—Establishment of an Ad Hoc Working Group on the Durban Platform for Enhanced Action, paras. 2 and 4.
2. UNFCCC, Decision 1/CP.17—Establishment of an Ad Hoc Working Group on the Durban Platform for Enhanced Action, paras. 7 and 8.

2013 and 2021, expounding actor constellations and tracing their activities (Beach 2016).

For data collection and analysis, we relied on triangulation. Specifically, we conducted an in-depth desk study of available documents, including COP decisions, UNFCCC reports, and "gray" literatures. Furthermore, we collected original field data at COP24, COP25, the Asia-Pacific Climate Week 2019, the New York Climate Action Summit 2019, and COP26, and we undertook 25 expert interviews. Using purposive sampling, we selected respondents who we expected would offer a "detailed exploration and understanding of the central themes and puzzles" that we sought to study (Ritchie et al. 2003, 78).[3] Using NVivo, we built a comprehensive case study database to code collected data and identify "themes" that captured patterns and meanings relating to our research questions (Braun and Clarc 2006, 82).

Tracing the Evolution of Data-Driven Climate Governance: From NAZCA to the GCA Portal

Our case study data reveal five stages in the development of the database: first, the emergence of NAZCA ahead of COP21; second, its official recognition at COP21; third, a period of planning, strategizing, and positioning ahead of COP22; fourth, the development of NAZCA into the GCA Portal between COP22 and COP24; and fifth, recent efforts to strengthen the portal's tracking capabilities. While in practice, transitions between these phases have been fluid, they highlight focal areas of activity that have characterized the evolution of the database.

Pre-COP21: The Emergence of NAZCA

At COP19, a portal on "cooperative initiatives" was launched. Hosted on the Secretariat's home page, this initial portal was intended to "enhance" the "understanding of non-state actor initiatives" and serve "as a platform for information exchange and for creating new cooperative interactions" (UNFCCC 2020). At COP20, the Lima–Paris Action Agenda (LPAA), a joint endeavor of the Peruvian and French COP presidencies, was announced to enhance the visibility of nonstate actors in the climate regime. It targeted actors that pledged quantifiable emission reduction targets and set out concrete steps for achieving these targets. Commentators have argued that, politically, these announcements played a central role in enabling the reaching of the Paris Agreement (Higham

3. Interviews were conducted between October 2018 and February 2020. Except for six online interviews, all interviews took place in person. Respondents comprised three groups: international climate policy experts involved in pre-COP21 negotiations and/or nonstate actor engagement in the post-COP21 implementation phase (respondents 1–9); technical staff at two GCA data providers (respondents 10–15); and staff at GCA-registered organizations across Europe, Latin America, and Asia with responsibility for climate data reporting (respondents 16–25).

2017b, 47–48). In parallel to the LPAA, the COP19 information hub was replaced with the first iteration of NAZCA. The focus of this initial version of the portal was to showcase the breadth of nonstate actor commitments, thus "injecting momentum into the negotiation process" leading up to COP21 (respondent 5). During this phase, workshops brought together nonstate actors, data specialists, supportive governments, the Secretariat, and observer organizations to discuss possible future roles of NAZCA (see Galvanizing the Groundswell of Climate Actions [GGCA] 2015).

COP21: Official Recognition of NAZCA

Whereas ahead of COP21, nonstate actor engagement had taken place on the sidelines and through informal channels, the Paris Decision—the formal decision capturing the outcomes of COP21—expressly "welcome[d] the efforts of all non-Party stakeholders [nonstate actors] to address and respond to climate change."[4] Furthermore, it encouraged governments to "work closely with non-Party stakeholders to scale up their climate actions to catalyze efforts to strengthen mitigation and adaptation action."[5] The Paris Decision thus made clear that governments, on their own, would not be able to implement the Paris Agreement or, more specifically, reach the goals formulated in Article 2. Importantly, the Paris Decision also "encouraged" nonstate actors to "register" their "climate actions" in NAZCA,[6] explicitly referencing the portal's URL in footnotes.[7] As such, with the Paris Decision, NAZCA became a formally endorsed element of the UN climate regime.

