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A new way forward for ocean-climate policy as reflected in the UNFCCC Ocean and Climate Change Dialogue submissions

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ABSTRACT

The ocean plays a central role in climate change mitigation and adaptation. However, climate and ocean policies have been historically siloed. After decades of slow convergence, the Ocean and Climate Change Dialogue, decided at COP25 and launched online in December 2020, was the first forum for Parties and non-Party stakeholders to the UNFCCC to give their perspectives on how the climate regime should address ocean-related mitigation and adaptation. The Ocean Dialogue was informed by 47 prior open submissions provided by a broad swath of actors from across the UN system and from civil society, including traditional and youth voices. Our analysis of the submissions demonstrates a political evolution towards the nexus among climate, ocean, and biodiversity regimes. The submissions uniformly acknowledge that ocean and climate systems are inextricably linked, and that consideration of ocean-based action will strengthen climate action and *vice versa*. Salient themes of the submissions include changing ocean impacts, carbon sinks and blue carbon opportunities, and the need for ecosystem resilience, biodiversity management and improved understanding of normative and institutional frameworks. There is a strong call to recognize the interconnectedness of the biophysical world. Similar themes emerged during the actual Ocean Dialogue and the subsequent informal meeting on next steps. The main message conveyed is the dire necessity to implement strong stewardship and good governance of the blue planet in a disrupted climate using cooperative and concrete actions. This analysis highlights the need for a continued transdisciplinary international dialogue on the ocean and climate change which elevates the ocean-climate-biodiversity nexus via collaborative science, finance, and policy.

Key policy insights:

- Ocean and marine ecosystem impacts of climate change were widely acknowledged, and referenced by ninety-one percent of submissions.
- After decades of slow integration of ocean into climate policy, the Ocean Dialogue submissions acknowledge that climate policy must address linkages with the ocean and its biodiversity.

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- Concerns include changing ocean impacts, carbon sinks and blue carbon opportunities, and the need for ecosystem resilience, biodiversity management and increased institutional interactions.
- Continuation of this Dialogue, with strengthened collaboration between States and non-state actors, may give rise to multilateral and multilevel decision-making toward sustainable climate, ocean and biodiversity action.

1. Introduction

This paper is inspired by a pivotal moment in informal ocean-climate policy: the coming together of three previously siloed policy agendas – those of international ocean, climate, and biodiversity management. Covering 70% of the planet, the ocean underpins the Earth's climate system, and is a critical element in the Earth's response to rising greenhouse gas (GHG) levels in the Anthropocene. The ocean moderates global warming by absorbing ~93% of the excess heat and ~26% of the excess CO_2 from the atmosphere. However, ocean ecosystems suffer the consequences of this buffering capacity with ocean acidification, ocean deoxygenation and many other complex changes in ocean dynamics (Bindoff et al., 2019).

We provide a background on how the ocean is recognized in climate policy. We then provide an overview of the 47 voluntary submissions received by the UNFCCC, in advance of the December 2020 Ocean and Climate Change Dialogue (hereafter referred to as the Ocean Dialogue)[1] and consider how the Ocean Dialogue (SBSTA, 2020, 2021) was responsive to the submissions (OCP and Rare, 2020). This qualitative and quantitative analysis is meant to inform a wide audience of readers whose interests and work intersect with the ocean-climate-biodiversity nexus.

2. The incremental convergence of ocean and climate international policy

The last half decade has seen heightening awareness of ocean issues within the sphere of climate policy. This recognition has evolved from isolated mentions to a push toward more convergence between climate and ocean governance. The 1992 United Nations Framework Convention on Climate Change (UNFCCC) and its subsequent treaties represent an almost-universal architecture of international law through which Parties (i.e. States that have consented to be bound thereto) work to reduce GHG emissions and adapt to climate change. In a spirit of wider participation, non-admitted entities (those that have not completed the admissions process to become official observers) qualified in matters covered by the UNFCCC are sometimes allowed to participate in sessions of the Convention bodies such as the Ocean Dialogue. Non-Parties include observer States and observer organizations whose representatives are entitled to participate in the UNFCCC process by informing it, but without voting rights or decision negotiation privileges. In addition to observer States, non-Parties encompass a wide range of admitted organizations (those that have been granted official observer status), such as Specialized Agencies from the United Nations system, other Intergovernmental Organizations (IGOs), and Non-Governmental Organizations (NGOs).[2]

The UNFCCC explicitly mentions possible adverse effects of sea level rise on islands and coastal areas in its preamble (Recital 12 Preamble) and of 'integrated plans for coastal zone management' in Article 4(1) (f) and (e), as well as acknowledges the ocean mainly through the 'narrow but significant prism' of sinks and reservoirs of GHGs (Guilloux & Schumm, 2016). Nevertheless, the ocean historically received little attention at the annual Conference of Parties (COP), both at the official negotiations and at its side events (Eddebbar et al., 2015; Galland et al., 2012). This marginal consideration of the ocean by international climate law can be explained by the broad scope of the UNFCCC and the fact that these multilateral climate negotiations have traditionally focused on the anthropogenic nature, causes and consequences of climate change on the atmosphere, terrestrial ecosystems and the economy (Guilloux, 2020). Early peripheral discussions of the ocean in climate policy focused on mitigation (Freestone, 2009; Galland et al., 2012; Rayfuse & Scott, 2012). Historically, national delegates have generally demonstrated a lack of political will in putting ocean-related issues on the international climate policy agenda, possibly as a result of limited

understanding about the role of the ocean within the global climate system and because it would add highly contested issues, such as finance or technology transfer, to an already complex process (Schuchmann, 2018).

In 2015 at COP21, some State and non-State actors voluntarily brought ocean-based solutions into the political debate, in the context of scalable strategies to mitigate and adapt to climate change.[3] The resultant Paris Agreement (PA) sets the ultimate goal of limiting global warming to 'well below 2°C' and ideally 1.5°C (Article 2 (1)(a)), elevating for the first time the *importance of ensuring the integrity of all ecosystems, including oceans* (Preamble, Recital 13). This Recital responds to a long-standing concern that marine biodiversity and ecosystem integrity risks were not being sufficiently considered by Parties when contemplating climate action (Carazo, 2017). Nevertheless, this singular mention of the ocean remains essentially political, having had little-to-no concrete legal effect (Guilloux, 2020). More concretely, Nationally Determined Contributions (NDCs) pledged by Parties under the PA, reflect increasingly ambitious commitments to reduce domestic GHG emissions and adapt to the adverse effects of climate change according to national circumstances (Art. 4 PA) and provide a valuable look into ocean-related challenges, priorities, and opportunities. The first round of NDCs revealed that 70% of submitted NDCs included ocean or marine issues, with more emphasis on adaptation than mitigation activities (Gallo et al., 2017).

Following COP21, interest in mainstreaming the ocean into climate negotiations grew. In 2016, governments solicited the Intergovernmental Panel on Climate Change (IPCC) to prepare a Special Report on the Ocean and Cryosphere in a Changing Climate (IPCC, 2019). At COP22, regular 'Ocean Action Days' organized by the Global Ocean Forum were moved from the public 'green zone' into the official 'blue zone' venue, offering increased visibility and closer access to influential stakeholders of the COP. Additionally, a multi-stakeholder initiative that included governments, international agencies, NGOs, scientific institutions and the private sector launched the 'Roadmap to Oceans and Climate Action' (ROCA).[4] At COP23, Fiji's Presidency unveiled the 'Ocean Pathway' with the objectives of increasing consideration for the ocean within the UNFCCC process and raising action in priority areas impacted by ocean and climate change.[5] It also proposed the 'Talanoa Dialogue' to help Parties, through an interactive dialogue based on the Fijian tradition, to prepare their NDCs and to enhance pre-2020 implementation and ambition.[6]

COP25, the last COP before the onset of the COVID-19 pandemic, was labelled by its Chilean Presidency as the 'Blue COP', with the aims of building political momentum to 'oceanize' the climate debate and to address the ocean-climate nexus in a more synergistic manner (Guilloux, 2020). COP25 hosted over 100 ocean-relevant side events and press conferences, covering topics such as ocean-based solutions, fisheries, maritime transport, maritime boundaries, ocean management, and ocean governance. In accordance with the outcome of the 50th meeting of the Subsidiary Body for Scientific and Technological Advice (SBSTA), the theme of 'oceans, coastal areas and ecosystems, including mega deltas, coral reefs and mangroves' was also discussed during the 13th Focal Point forum of the Nairobi Work Programme on impacts, vulnerability and adaptation to climate change (Doc. FCCC/SBSTA/2019/INF.1 (11 June 2019), paras. 30 and 31).

Thanks to the mobilization of civil society and the political support of ocean-dedicated Parties (especially, Chile, Monaco, Costa Rica and Small Island Developing States (SIDS), despite initial opposition from some others (Brazil, Argentina, Saudi Arabia and the Russian Federation)), the Chile-Madrid Time for Action decision welcomed ocean-relevant efforts from the IPCC and the President of COP25 (Decision 1/CP.25 (16 March 2020), para. 6 p. 2 para. 30, p. 4). Parties consequently requested the chair of the SBSTA to convene at its fifty-second session a dialogue on the ocean and climate change (Decision 1/CP.25 (16 March 2020), para. 31, p. 4.). The SBSTA dialogue format was designed as a space to exchange best information, knowledge, and practices to inform and facilitate the implementation of the UN treaties by Parties and non-Party stakeholders on a basis (*ad hoc* or regular) to be defined. In response to the COVID-19 pandemic, the Ocean Dialogue was held as part of the virtual UN Climate Change Dialogues 2020.[7] The Ocean Dialogue, and the voluntary submissions thereto, represent the first UNFCCC-wide opportunity for both Party and non-Party stakeholders to weigh in on the consideration of ocean-related issues in the climate negotiations (see also, Post (2019), OCP and Rare (2020), and SBSTA (2020)).

3. Methodology

The Ocean-Dialogue presents an inaugural opportunity to gauge how a diversity of UNFCCC actors perceives the ocean and how they wish to shape action at the climate-ocean intersection. In advance of the Ocean Dialogue (held virtually on 2–3 December 2020), our analysis evaluated the 47 electronic submissions by systematically identifying key themes (as reflected in the text), as well as specific subtopics within each theme. Each submission was independently reviewed by one natural scientist and one expert in law or policy. Themes and subtopics were predefined and then their appearance was quantified for: frequency of occurrence (expressed here as a percentage of all submissions that included each theme or subtopic), the average number of mentions per submission (for those addressing the theme or subtopic), and the context in which each topic was considered. Totals for each submission were averaged across the two reviewers to decrease biases from individual-level differences in annotation. Following the initial annotation, select submissions were revisited to extract narrative or anecdotal examples to illustrate the treatment of specific themes and subtopics. In Appendix 4 we compare party submissions to the Ocean Dialogue to those Parties' respective treatment of the ocean in their initial NDCs, using data presented in Gallo et al. (2017).

Since the UNFCCC encompasses a diversity of constituencies with different degrees of representation and rights, submissions were divided into two categories: Party submissions (those by Parties or groups thereof) and non-Party submissions. The use of this broad division in our analysis was intended to examine if Parties who are legally entitled to decide on new binding rules for the application of climate treaties (and to whom those rules will subsequently apply) prioritize different issues in their submissions than non-Parties. The non-Party category includes submissions by UN system organizations and agencies (referred to as UN system entities), UNFCCC-admitted IGOs and NGOs with observer status, and non-admitted NGOs (Figure 1). In the run-up to COP26, this examination sheds light on how non-Party submissions could influence, contribute to, or inform future Party decisions on climate-ocean interactions.

Here we draw some qualitative comparisons between the topics emphasized in the 47 submissions and those presented at the Ocean Dialogue event during the plenary sessions, participant inputs, and breakout group discussions. Lastly, we compile and highlight promising recommendations and concrete suggestions extracted from the submissions, from the Ocean Dialogue event, and from an informal follow up meeting convened by the presidents of COP 25 and 26 on 29 June 2021. Appendix 1 contains a glossary of acronyms appearing in this paper. Appendix 2 (with figures numbered as A2.1 through A2.11) contains additional visualizations

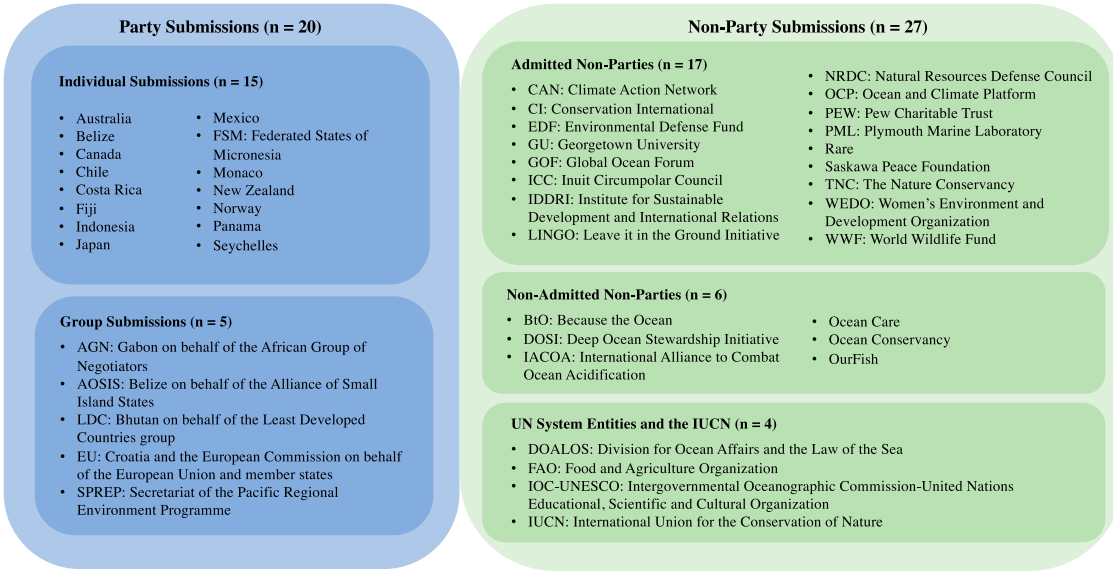

Figure 1. Categories of submissions to the ocean and climate change dialogue.

of the analyses discussed in the paper. The raw data used to compile the figures are available in Zenodo (Dobush et al., 2021).

4. Results

4.1. Key submitters

In 2020, the UNFCCC welcomed submissions by both Parties and non-Party actors for suggested priority areas and ideas for the Ocean Dialogue. The 47 submissions received to guide the creation of the Ocean Dialogue illustrate the diversity of ocean-climate stakeholders and the diversity of regimes involved (Figure 1).