From COP21 to COP22: Planning, Strategizing, and Positioning of NAZCA

Following COP21, political and technical dialogues took place to scope options for further developing NAZCA. Political discussions were linked to the development of the Marrakech Partnership for Global Climate Action (MPGCA), a COP21-mandated initiative to foster collaboration between national governments and nonstate actors.[8] With the support of the Secretariat, political meetings were convened by the COP21 and COP22 presidencies under the aegis of the two High-Level Champions (the Champions), who were formally mandated to "engage" with nonstate actors.[9] These discussions focused on how to move NAZCA from showcasing nonstate actor pledges toward tracking progress of actors in actualizing their commitments (e.g., UNFCCC 2016a). Respondents explained that the intention was to shift NAZCA from capturing the readiness

4. UNFCCC, Decision 1/CP.21—Adoption of the Paris Agreement, para. 133.
5. UNFCCC, Decision 1/CP.21—Adoption of the Paris Agreement, para. 118.
6. UNFCCC, Decision 1/CP.21—Adoption of the Paris Agreement, para. 117.
7. UNFCCC, Decision 1/CP.21—Adoption of the Paris Agreement, paras. 117 and 134.
8. UNFCCC, Decision 1/CP.21—Adoption of the Paris Agreement, para. 120.
9. UNFCCC, Decision 1/CP.21—Adoption of the Paris Agreement, para. 121.

of nonstate actors to address climate change toward building a database that could show to what extent nonstate actor pledges were actually being implemented. To illustrate, respondent 2 described NAZCA in the pre-COP21 period as a "repository of good intentions" and a "recognition hub," while post-COP21, the platform was to gradually evolve into a "tracking tool" and make available information on nonstate actors' implementation efforts. Thus, the long-term vision for NAZCA, which emerged following COP21, was to develop the portal into an instrument that would meaningfully capture the progress of nonstate actors implementing voluntary commitments.

High-level discussions about the future of NAZCA were complemented by an official consultation process that invited submissions from governments and nonstate actors (UNFCCC 2016c). Informed by this process, the Champions set out tentative criteria, broadly defining which commitments and actions would be eligible for registration (see UNFCCC 2016b, 4–5). During COP22, further informal consultations took place before the Champions released the MPGCA founding document (respondents 7 and 9), which confirmed the criteria communicated in the lead-up to COP22. Political consultations were flanked by technical discussions that convened organizations specializing in climate data processing, representatives from academia, and nongovernmental organizations. These discussions started to focus on resolving analytical, methodological, and conceptual difficulties in developing NAZCA into a tracking tool, such as data gaps, issues around double counting, and options for linking nonstate actor data to Nationally Determined Contributions (NDCs) (see further Hsu et al. 2016b).

From COP22 to COP24: Developing NAZCA into the GCA Portal

Following COP22, NAZCA underwent major revisions. First, the portal was aligned with the LPAA "thematic areas", resulting in an overhaul of the portal's web interface (see UNFCCC 2017). In a second step in late 2018, a further update of NAZCA resulted in the renaming of the platform—it became known as the GCA Portal. This rebranding was intended to evidence, and make explicit, the integration of the database into the Global Climate Action program—the section of the Secretariat that, following COP21, evolved as the focal point for coordinating nonstate actor engagement (respondent 4). In addition, the portal's background IT infrastructures were updated to improve data processing and allow for more granular filtering. Respondent 2 explained the significance of the 2018 update as follows:

> The revamp ties it [the GCA Portal] to the Paris Agreement … Originally, NAZCA was part of the effort to galvanize the groundswell of non-Party stakeholder commitments to help reach the Paris Agreement. And in this context, NAZCA played its role. Now that we have the Agreement, this groundswell is still important, but at this stage it is more about the implementation of the Agreement.

Despite the overhaul of NAZCA's web interface and supporting IT infrastructures, conceptual and technical issues remained. For example, questions around double counting and the localization of actions continued to prove problematic. Several respondents explained that one central issue of concern was the localization of emission reductions. In early 2019, respondent 8 frankly explained, "I think we need to go to the next level on data. I think it is insane that we are still struggling with those emission data boundaries." Furthermore, with nonstate climate action and reporting taking place primarily in Europe and North America, it became evident that there were significant data gaps in the Global South (GGCA 2016a; Hsu et al. 2016b).