Among the submissions, 20 were made by Parties, individually or as groups, including LDCs, AOSIS, and AGN (for acronyms, see Figure 1). Additionally, we considered the joint submission by the OPOC/SPREP as a Party submission, since it represents the interests of a number of Pacific Island States. Combined, the Party submissions represent approximately 120 out of 197 UNFCCC State Parties and out of 146 coastal and archipelagic States worldwide. The vast majority of submitting Parties are either coastal (e.g. Mexico, Monaco, Gabon) or archipelagic States (e.g. AOSIS and most of the OPOC/SPREP members) including Parties with extensive marine spaces (archipelagic waters and/or Exclusive Economic Zones [EEZs] and continental shelves) such as Canada, Australia, Chile, Indonesia or Fiji. Many of the Parties providing individual submissions have a long history of strong ocean management and policy (e.g. Canada, Japan, Chile, Australia, Costa Rica, Indonesia). However, input from several major coastal Parties was notably absent (e.g. China, India, Brazil, the Russian Federation, and the USA). Individual submissions were made by both developed (6 submissions) and developing countries (9 submissions), as based on Annex 1 classification. However, no individual submissions were made by any of the 49 countries classified as least developed (LDCs), and the submissions by Bhutan on behalf of the LDCs and Gabon on behalf of the AGN were the shortest submissions received (1 page).

Four UN system entities offered submissions: IOC-UNESCO, DOALOS, FAO, and the IUCN.

An additional 23 submissions came from NGOs, among them academic institutions and both admitted and non-admitted observer organizations. One joint submission represented the scientific networks of the DOSI/DOOS. Many of these NGOs have shown a longstanding commitment to ocean and climate policy (e.g. GOF, OCP, PML). Other submitters with established involvement in international environmental and climate policy are increasingly interested in the ocean-climate interface within the UNFCCC process (e.g. WWF, TNC). There were also submissions by several NGOs centred on fisheries, the energy sector, the deep sea, or other specific foci that are emerging into the climate-ocean policy scene.

Both NDCs and the Ocean Dialogue rely on 'submissions', but these documents do not have equal legal force, object and purpose, nor level of participation. We found no clear pattern connecting the weight that a Party gave to the ocean in its first NDC submission ('Marine Focus Factor' as identified in Gallo et al., 2017) and the likelihood that it submitted voluntary comments to the Ocean Dialogue. Interestingly, there is a subgroup of Parties whose 2015 NDC submissions did not discuss coastal or ocean issues, but that submitted robust Ocean Dialogue recommendations (e.g. EU, New Zealand, Norway, Federated States of Micronesia [FSM]). This positive evolution in positioning the ocean-climate nexus can be attributed to many factors, including shifting diplomatic priorities as well as political and legal implications of NDCs and the Ocean Dialogue.

4.2. Salient themes arising out of submissions

Salient themes emerging from our assessment of the Ocean Dialogue submissions are discussed below. Categorically, these are grouped into Ecosystems and Biodiversity, Regime and Policy Interactions, and Cross-Cutting Issues. Certain themes were mentioned by 85% or more of submissions, including: climate normative and institutional interactions, ocean management for biodiversity, ecosystem services, ocean and ecosystem impacts, blue carbon, and scientific research, observing, and monitoring (Figure A2.1). The diversity of submission themes demonstrates the complexity of ocean uses and services, the multiple ways in which they intersect with climate change adaptation and mitigation, and the various policy interactions they imply. These policy

interactions are complementary, rather than mutually exclusive, articulating the complex cause-and-effect relationships linking ocean and climate issues through framing, scoping, decision-making, and implementation (Guilloux, 2020; Oberthür & Gehring, 2006; Van Asselt, 2014).

4.2.1. Ecosystems and biodiversity

4.2.1.1. Ocean and ecosystem impacts. Ocean and ecosystem impacts of climate change were referenced by ninety-one percent of submissions (Figure A2.1). These impacts were mentioned an average of 15 times per submission (Figure A2.2). Within the ocean and ecosystem impacts category, ocean warming (70%), ocean acidification (64%), and sea level rise (64%) received the most attention across submissions (Figure 2a). Impacts to the ocean's ability to uptake carbon (51%) or heat (45%), ocean deoxygenation impacts (45%), coral reef impacts (43%), extreme events (38%), general ecosystem impacts (36%), mangrove impacts (36%), and the impacts of species redistribution (34%) were considered by more than a third of the submissions (Figure 2a).

Ocean and ecosystem impacts were more frequently considered in submissions by non-Parties compared to Parties; this was especially true for certain categories such as impacts of species redistribution, circulation changes, deep-sea impacts, and saltwater intrusion (Figure 2a). Sea level rise, impacts to ocean circulation, and ocean acidification were referenced many times by UN system entities, and by non-Parties in general (Figure A2.3), indicating a potentially deeper look at these topics. Impacts were frequently discussed by submitters in reference to adaptation or mitigation strategies, either in reference to research needs or as a call to action. In rarer cases submitters made process-based suggestions for relevant impacts, or discussed finance needs.

4.2.1.2. Blue carbon. Blue carbon is understood as the biologically-driven carbon flux and storage in marine systems amenable to management. It was referenced in 85% of submissions (Figure A2.1), and some aspect of blue carbon was mentioned an average of 7 times per submission (Figure A2.2, A2.4). This theme was a high priority for UN agencies and non-admitted entities: IOC-UNESCO, Pew, and BtO highlighted the role of blue carbon ecosystems throughout their submissions, consistently as background information, but often in the context of action, mitigation or adaptation. These mentions indicate a recognition of the ocean as a critical sink for GHG.

Among quantified subtopics (Figure 2b), nature-based solutions (NBS) were mentioned in 64% of submissions and blue carbon ecosystems were acknowledged for their ability to sequester large amounts of carbon. Submissions recommended actions such as their conservation, restoration, and management for sustainable use and resilience. About half of the submissions (53%) specifically cited restoration and conservation of mangroves, coastal wetlands (e.g. salt marshes), and seagrasses, with watersheds receiving less attention overall (34% of submissions).

Submissions mentioning blue carbon most prominently were CI, BtO, WWF, and IOC-UNESCO. NBS were advocated by PEW, WWF, TNC, and IUCN as well as the EU and FAO. Co-benefits of blue carbon for coastal protection, fisheries, and biodiversity make it a favourable mitigation strategy, despite the limited CO_2 removed (Vegh et al., 2019). Blue carbon themes appeared most frequently as mitigation, adaptation or action items, but also in the context of research and finance needs. Submissions highlighted the Blue Carbon initiative, coordinated by CI, IOC-UNESCO and the IUCN (and supported by the International Blue Carbon Scientific Working Group), which strives to build blue carbon into NDCs, REDD+, national management plans, and financing mechanisms such as the Green Climate Fund (GCF). Key issues involved the dependence of blue carbon measures on slowing sea level rise and links to restoration efforts such as the Decade for Ecosystem Restoration.