Following COP24, the GCA Portal was linked to NDCs by including "country profiles" that set out information about nonstate actor activities for each jurisdiction. Individual country profiles also included a link to the Secretariat's NDC portal (UNFCCC 2021b). The inclusion of country profiles made explicit that neither nonstate climate actors nor governments on their own have the capacity to reach the goals of the Paris Agreement. Rather, governments and nonstate actors are expected to work together. A press statement explained the rationale for linking nonstate actor climate data with national climate strategies:

> The intention is to offer governments, policymakers and other users a snapshot of climate action undertaken at a national level, which can inspire the replication of initiatives in other countries and help identify the potential for further collaboration across other sectors of society. (UNFCCC 2019c)

This statement evidences the core logic of data-driven governance in the post-COP21 implementation phase: by providing policy-relevant information, the intent now is to "manage" (see Abbott et al. 2015, 11), by way of animating and facilitating, implementation activity which involves both states and nonstate actors.

From COP25 to COP26: Operationalizing Tracking Capabilities

COP25 and COP26 witnessed renewed efforts to strengthen the portal's capabilities to "track" nonstate climate action, that is, to use data to demonstrate to what extent nonstate actors are actually implementing voluntary pledges. Our analysis indicates that developing tracking capacities is widely seen as key for nonstate climate action to be credible. However, in addition to data gaps and issues around localizing emissions, further factors have hampered the development of tracking capabilities. These include time lags between data collection, processing, and display; the lack of consistent metrics and baselines across various nonstate actor groups; and the incompatibility of relevant IT infrastructures (GGCA 2016b). In light of these issues, the Climate Action Methodologies Data and Analysis (CAMDA) community was officially formed at COP24 to support the Secretariat. Initially, CAMDA met as a loose collective of experts, academics, think tanks, funders, and supportive governments. At COP25, the group

articulated the aim to "create a common framework for tracking progress that looks at targets, ambition, outputs and outcomes to align with the Paris Agreement" (UNFCCC 2019b). Concomitantly, governments officially recognized the importance of developing tracking capacity, thus endorsing CAMDA's technical work.[10]

In the lead-up to COP26, CAMDA evolved into a more structured network, now referring to itself as the Climate Action Data 2.0 Working Group (CAMDA 2022). The expanded expert network meets regularly, makes available shared resources, and is formally structured into workstreams that address key issues in developing tracking capabilities. CAMDA's technical work is flanked by renewed political acknowledgment "to support accountability and track progress of voluntary [nonstate actor] initiatives".[11] In addition, the emphasis on accountability continues to be reflected in the strategic framework of the MPGCA, which explicitly acknowledges tracking as one of its "six key functions" for the 2021–2025 period (UNFCCC 2021a).

Conceptualizing Data-Driven Climate Governance: Comparing Pre- and Post-COP21 Orchestration Dynamics

Having traced the development of NAZCA into the GCA Portal, we now conceptualize how the shift from pre-COP21 negotiation to post-COP21 implementation affected the database. In so doing, we focus on data-driven governance as one specific aspect of the involvement of nonstate actors in the UN climate regime. While we argue that ahead of COP21 the primary aim of NAZCA was to orchestrate intergovernmental negotiations, to some extent nonstate actor engagement was already expected to directly achieve emission reductions, for instance, under Workstream II of the Durban Mandate (see section 2) and as part of the 2014 Climate Action Summit (see Chan et al. 2018). Conversely, even though we find that post-COP21, the GCA portal serves as a tool to orchestrate implementation efforts, nonstate actor activity arguably continues to affect intergovernmental processes. In the specific context of NAZCA and the GCA Portal, however, we identify two distinct governance logics: orchestrating intergovernmental negotiations (pre-COP21) and orchestrating implementation activity (post-COP21).

Pre-COP21: NAZCA as a Recognition Platform to Orchestrate Intergovernmental Negotiations

In the pre-COP21 negotiation phase, NAZCA was primarily intended to showcase how nonstate actors supported, and in fact expected, national governments to reach agreement at COP21. Capturing the "breadth of non-state actor climate

10. UNFCCC, Decision 1/CP.25: Chile Madrid Time for Action, para. 29.
11. UNFCCC, Decision 1/CMA.3: Glasglow Climate Pact, para. 89; Decision 1/CP.26: Glasgow Climate Pact, para. 56.

commitments" (respondent 9), NAZCA was used to raise awareness about nonstate actors' readiness and capacity to take action on climate change. In the pre-COP21 context, the database can thus be seen as a recognition platform that was intended to inject momentum into the intergovernmental negotiation process. As such, NAZCA was intended to discredit arguments that strong climate policy lacked support or was allegedly too costly, economically disadvantageous, or simply impossible. In this sense, NAZCA was designed to "inspire" governments and "provide confidence to decision makers" to "take a more ambitious and bolder stance on climate change" (respondent 8). In other words, in the pre-COP21 negotiation period, the aim of the portal was to "generate the right kind of mood music to make the Paris Agreement possible" (respondent 6).