4.2.1.3. Ecosystem services. Ecosystem services were mentioned by 94% of submissions (Figure A2.1); these impacts were mentioned an average of 13 times per submission (Figure A2.2). Among the subtopics, ocean energy was mentioned by more than half of all submissions (60%) (Figure 2c), including almost half of Party submissions, and was discussed in relative depth, with an average of 3.3 mentions per submission (Figure A2.5). The ocean energy category encompasses both renewables and innovative energy solutions as well as traditional, carbon-emitting energy sources such as oil and gas. The EU, FSM, BtO, and IDDRI focused on increased innovation in the renewables space. The EU also focused on offshore wind and discussed other

Figure 2. Percentage of submissions (total, Party and non-Party organized by colour) that include mention of subtopics related to the themes of: (a) Ocean and Ecosystem Impacts, (b) Blue Carbon and Carbon Storage, (c) Ecosystem Services, (d) Ocean management for Biodiversity, and (e) Scientific Assessments.

ocean energy alternatives. Separately, the DOSI/DOOS submission noted that expected increased reliance on land-based renewable energy could further escalate demand for critical minerals and potentially raise pressure for deep-seabed mining.

Coastline protection was mentioned by 55% of submissions (Figure 2c); the submissions with most mentions of protecting coasts were Norway, SPREP, SPF, WWF, and RARE (with 21 mentions). The SPREP submission highlighted the need for financing for Loss and Damage due to sea level rise, the importance of protecting coastal zone blue carbon sinks and other coastal ecosystem services, and of protection and adaptation for fisheries resources and communities. Almost half of all submissions (49%) mentioned maritime transport, and nearly a third of submissions mentioned marine tourism (32%) and the blue economy (28%) (Figure 2c). Certain topics received less attention: seawater desalination was mentioned only by OCP (once) and by SPREP (three times). Similarly, marine genetic resources (MGRs) were only mentioned in three submissions (Mexico, SPREP and DOSI/DOOS), despite their potential promise for climate solutions and the increased attention on the topic at the ongoing BBNJ negotiations (Tessnow-von Wysocki & Vadrot, 2020).

4.2.1.4. Fisheries and aquaculture. Fisheries and aquaculture were evaluated as subtopics under the theme of Ecosystem Services. Fisheries considerations appeared in 79% of submissions (Figure 2c), with an average of 6 mentions per submission (Figure A2.5). Thirty percent of submissions included aquaculture considerations (Figure 2d); with an average of 4 mentions per submission (Figure A2.5). Aquaculture was more frequently included in submissions by non-Parties (44%) compared to Parties (10%), whereas both groups frequently highlighted fisheries (75% Party and 81% of non-Party submissions included fisheries considerations) (Figure 2c).

Fisheries considerations were included in the context of: (1) the impacts of climate change on fisheries productivity, (2) industry supporting human livelihoods and food security, (3) being a cumulative ocean ecosystem stressor (i.e. overfishing and illegal and unreported fishing), (4) mitigation opportunity to decrease fossil fuel emissions from fisheries, and (5) policy need for more coordination between fisheries management organizations and the UNFCCC on climate and fisheries issues.

Submissions with the most consideration of fisheries included EU, Mexico, Japan, FAO, OurFish, WEDO, and EDF. Submissions with the most consideration of aquaculture included EU and SPREP, FAO, and EDF. In general, non-Party submissions tended to have more detailed information pertaining to fisheries and aquaculture. Somewhat unexpectedly, several States for which fisheries represent an important economic sector (Indonesia, Fiji, Canada, the Seychelles, and Belize) did not include fisheries considerations in their submissions. Other Parties, like Chile and Norway, referenced fisheries only in a general manner, with no specific actions relating to the Ocean Dialogue.

Fisheries' mentions had varied focal elements. WEDO focused on the role of women in fishing communities, and called for specific actions, such as including gender in data collection and ending fossil fuel subsidies to the fisheries sector. OurFish focused on ending overfishing to address the biodiversity and climate crises and encouraged Parties to include such commitments in their NDCs. FAO proposed a dialogue on climate-resilient fisheries and aquaculture as nature-based solutions to foster adaptation and mitigation, advocating for the prioritization of aquatic food production in climate conversations and upcoming UN planning processes. It noted the vulnerability of the sector as highlighted in the SROCC, and offered ongoing guidance and support for States looking to integrate fisheries and aquaculture into their NDCs or climate planning. The EU called on FAO, Regional Fisheries Management Organizations (RFMOs), and Regional Seas Conventions to coordinate and cooperate with other relevant bodies and to provide guidance on how to adjust fisheries management to account for climate change.

4.2.1.5. Ocean management for biodiversity. Among the most prevalent themes, some form of ocean management for biodiversity was referenced by 96% of submissions (Figure A2.1; A2.6); this topic was mentioned an average of 11 times per submission (Figure A2.2).

Ecosystem resilience was among the highest-priority subtopics, mentioned by 79% of submissions; biodiversity protection also had frequent mentions (74%) (Figure 2d). Both subtopics appeared as integral to climate action and adaptation, but also within the contexts of mitigation, capacity building, research, and finance. Integrated coastal and ocean management (70%), ecosystem-based management (64%), and marine protected areas (MPAs) (60%) were seen as key process and action items, with lesser attention paid to marine pollution management (40%), Marine Spatial Planning (MSP) (28%), disaster and extreme event management (26%), and strategic environmental assessment (15%) (Figure 2d). Ecosystem resilience was highlighted by organizations

such as CAN, OurFish, and PEW, while WWF and TNC prioritized integrated coastal management. The strongest advocates for MSP were Mexico, IOC-UNESCO and GOF; Chile, EU, SPREP, and BtO emphasized MPAs; and IOC-UNESCO underscored ecosystem-based management.

4.2.1.6. Science assessments. Science assessments were referenced by 83% of submissions (Figure A2.1) and were mentioned an average of 3 times per submission (Figure A2.2, A2.7). Appendix 3 provides a brief overview of the key science assessments cited in the Ocean Dialogue submissions. Submitters called for a science-based discussion, with a number of Parties requesting that part of the Ocean Dialogue include short presentations on the state of ocean science. Reference to scientific research was included in 79% of submissions (Figure 2e), and was included in both general and specific ways, via calls for action, capacity building, and in relation to mitigation and adaptation needs.

By far the most frequently referenced science assessments were those produced by the IPCC. In total, 77% of reviewed submissions referenced the IPCC SROCC, 21% referenced the IPCC 1.5°C Special Report (2018), and 9% the IPCC Assessment reports (AR5/AR6) (Figure 2e, Appendix 3). The IPCC Wetlands Supplement, the IPCC Climate Change and Land Special Report, and IPCC methodologies and guidance were also referenced in submissions.

Beyond the IPCC, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) was referenced in 23% of submissions (Figure 2e), providing recognition of the climate-ocean-biodiversity nexus in informing the Ocean Dialogue. Notably, more non-Party submissions referenced IPBES (30%) compared to Party submissions (15%), suggesting that the IPBES reports (2019) may be less recognized by State actors in the UNFCCC process. Additional scientific assessments referenced in submissions included the FAO Technical Papers 627 and 650, the FAO International Symposium on Fisheries Sustainability, the UN Oceans Conference, the Global Ocean Science report, the State of the Ocean report, the High-Level Panel for a Sustainable Ocean Economy, and reports from the World Meteorological Organization (WMO). Somewhat surprisingly, the first World Ocean Assessment (WOA1, 2016) was only referenced in 2 submissions, both from within the UN system (4%; DOALOS and IOC-UNESCO) (Figure 2e).