In the effort to orchestrate intergovernmental negotiations, NAZCA displayed ex ante information, that is, data reflecting estimates of the mitigation potential of voluntary climate pledges. Thus, while NAZCA set out which climate actions would be possible, the portal did not display information about whether pledges had in fact been implemented (respondents 2, 11, and 13). Drawing on Abbott and Bernstein (2015, 229), NAZCA has been conceptualized as a "meta intermediary" with actor-like qualities that sets "standards for standard setters" (Bäckstrand and Kuyper 2017, 766–768). Our case study data, however, reveal a more granular picture. Aiming for inclusiveness rather than prescribing specific standards, in practice, the criteria set out by the Champions at COP22 were applied relatively flexibly. This aligns with our interpretation of NAZCA as a data-driven recognition platform. Its primary function was to make visible the breadth and scale of nonstate actor climate commitments. The logic was to leverage the readiness of nonstate actors to address climate change within their spheres of influence to orchestrate intergovernmental decision-making.

To position NAZCA as a data-driven recognition platform, the Secretariat had to navigate limitations evident in its mandate and resources (see also Hickmann and Elsässer 2020).[12] To do so, it turned to third-party actors—known as "data providers"—who, acting as intermediaries, provided technical infrastructures and expertise to maintain the database. Aiming to reflect the diversity of nonstate actors, NAZCA received data from various data providers, each of which focused on a specific category of actors. For instance, the Global Covenant of Mayors for Climate and Energy provides information on city-level climate action, while the UN Global Compact and CDP (formerly known as the Carbon Disclosure Project) provide data on company- and investor-led actions (for an overview of data parters, see UNFCCC 2022). During this period, the Secretariat began to engage with data providers in numerous ways, including by inviting participation in surveys and engaging in technical discussions. Thus, in the pre-COP21 negotiation phase, a division of labor emerged: while data

12. United Nations Framework Convention on Climate Change, Article 8.

providers made available technical know-how and infrastructures, the Secretariat set up, strategically positioned, and managed NAZCA (respondents 2 and 3).

Post-COP21: The GCA Portal as a Tracking Tool to Orchestrate Implementation Activity

While NAZCA was used to push for ambitious intergovernmental consensus at COP21, key questions in the implementation phase relate to how to garner political support for adequate and effective climate policies and programs. In this context, data are now used with a view to orchestrate implementation efforts. The shift in the logic of data-driven climate governance is reflected in the type of data that are needed: while NAZCA displayed information relating to the potential of mitigation commitments on the basis of *ex ante* projections, the GCA Portal is now intended to display "progress data", that is, information about the extent to which voluntary pledges have actually been acted upon (respondents 10, 11, and 13). Thus, post-COP21, the intention is to move the GCA Portal from a recognition platform to a monitoring tool that tracks implementation efforts. Respondent 2 explained:

> NAZCA served its initial function as a recognition hub. But at some point … surely you will ask: "Ok, but what happened to all these commitments?" So, there is a need to provide some sort of accountability what is happening once the commitments have been put in place.

A first step in developing the portal into a tracking tool was to include contextual information, for example, revenue and employee data for companies and population and geographical data for cities. Contextual information is intended to enable meaningful interpretation of data and comparison across actors (respondent 2). The inclusion of contextual information thus supports the intended move from "static information", which captures ex ante the emission reduction potential of nonstate actor commitments, to "progress information", which evidences the actual progress of implementing these pledges over time (ex post). Respondent 3 described the vision for the GCA Portal as a tracking tool:

> Technical people working in relevant ministries should be able to look to the platform as a source of information about what is happening in their countries … That could provide enough information to guide action [from governments] in terms of which policies will need to be implemented.