4.2.2. Normative and institutional regime interactions

Submitters highlighted the need for more interactions among sets of norms, decision-making procedures, and organizations coalescing around distinct functional issue areas, such as climate, ocean, biodiversity, or human rights and development, hereinafter defined as regime interactions (Young, 2012). Normative regime interactions are understood as associations between legal approaches (e.g. ecosystem-based approach), principles (e.g. cooperation), objectives or meta-norms (e.g. mitigation, adaptation, Sustainable Development Goals (SDGs)), obligations (e.g. raising NDC ambition as set in Art. 3 PA), and soft rules (e.g. BtO Declarations 2015 and 2016), that can be used to foster the Ocean Dialogue and other ocean-relevant climate processes. Institutional regime interactions are interactions taking place through coordination and cooperation between competent international organizations, treaty bodies, and mechanisms within and beyond the climate regime at the level of decision-making and implementation. Both normative and institutional interactions between climate and ocean regimes rely on knowledge being available to State and non-State actors (Guilloux, 2020; Van Asselt, 2014; Young, 2011). However, the submissions suggest that depth of understanding of ocean-climate interactions and their societal consequences may differ among actors, potentially to the detriment of 'underrepresented' issues or topics, such as the deep ocean or deoxygenation. Certain submissions exhibit a lower level of understanding or awareness of relevant existing norms, their legal force and the role of institutions in furthering the ocean-climate-biodiversity nexus (e.g. AGN, LDCs, LINGO, OurFish).

4.2.2.1. Normative and institutional regime interactions within the climate regime. Normative interactions within the climate regime were referenced in 96% of submissions (all but two submissions) (Figure A2.1) with an average of 10 mentions per submission (Figure A2.2). Unsurprisingly, given the political context of the Ocean Dialogue, the primary focus was given to interactions within the climate regime (Figure 3a). Such references included the PA or the Paris Agreement Rulebook (77%), NDCs (66%), the Global Stocktake (40%) and the

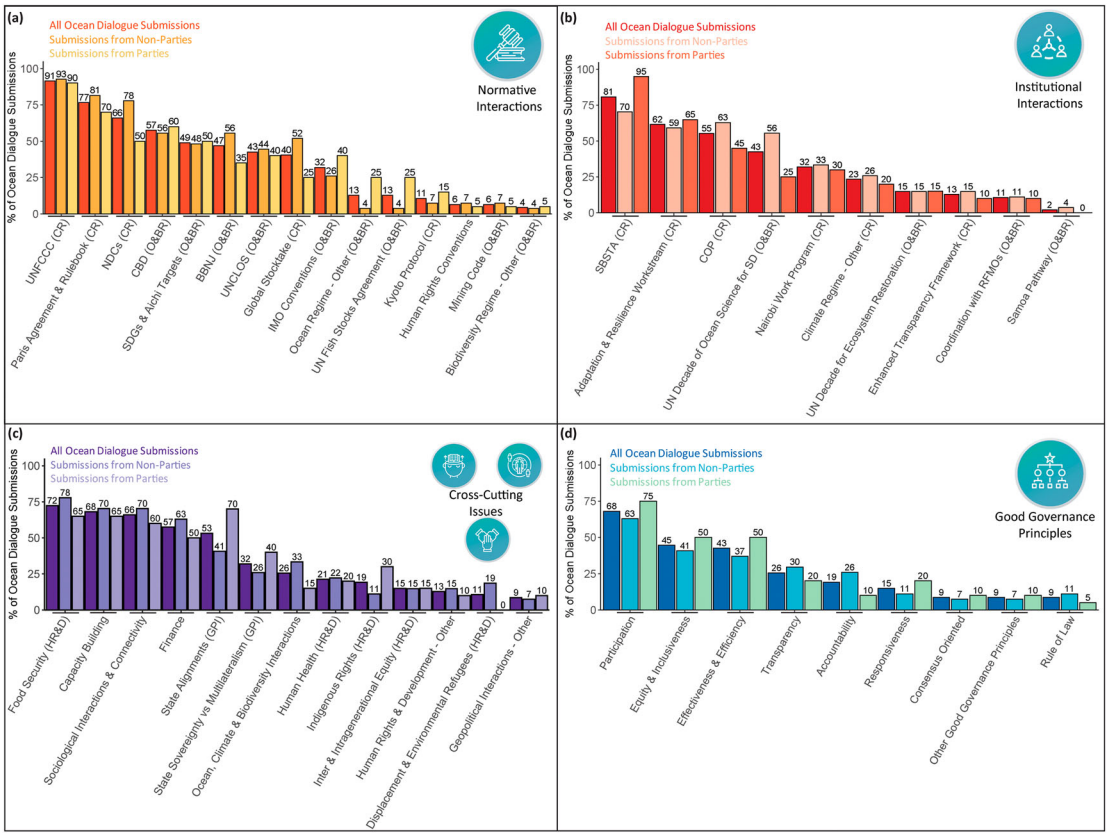

Figure 3. Percentage of submissions (total, Party and non-Party organized by colour) that include mention of subtopics related to the themes of: (a) Normative Interactions, (b) Institutional Interactions, (c) Cross-cutting Issues, and (d) Good Governance Principles.

Kyoto Protocol (11%). These were typically brought up in submissions relating to mitigation and adaptation actions, as well as in an effort to provide context to frame the submission.

Institutional interactions within the climate regime were referred to in 89% of submissions (Figure A2.1), with an average of 8 mentions per submission (Figure A2.2, A2.8). The three main institutional mechanisms most mentioned by submitters operating within the climate regime are the Science Work Stream (i.e. SBSTA) including the Ocean Dialogue (95% Party, 70% non-Party submissions), the COPs (45% Party, 63% non-Party submissions), and the adaptation and resilience work stream (65% Party, 59% non-Party submissions) (Figure 3b), which include the Warsaw Mechanism on Loss and Damage, as well as national adaptation plans. Institutional interactions are mentioned mostly in an introductory context or related to generic action. Through the lens of specific work streams on science, adaptation and resilience, process-based suggestions have also been made by submitters, especially by admitted entities, to foster synergistic interactions within the climate regime when dealing with ocean-related issues (e.g. IDDRI).

4.2.2.2. Normative and institutional regime interactions beyond the climate regime. The majority of submissions also included a focus on normative interactions with the ocean regime and/or the biodiversity regime. Institutional interactions beyond the climate regime were referenced in 47% of submissions (Figure A2.1), with an average of 2 mentions per submission (Figure A2.2). The EU, FSM, Costa Rica, DOSI, CAN, and GOF had a stronger focus on normative interactions beyond the climate regime, compared to other submissions. The strong emphasis of submissions on normative interactions between the ocean and biodiversity regimes is encouraging. Normative interactions with the ocean regime were referenced in 77% of submissions (Figure

A2.1) with an average of 4 mentions per submission (Figure A2.2, A2.9). Under the ocean regime, 47% of submissions referenced BBNJ, 49% referenced SDGs, especially SDG14 ('conserve and sustainably use the oceans, seas and marine resources'), 43% UNCLOS, and 13% the 1995 United Nations Agreement for the Implementation of the Provisions of the UNCLOS relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (Figure 3a). Less frequently mentioned legal sources that are part of the ocean regime and were included in certain submissions are: the mining code of the International Seabed Authority (ISA), Regional Seas Conventions in general, the 1996 London Protocol to the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter and the 1980 Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR).