Several respondents explained that data displayed by the GCA Portal could eventually help actors to "connect" (respondents 6, 8, and 13). As an intermediary, the platform is intended to create a feedback loop: it regularly receives and organizes data as policy-relevant information to "manage" (Abbott et al. 2015, 11), by way of animating and facilitating, state and nonstate activity in the implementation arena (see Figure 1). Specifically, ex post progress information is seen not

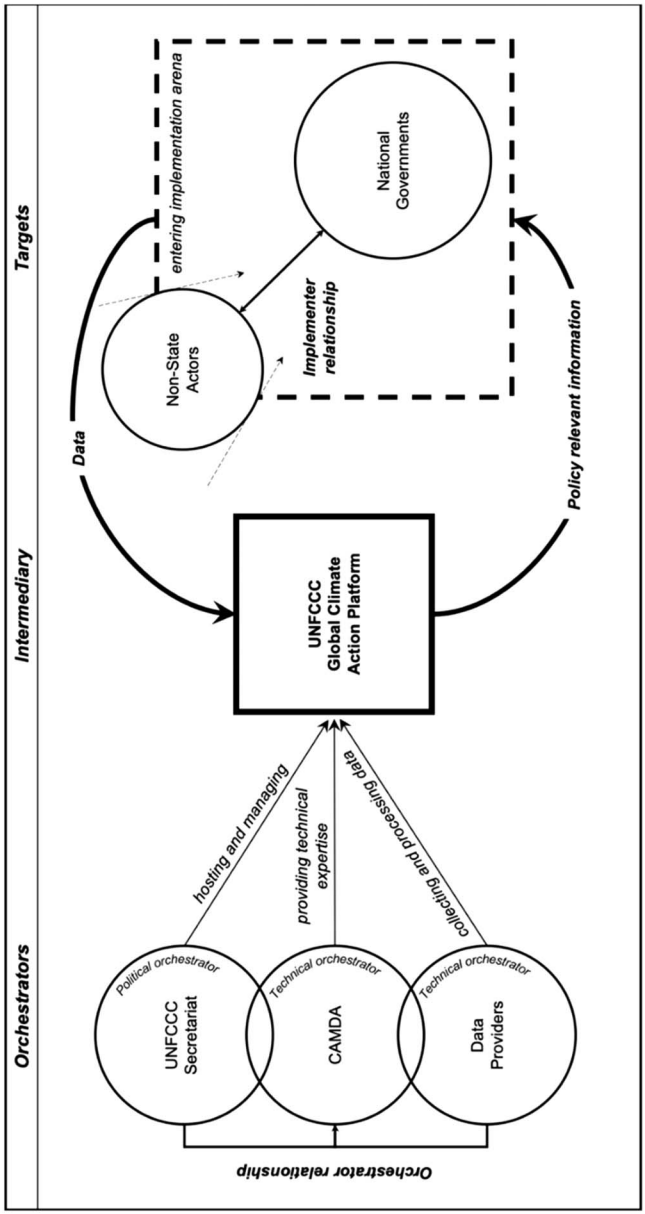

Figure 1
Data-Driven Orchestration Dynamics in the Post-COP21 Climate Regime

only to increase transparency, accountability, and credibility but also to facilitate learning, knowledge integration, and collaboration (Hale et al. 2020). The implementer relationship, to be facilitated through orchestration activity, thus comprises cooperative partnerships between nonstate actors and national governments. This aligns with research suggesting that strong domestic climate policy supports nonstate climate action, and vice versa (Andonova et al. 2017; Kahler 2017). Respondent 9 explained how nonstate actors can inspire domestic climate action:

> They [nonstate actors] can be kind of an advance guard of where they want to go … These signals … can then push governments further and faster towards taking action on climate change than they otherwise would have done. That is the sort of a strange state of affairs, but that is how we found it to play out.

Thus, while states are tasked with incentivizing and supporting implementation through adequate regulatory frameworks, nonstate actors are expected to directly contribute to mitigation, adaptation, and financing efforts. As Falkner (2016, 1123) explains, "governmental regulation can provide a supportive regulatory framework, but it is companies that decide on the direction of technological innovation, R&D expenditure, and investment flows." As such, in the post-COP21 implementation phase, nonstate actors have entered the implementation arena, taking up an integral function next to national governments.