Institutional interactions across climate and ocean regimes, such as cooperation with RFMOs, generally received less attention (Figure 3b), though institutional interactions through the UN Decade on Ocean Science for Sustainable Development (2021-2030)[8] were well represented (25% Party, 56% non-Party submissions). This lack of attention may reflect scientific uncertainty on shifts owing to climate-related changes in ocean temperature, acidity, and currents and the fact that not all RFMOs apply the best-available scientific evidence (Rayfuse & Scott, 2012). Multiple submissions invited the Ocean Dialogue to examine potential institutional synergies at the ocean-climate nexus (e.g. AOSIS, Costa Rica, Seychelles, SPREP, IUCN, Ocean Conservancy). To this specific end, Indonesia proposed that the Ocean Dialogue provide technical guidance on existing substantive and institutional arrangements by including brief presentations by representatives from relevant international organizations.

Normative interactions with the biodiversity regime were referenced in 57% of submissions (Fig A2.1) with an average of 1 mention per submission (Figure A2.2, A2.9). These include a strong focus on fostering connections with the 1992 Convention on Biological Diversity (CBD) (57% of submissions), the 2011–2020 Aichi Targets and the post-2020 Global Biodiversity Framework (Figure 3a). In contrast, normative interactions with the human rights regime were referenced in only 6% of submissions (Figure A2.1), with an average of 1 mention per submission and none related to institutional interactions (Figure A2.2). Despite the concerning ramifications between human rights and climate change (Rajamani, 2018; Roth-Arriaza, 2010), this absence in submissions may point to a lack of awareness of directly identifiable normative and institutional links.

4.2.3. Cross-cutting issues

A number of topics appeared in the context of multiple categories discussed above. They are identified as cross-cutting in that they are relevant to, affect, and cut across most or all aspects of Ocean and Climate Change action and more generally, environmental policy. These include ocean, climate and biodiversity regime interactions, capacity building, finance, geopolitical interactions, and human rights and development issues (Figure 3c). We analyze these separately below.

4.2.3.1. Ocean, climate and biodiversity regime interactions. While in the past, issues pertaining to the ocean, climate, and biodiversity were often treated in silos within the framework conventions that govern each topic (Freestone, 2021), the Ocean Dialogue submissions indicate that a more integrated or holistic approach across governance systems is necessary. This understanding is evident since 81% of submissions referred to ocean, climate, and/or biodiversity interactions (Figure A2.1) and 26% of submissions referenced the ocean-climate or ocean-climate-biodiversity 'inherent nexus' (SBSTA, 2020), which can serve as a model for further thought and action (Freestone, 2021; Guilloux, 2020; McDonald et al., 2020; Trevisanut et al., 2020). Submissions also emphasized the need to reinforce coordination and cooperation between the UNFCCC and other UN-relevant, multilateral frameworks. However, these interactions were more frequently discussed in non-Party (33%) than Party (15%) submissions (Figure 3c).

4.2.3.2. Capacity building. Capacity building is discussed in 68% of the reviewed submissions (Figure 3c), with an average of 3 mentions per submission (Figure A2.2, A2.10); the most mentions were by Chile, Panama, IOC-UNESCO, GOF, IUCN, and WWF. Technical support was highlighted as an important part of capacity building activities. Chile noted that international collaboration is key to standardizing blue carbon ecosystem management and open data sharing, and encouraged a user-friendly report of the Ocean Dialogue be produced for use

in strengthening mitigation and adaptation actions. Panama's submission focused heavily on international cooperation, noting that international scientific research is required to support science-based policies, with a focus on assistance to States that do not have the capacity for intensive study of ecosystems in under-researched areas. Panama also called for advice and experience-sharing from States that have successfully integrated the ocean into their national climate policies. Complementarily, Japan noted its willingness to share its lessons learned through various capacity building programmes.

WWF advocated for increasing the capacity of coastal developing states to respond to ocean-climate impacts through planning, education, and technology transfer. IUCN suggested stakeholders identify, support, and strengthen existing work streams within the UNFCCC realm to advance constructive action on ocean and climate. IACOA highlighted its Ocean Acidification Action Plans, which help governments identify key species, assess vulnerabilities, and develop protection strategies while engaging policy makers in leadership roles. The IOC-UNESCO noted its planned development of a State of the Ocean Report (IOC-UNESCO, 2020), which would feed into processes such as the Ocean Dialogue and provided various examples of successful capacity building efforts. GOF spotlighted development of a global capacity building programme for developing regions to implement proven ecosystem-based climate solutions.

Among the submitters that focused on the interrelated nature of capacity building and finance, GOF noted that existing and emerging finance mechanisms should be used to support capacity development in the form of sharing knowledge, tools and scientific and political expertise, and that technical assistance must be combined with financial assistance.

4.2.3.3. Finance. Finance was referenced in 57% of submissions (Figure 3c), with an average of 4 mentions per submission (Figure A2.10), but was considered more frequently and intensely by non-Parties (63%, 5 mentions per submission) than Parties (50%, 3 mentions per submission). The submissions that focused most on finance include TNC, WWF, SPF, OCP, GOF, and CI. GOF noted the need for sufficient funding to support adaptation and mitigation efforts in coastal States and SIDS, and to support those displaced as a result of climate change. OCP focused on using all available tools, including finance, to protect 30% of the ocean by 2030. Their submission advocated for strengthening the capacity of the GCF and encouraging philanthropic investment alongside financing with a focus on blue carbon and NBS.

Many other innovative and emerging finance mechanisms were proposed. The Seychelles referenced debt for nature swaps and sovereign blue bonds. WWF advocated for blue bonds, impact investment funds, and blended finance as mechanisms to accelerate sustainable finance. IUCN highlighted 'blended finance solutions that can help de-risk blue infrastructure investments' and noted the need to direct funds away from infrastructure investments with negative or unclear impacts on nature. OCP called for the consolidation of climate financing mechanisms and the standardization of carbon pricing. Many of these mechanisms were echoed recently by the High-Level Panel for a Sustainable Ocean Economy (Sumaila et al., 2020). Parties (including the Seychelles and FSM) as well as non-Parties (including CI, IUCN, and TNC) suggested that the ocean-climate work of the Ocean Dialogue be continued at the next meeting of the Standing Committee on Finance.

4.2.3.4. Geopolitical interactions. Geopolitical interactions were referenced in 70% of submissions (Figure A2.1), with an average of 2 mentions per submission (Figure A2.2). Geopolitical interactions refer to interactions within and beyond the climate regime based on both geographic and political features for the determination of the strategic positioning of States on the international scene and, especially within the framework of the climate regime as Parties or observers. In the context of the Ocean Dialogue, 5 submissions have been presented collectively by Parties as State members, either of groups or alliances of States (Gabon on behalf of the African Group, Bhutan on behalf of the LDCs Group, Belize on behalf of AOSIS), or of regional (intergovernmental and/or supranational) organizations (the EU and SPREP/OPOC) according to shared socio-ecological circumstances and political interests (e.g. SIDS). In the submissions themselves, Parties highlighted specific interests on the basis of their sovereignty or exclusive rights (e.g. food security) or because of their membership in geopolitical groupings. For example, the African Group of Nations requested the representation of regional groups in the dialogue (OCP and Rare, 2020, p. 4). Other coalitions or alliances of States and/or non-State actors gathered on the basis of a shared concern of advocating for a mutual reinforcement of ocean and climate

regimes have also filed submissions (e.g. BtO). In general, State alignments were mentioned directly or indirectly in 53% of submissions (by twelve States, two UN entities, eight admitted entities and one non-admitted entity).

4.2.3.5. Human rights and development issues. Human rights and development issues were referenced in 79% of submissions (Figure A2.1), with an average of 4 mentions per submission (Figure A2.2). As a 'regime complex' (Keohane & Victor, 2011), the climate regime is prone to virtually encompass all sectors of sustainable development or to coordinate or cooperate with other regimes and fields of international law, such as human rights. Some submissions prepared after the start of the COVID-19 pandemic also emphasize human or 'one health' as a contextual or disruptive parameter of the Ocean Dialogue (e.g. EU, New Zealand, and Norway). Human rights issues were also highlighted in additional input received following the Ocean Dialogue, for example in a submission by WEDO.

Seventy-two percent of submissions (Figure 3c) evoked food security alone or in connection with poverty reduction or employment mostly from a contextual angle, with the exception of FAO, whose mandate includes action in this issue-area. Food security is a particularly important issue for coastal and island communities and States where climate change disrupts sustainable access to food from fisheries or aquaculture, and livelihoods via sea level rise and extreme weather events. Other themes such as indigenous rights, inter- and transgenerational equity, and displacement and environmental refugees are only mentioned by a few submitters, with a specific interest in raising these issues due to their national circumstances or to their mandate as an organization (e.g. Canada and FSM in regards of indigenous rights; WEDO concerning inter- and transgenerational equity; SPREP, FAO and GOF with respect to displacement and environmental refugees).

4.2.4. Good governance principles

As a democratic political process, the Ocean Dialogue involves fostering ocean and climate synergies for climate mitigation and adaptation, in accordance with good governance principles. Good governance principles were referenced in 83% of submissions (Figure A2.1), with an average of 6 mentions per submission (Figure A2.2, A.211). Submitters requested a Dialogue process that was equitable, allowed for participation of multiple stakeholders, was effective, transparent, responsive, followed the rule of law, and was based on accountability (Figure 3d). Sixty-eight percent of submissions envisaged the Ocean Dialogue on a participatory and/or on an equity/inclusive basis by 'putting peoples at the center' (WWF) or, at least, as taking into consideration the voices of the civil society organizations (e.g. BtO) and the communities involved (women, fishermen, indigenous peoples and coastal communities: e.g. WEDO). Mentions were made mainly in contextual or process-based contexts as follows: participation in the deliberation of the Ocean Dialogue (e.g. EU and BtO); participation in marine environment management (e.g. New Zealand and IOC); inclusiveness and equity through the co-design and co-implementation of climate- and ocean-related actions (e.g. Canada, Seychelles, IOC-UNESCO, IUCN, WWF and OC). Efficiency and effectiveness were referenced by 43% of submissions and 26% referenced transparency (Figure 3d), both of existing climate and/or ocean measures and of actions that may be identified or fostered in the framework of the Ocean Dialogue. Accountability of Parties and stakeholders in implementing outcomes of the Ocean Dialogue was also directly or indirectly mentioned in 19% of submissions (Figure 3d). Such mentions still lack an in-depth link to concrete mitigation and adaptation actions.

5. Discussion

5.1. Ocean and climate change dialogue

The structure of the 2–3 December 2020 virtual Ocean Dialogue[9] reflected submitters' focus on how to navigate the promising, but potentially overwhelming, plethora of programmes and instruments available for improving coordinated and cooperative action under the umbrella of the UNFCCC and within the broader UN system. The four breakout sessions (Strengthening Action Under the UNFCCC, Strengthening Action Across the UN System, Strengthening Action at the National Level, and Strengthening Cross-Cutting Support for Action) directly addressed submitters' calls for understanding of and collaboration across climate processes and work

streams. The breakout group on Action Across the UN System featured representatives from CBD, DOALOS, FAO, and IMO, and called for increased synergy, including through joint working groups and 'reciprocal mainstreaming' (i.e. bringing the work of complementary UN programmes and processes into the mainstream of each participant's own respective workflow).

The Ocean Dialogue advanced submitters' focus on good governance principles by including a diversity of voices. The presentations reflected the submissions' stated need to integrate such voices and to integrate diverse knowledge sources into climate-ocean-biodiversity policy (as goals to achieve) but also law (as enforceable measures). For example, keynotes included presentations by Dr. Dalee Sambo Dorough of the ICC on the profound relationship between the Inuit and the marine environment, and by Ruth Mthembu of WILDOCEANS South Africa on the YouthforMPA programme, which advocates for the expansion of MPAs in South Africa.

The Ocean Dialogue echoed the 57% of submissions that discussed finance, calling for public leadership to direct private finance and to spearhead concessional or blended finance to be attractive to private investors, including by realigning global finance to reflect conservation objectives and the preservation of the blue planet on which all life depends. There was broad agreement that such discussions should be continued at the 2021 meeting of the Standing Committee for Finance.

Ocean Dialogue participants called for further integration of the ocean into NDCs, as well as for examples of how to successfully do so from States who have already considered ocean-related climate actions (Gallo et al., 2017; Guilloux, 2020). Some updated or new NDCs that were submitted in 2020 mention ocean-based solutions and co-benefits as 'entry points' to better link the conservation of marine biodiversity to the mitigation of and adaptation to climate change (e.g. Costa Rica and Monaco).[10] While it remains to be seen how the Ocean Dialogue will influence future NDC submissions, we hypothesize that it will lead to countries submitting NDCs with more ocean-related climate actions. We expect this because 66% of Ocean Dialogue submissions referenced the NDC process (Figure 3c), with some submissions specifically asking for additional guidance. The Ocean Dialogue was responsive to these requests, and devoted one of the four sessions to the topic of Strengthening Action at the National Level, including within NDCs. Unlike the first round of NDCs (Gallo et al., 2017), in which countries had little guidance on how to include ocean actions with their climate plans, substantially more guidance is available now (Gattuso et al., 2019, NDC Partnership resources, Ocean Dialogue resources), and awareness about the ocean-climate nexus has grown. We expect this will be reflected in future NDC submissions that will include more specific ocean-based mitigation and adaptation plans, for example nature-based solutions such as blue carbon ecosystem restoration and climate-smart MPAs, or offshore renewable energy generation via wind and algal biomass. Though Parties were requested to provide updated NDCs by 2020, according to the UNFCCC NDC interim registry, as of July 2021, only about half have submitted new or updated first NDCs or second NDCs. The Ocean Dialogue process may thus inform those NDCs still in preparation.

5.2. Next steps and a way forward

An informal follow up to the Ocean Dialogue was sponsored by the COP25 and COP26 presidencies to discuss next steps; this was held virtually with Party and non-Party participants on 29 June 2021. Contributors highlighted mainstreaming ocean considerations into climate actions (and vice versa), commitments by countries for financial support, and a strengthened framework for coordinated action. Chile and Mexico advocated for furthering national and regional actions. Proposed next steps emerging from the Ocean Dialogue included featuring the ocean in the Global Stocktake, continuous consideration of the IPCC Land and Ocean's reports, funding to support inclusion of land and ocean into SBI and SBSTA processes, and addressing the blue finance gap**.**

The need for science in and produced by developing countries will define the ocean-climate-biodiversity nexus moving forward. Despite the intent of the WOA1 to serve as a guide for decision-making, management, and policy development (Fawkes & Cummins, 2019), its mention in only two Ocean Dialogue submissions suggests it is an underutilized source of scientific information on the health of and changes in the world ocean for participants in the UNFCCC process. The newly released second World Ocean Assessment (United Nations, 2021), which addresses the ocean-climate-biodiversity nexus can be an important resource going

forward. However, science research and science assessments generally were mentioned by most submitters. A number of submissions requested that the Ocean Dialogue include short presentations on the underlying science, and calls for more science and dissemination thereof continue. At the Ocean Dialogue informal follow up meeting, Brazil noted that the majority of the studies cited by SROCC were from the Northern Hemisphere, and the Ocean Dialogue could be a tool to share knowledge and close this geographical gap. As noted during the Ocean Dialogue, in order to manage our one ocean as a whole, we need to close the geographic gaps in knowledge and uptake (SBSTA, 2021). The varying size of state delegations, the fraction of GDP dedicated to science, and the number of participants in IPCC assessments, may contribute to limited access and engagement with climate science.