Building on the division of labor between the Secretariat and data providers that emerged pre-COP21, we conceptualize their roles in the post-COP21 orchestration setting as follows: while the Secretariat functions as the political orchestrator, data providers and CAMDA can be conceived as technical orchestrators (see Figure 1). Political orchestration involves providing authority and legitimacy, convening relevant stakeholders, managing the portal, and hosting it on the UNFCCC web pages. In so doing, the political orchestrator strategically positions the database and provides for global visibility. The clout of the Secretariat, as an international bureaucracy embedded in the UN system, is seen as key for successful political orchestration (respondents 7, 9, 17, and 20). Meanwhile, data providers and CAMDA, as technical orchestrators, provide know-how and resources to maintain the portal. As described in the preceding section, CAMDA functions as a forum that convenes technical experts, data providers, and Secretariat staff, who collaborate to develop methodologies and metrics to track nonstate actor implementation activity. Contrary to their role as intermediaries in the pre-COP21 period, data providers now directly work with the Secretariat through CAMDA and can therefore be perceived as orchestrators in their own right. Importantly, it is only if political and technical orchestrators work together that data-driven governance arrangements can be operationalized. Without data providers, the GCA Portal would not have any data to display, and without CAMDA, there would be insufficient technical expertise to develop required methodologies and metrics. Likewise, without

the clout of the Secretariat, the portal would have to find other ways to gain visibility and resonance in the climate regime. The relationship between orchestrating actors is thus best characterized as one of direct collaboration and mutual dependence.

Assessing Data-Driven Climate Governance in the Post-COP21 Implementation Phase

In the post-COP21 implementation phase, data-driven climate governance can foster collaboration between states and nonstate actors in two ways. First, progress data demonstrates—in quantitative terms—to what extent nonstate actor climate action contributes to reaching the Paris Agreement goals. Second, data explicates the extent to which nonstate actors are receptive to climate policies. A large number of registered actions signals a "can-do" attitude to political decision makers (respondents 2, 3, and 14). Accordingly, data-driven governance may allow national governments to learn about nonstate climate action and gain confidence that relevant political interventions will fall on fertile ground, thus creating the conditions for increasing political feasibility of ambitious domestic climate policy (see also Gilligan and Vandenbergh 2020; Hale et al. 2020). The theory of change underpinning data-driven governance can thus be described as a "virtuous cycle"—a dynamic of mutually reinforcing implementation activity that spans jurisdictions and scales of governance. Accordingly, data sharing by private-sector and government entities is intended to lead to increased confidence in the counterpart's readiness to take required action: "bold government policies and private sector leadership reinforce each other, and together take climate action to the next level" (Dickerson et al. 2018, 2).

However, it is yet to be seen how effective the GCA Portal will be in orchestrating implementation activity. A recent review of NDCs suggests that "there is scope for countries to broaden their linkages to NSAs [nonstate actors] … to further catalyze engagement" (Hsu et al. 2019, 443). When updating NDCs, national agencies could eventually use nonstate actor data to understand how economic sectors and subnational authorities can contribute to meeting domestic climate targets. If a future version of the GCA Portal provides such data, it will help countries—especially those that lack resources—to access relevant information (Röser et al. 2020, 421–423). Analytical and conceptual work to operationalize data-driven climate governance is ongoing. CAMDA has set itself the goal to develop "draft plans for a framework for tracking individual and cooperative actions" and to "increase interchangeability of data between providers" to "optimize data flow" (UNFCCC 2019a). This requires the group to tackle both conceptual and practical issues that have to date been inhibiting the portal's progression into a tracking platform.

While data-driven governance entails opportunities for facilitating global efforts to respond to climate change, it is crucial to acknowledge its limits. First, it will be key to ensure that data are accurate, global, and meaningful. "Patchy

reporting" and inconsistent metrics and disclosure methodologies mean that available data are not always comparable and up to date (Hsu et al. 2016a, 303). Addressing these issues requires suitable metrics and reporting infrastructures, that is, IT systems that allow the processing of large amounts of data (respondent 2). While progress has been made in formulating appropriate metrics and reporting methodologies (see Hale et al. 2020), it is still unclear how nonstate actors from countries with limited financial resources and little technical expertise can be supported (respondents 20, 21, and 22). Furthermore, it is essential to acknowledge that data-driven climate governance conforms to Western logics and as such is not universal. Respondent 5 noted:

> Disclosure is obviously very centered in the Western hemisphere. If you look at NAZCA, at the moment … you see a map that has a massive energy towards Europe and North America. When it comes to other regions, there are huge gaps.

Thus, strategic engagement with a more diverse set of actors is needed. If data-driven climate governance is to be effective, credible, and legitimate, ensuring participation across all regions and actor groups will be key.