While our analysis focused on differences between Party and non-Party views, developed and developing countries are faced with different challenges and opportunities regarding ocean-climate action. Both developed and developing countries provided individual submissions and participated in the Ocean Dialogue and the informal follow up, however, LDCs were notably underrepresented within this process, pointing to existing capacity challenges, particularly amplified by the pandemic.

Given that 50% of Party submissions referenced the need for the Ocean Dialogue process to be equitable and inclusive (Figure 3d), this is an area for future improvement. Individual submissions from developing countries focused more on incorporating ocean actions into NDCs, recognizing socio-ecological connectivity, improving capacity building, and applying MSP tools, compared to individual submissions from developed countries. A paramount outcome of the Ocean Dialogue and surrounding conversations is the need for synergy across geographies, processes, nations, agencies, and institutions that builds capacity equitably. The UN Decades of Ocean Science for Sustainable Development and on Ecosystem Restoration may provide platforms for such collaboration.

The submissions had a high focus on normative interactions in the ocean and biodiversity regimes. Continuing dialogue and action on the ocean-climate-biodiversity nexus are necessary, and will require institutions and stakeholders to be nimble and willing to collaborate in unforeseen ways. Evidence for increased transdisciplinary interaction around this nexus is the recent IPBES-IPCC Biodiversity and Climate Change workshop report, in which the ocean features prominently (Portner et al., 2021). This report brings together two domains that up to this point have been addressed independently by separate research communities and intergovernmental bodies, and highlights many of the co-benefits and trade-offs between climate and marine biodiversity that are presented in the Ocean Dialogue submissions and the event itself. The first draft of the CBD's post-2020 Global Biodiversity Framework, released July 2021 (CBD, 2021) has a target specifically focused on minimizing the impact of climate change on biodiversity, contributing to mitigation and adaptation through ecosystem-based approaches, and ensuring that all mitigation and adaptation efforts avoid negative impacts on biodiversity.

The conceptual joining of climate and biodiversity is reflected broadly in Ocean Dialogue submissions which discussed nature-based solutions, blue carbon, ecosystem approaches and ocean management (Figure 2). These connections now echo in many non-Party actions, networks (Ocean & Climate, 2021; Turley et al., 2021) and scientific publications (e.g. Sala et al., 2021). However, both normative and institutional interactions among ocean, climate and biodiversity regimes rely on a certain level of knowledge from State and non-state actors. This level of knowledge is uneven, and capacity building may be necessary for all parties to take full advantage of transdisciplinary opportunities.

6. Conclusions

The primary focus of the 47 submissions to the Ocean Dialogue was the dire necessity to implement strong stewardship and good governance of the blue planet in a disrupted climate. There were many requests for the Ocean Dialogue to be the first step in a long-term process to integrate climate, ocean and biodiversity. As of the writing of this paper, the Ocean Dialogue has not been officially reported to COP26, nor has there been formal action to continue the Ocean Dialogue as an ongoing process. However, the COP presidents' informal follow-up meeting reflected the overwhelming interest in continuing the conversation, raising the ocean profile, and enhancing ocean action.

More generally, in light of the compelling calls for international cooperation and science-based decision-making, as precisely expressed in most Ocean Dialogue submissions and at the Ocean Dialogue event, it is urgent that decision-makers consolidate stronger collaborative partnerships with scientists, to jointly create strategies aiming to solve global challenges, such as those at the heart of ocean-climate-biodiversity issues. In this context, the emerging field of science diplomacy provides a framework of practices and theoretical concepts that can help in building the necessary infrastructure for scientific advice to reach and influence policy-making, both at domestic and international scales. Among those elements are the establishment of networks of researchers, the access to cooperation funding mechanisms, the linkage with the scientific diaspora, and communication training to enable effective interfacing between the science and foreign policy communities. The multilateral climate regime, through the IPCC and SBSTA, already provides a blueprint of large-scale, politically-legitimized scientific advising (Ruffini, 2018). Combined with the tools of science diplomacy, the Ocean Dialogue process could serve as a catalyst that promotes ocean issues and ocean science, as well as increased regime interactions, improved stakeholder coordination, more equitable access to scientific research and technologies, and more ambitious agreements toward well integrated climate action and sustainability (Polejack, 2021).

We join the chorus of supportive voices calling for formal acknowledgement and continuation of the Ocean Dialogue as a next action step in a transdisciplinary, international dialogue on the ocean and climate change, creating a space where Parties and non-Party stakeholders co-design and co-implement solutions and share knowledge and experience around these solutions to elevate the ocean-climate-biodiversity nexus via science, finance, policy, and innovative collaboration. The imperative for these scientific, political, and diplomatic efforts becomes more urgent as climate change ensues.

Notes

1. A list of submitters is included as Figure 1. Further, access to all submissions to the Ocean Dialogue can be found at https://unfccc.int/sites/default/files/resource/OceanDialogue_SubmissionsList.pdf
   and a recording of the Ocean Dialogue itself can be found at https://unfccc.int/cd2020/ondemand.
2. As of 2018, over 2,200 NGOs and 130 IGOs are admitted as observers: Overview of participants at meetings and conferences in the UNFCCC process, available online: https://unfccc.int/process-and-meetings/parties-non-party-stakeholders/non-party-stakeholders/overview.
3. See, for example, the Ocean and Climate Platform and Because the Ocean Initiative, available online: www.ocean-climate.org and www.becausetheocean.org.
4. For more information, see: https://roca-initiative.com/.
5. For more information, see: https://cop23.com.fj/the-ocean-pathway/.
6. See "Overview of inputs to the Talanoa dialogue" (23 April 2018), paras. 119 and 129, 29, p. 21 and 23–24, available online: https://unfccc.int/sites/default/files/resource/Overview%20of%20inputs%20to%20the%20Talanoa%20Dialogue.pdf.
7. For more information, see https://unfccc.int/event/ocean-and-climate-change-dialogue-to-consider-how-to-strengthen-adaptation-and-mitigation-action.
8. On December 5, 2017, the UN General Assembly proclaimed a Decade of Ocean Science for Sustainable Development to be held from 2021 to 2030 under the auspices of IOC-UNESCO (A/RES/72/73). The Decade will provide a common framework to ensure that ocean science can fully support countries' actions to sustainably manage the Oceans and more particularly to achieve the 2030 Agenda for Sustainable Development. https://www.oceandecade.org/.
9. See https://unfccc.int/event/ocean-and-climate-change-dialogue-to-consider-how-to-strengthen-adaptation-and-mitigation-action.
10. NDCs accessible via the NDC Registry (interim), available online: https://www4.unfccc.int/sites/ndcstaging/Pages/Home.aspx.

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