The second limitation of data-driven governance revolves around the notion that data will not "do the job" on their own. Simply providing information cannot—by itself—shift the political and economic parameters by which decision makers allocate resources and formulate policy. As Aykut and colleagues (2020, 13) note, "It might be overly simplistic to assume that highlighting private climate action would automatically increase state ambitions. While the focus on businesses and cities may momentarily divert public attention away from state commitments, it clearly was not sufficient to unlock political stalemate." As such, in addition to data itself, facilitative mechanisms are needed. These could include regional and national programs that have the potential to link government and nonstate actor activities. As Chan and colleagues (2021, 10) convincingly argue, due to their proximity to "specific implementation contexts and policy demands", regional and national platforms and programs are likely to be more effective in encouraging and facilitating cooperation between governments and nonstate actors. Furthermore, data-driven climate governance could be more explicitly linked to other policy priorities, highlighting, for instance, synergies with issues that are likely to resonate with both government and nonstate actors, including energy, food and water security, and human and ecological health (see Chan et al. 2021).

Finally, "datafication" processes are rarely as complete and accurate as may be assumed, thus raising questions about how to acknowledge and deal with inbuilt uncertainties, false assumptions, and prejudices. In other words, there is a need to critically engage with the assumption that data are "neutral". Data collection and processing activities are based on embedded normative judgments as to what counts and what does not. Data, therefore, are political and must be recognized as such (see Ellis 2020). Failure to do so risks undermining

not only the effectiveness but also the credibility and legitimacy of data-driven climate governance. Furthermore, it is necessary to explicitly acknowledge that the GCA Portal currently privileges implementation actions that can be quantified, while other contributions, such as those relating to more lateral impacts (e.g., diffusing best practices, organizational learning, and knowledge transfer), may not be easily captured (van der Ven et al. 2017). An important question, thus, is how data-driven governance may be complemented with mechanisms that acknowledge implementation activities that do not fit standardized reporting formats (respondent 14).

Conclusions

In this article, we empirically investigated, conceptualized, and assessed data-driven governance arrangements in the UN climate regime. Adopting a case study approach, we traced the evolution of NAZCA and its successor, the GCA Portal, between 2013 and 2021. Our analysis details how the evolution of the portal reflects the broader trend of increasing nonstate actor involvement in the climate regime. Furthermore, it provides an empirical analysis of how the portal has evolved to account for the shift in focus that occurred with the adoption of the Paris Agreement at COP21: from orchestrating intergovernmental negotiations to orchestrating state and nonstate actor implementation activities. Seeking to conceptualize data-driven governance arrangements in the post-COP21 implementation period, we analyzed how the Secretariat, as a political orchestrator, strategically positions and manages the database, while data providers and CAMDA, as technical orchestrators, provide data, technical know-how, and IT infrastructures to support the platform. We suggested that, in the post-COP21 context, the portal is now intended to document state and nonstate actor implementation activity. Finally, we highlighted the potential of data-driven climate governance, while also discussing important limitations, including those relating to participation, access, legitimacy, and effectiveness.

To conclude, we identify three lines of future research. First, in light of the ongoing evolution of the GCA Portal, empirical and conceptual questions will arise regarding the development of orchestration dynamics over time. For instance, with the recent reconstitution of CAMDA, it remains to be seen how the relationships and dynamics between orchestrating actors will further evolve. In addition, it will be key to investigate whether, and in what ways, the GCA Portal will relate to the first Global Stocktake—the next key milestone in implementing the Paris Agreement. Recent announcements by the Champions suggest that the GCA Portal will have a role to play in this respect (UNFCCC 2021a). Moreover, future research may provide insights regarding the pathways, impacts, and effects of data-driven governance. In this context, the global perspective provided in this article could be complemented with regional and local case studies. Second, as our assessment of the potential and limitations of data-driven climate governance shows, future research should include not only

empirical and conceptual approaches but also critical perspectives. Specifically, it will be key to consider issues around participation and how to bolster the inclusiveness of data-driven climate governance. And third, technological advancements, such as real-time satellite-based emission tracking technologies and intelligent data-processing systems, including machine learning, will shift reference points as to what is regarded as technologically feasible. These developments will raise questions regarding the agency of data and data-processing infrastructures and their roles in developing adequate governance responses to planetary change.

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