Cross-national Salience of Marine Environmental Issues: Evidence from UN General Assembly Debates, 1993–2020

JAN KARLAS   Institute of Political Studies, Faculty of Social Sciences, Charles University, Czech Republic

E-MAIL   jan.karlas@fsv.cuni.cz

ORCID   0000-0001-9473-2875

JAN MAZAČ   Institute of Political Studies, Faculty of Social Sciences, Charles University, Czech Republic

E-MAIL   jan.mazac@fsv.cuni.cz

ORCID   0000-0002-7313-104X

ABSTRACT   In this paper, we examine an important dimension of state preferences regarding the protection of the marine environment, namely the salience of marine environmental problems. To do so, we analyse statements delivered in the annual reviews of ocean affairs and the law of the sea in the General Assembly of the United Nations in the years 1993–2020. In methodological terms, the paper employs topic modelling. The results reveal that the attitudes of states to the importance of specific environmental issues are relatively heterogeneous and the overall salience of these issues also varies significantly. The variation is primarily driven by the geographic characteristics of countries. The ratio of the given country's marine territory to its land area is positively associated with the salience of climate change, pollution, and the aggregated salience of environmental topics in the country. Also, the absolute size of the marine territory is positively associated with the salience of sustainable fisheries.

INTRODUCTION

The degradation of the marine environment represents one of the most serious contemporary environmental problems. Its continuation has also stimulated shifts in the research on international cooperation in the area of marine environmental protection. Unlike the earlier scholarship, the recent literature not only deals with individual international institutions, but also addresses ocean environmental governance as a macro-system. This literature has explored the gaps that exist in ocean governance, its fragmentation, and the need for a more substantive transformation of it (BIGAGLI, 2016; MAHON & FANNING, 2019; STEPHENS, 2022). Yet, the existing scholarship has paid little attention to one crucial issue: the preferences of states. This analytical gap is substantial since state preferences significantly condition the functioning of ocean governance and its possible reforms (BLYTHE ET AL., 2021).

In order to diminish this gap, we examine in this paper the preferences of states regarding marine environmental problems. More specifically, the paper focuses on the salience of these problems, that is, on the importance that the individual states attach to these problems (THOMSON, 2011). To conduct an empirical study on cross-national variation, we analyse statements presented by state representatives in the General Assembly of the United Nations (UNGA) as a central body for the discussion and coordination of global ocean issues (CORELL, 2017; HAKAPÄÄ, 2013). Our analysis includes more than 1,000 state speeches delivered in the annual reviews of ocean affairs and the law of the sea in the UNGA in the years 1993–2020 (UNITED NATIONS, 2021). In a descriptive analysis, the paper primarily employs the methodology of topic modelling (BLEI, 2012; GRIMMER & STEWART, 2013). In order to explain the variations in salience, we conduct a regression analysis that explores the effects of several factors that represent the geographic, socio-economic, and political characteristics of countries (BÄTTIG & BERNAUER, 2009; CLULOW, 2018; FOX ET AL., 2011).

The paper offers four major findings. First, the number of actors who regard marine environmental issues as salient has gradually grown and is now quite large. Second, state views on which specific environmental issues they regard as important considerably vary. In particular, there is a notable division between states that consider sustainable fisheries as

the most important priority, and states which focus on other environmental topics, namely biodiversity, climate change, and pollution. Third, the cross-national variation in the salience of specific environmental issues is primarily driven by the geographic characteristics of countries. While the relative size of a country's marine/coastal territory compared to its land area, is positively associated with the salience of climate change, pollution, and the aggregated salience of environmental topics in the country, a similar relationship exists between the absolute size of the coastal/marine territory and the salience of sustainable fisheries. Fourth, a negative relationship exists between the salience of the majority of the analysed environmental topics and state capabilities. These findings have important implications for international cooperation on marine environmental issues, in particular in terms of the ability of countries to agree on the priorities and concrete content of their cooperation.

STATE PREFERENCES AND THE RESEARCH ON OCEAN ENVIRONMENTAL GOVERNANCE

Initially, research on marine environmental cooperation concentrated on the origin and functioning of this cooperation. Some studies emphasised the role played by the interests and actions of states (DESOMBRE, 2006; VAN DEEVER, 2013). Other studies examined how the designs of international institutions influence their effectiveness (MITCHELL, 1994; SKJÆRSETH ET AL., 2006). A part of the earlier literature explored the relationship between domestic politics and the creation and development of cooperation (ÁSGEIRSDÓTTIR, 2007; DESOMBRE, 2000; SKJÆRSETH, 2000).

In a more recent period, the research on marine environmental cooperation broadened its orientation and began to more extensively analyse ocean environmental governance as a macro-system. This new literature has examined several important issues. One group of works deals with the potential limitations in the substantive focus of ocean environmental governance (BIGAGLI, 2016; CAMPBELL ET AL., 2016; HOUGHTON, 2014; MA & ZHOU, 2021; RAYFUSE & WARNER, 2008). These works point out that important regulatory or implementation gaps exist in inter-state cooperation. Simultaneously, they propose concrete changes in the authority or agenda of the contemporary marine environmental institutions. Another part of the literature explores the fragmented character of ocean environmental governance, which exists

in both a sectoral and a geographical sense (AULD ET AL., 2023; BARKIN & DESOMBRE, 2013; BLANCHARD, 2017; CLARK, 2020; MAHON & FANNING, 2019; MONDRÉ & KUHN, 2022). Most scholars highlight the need for establishing a division of labour among the numerous institutions and assuring their mutual coordination. Finally, some studies highlight that the existing governance structures are inadequate to halt the rapid deterioration of the environment (BRODIE ET AL., 2020; PYĆ, 2023; STEPHENS, 2022). They argue that a profound, even paradigmatic, change in the nature of ocean governance is necessary.

In spite of this significant development, the literature on ocean environmental governance is characterised by one important limitation: the absence of a thorough analysis of state preferences. Many of the existing works completely neglect these preferences. Other works do not explore state preferences directly, but instead proceed from assumptions, most typically treating states as rational egoists in line with Hardin's classic analysis presented in his tragedy of commons (FRIEDHEIM, 1999; RAYFUSE & WARNER, 2008).

This treatment of state preferences is not satisfactory. Given that the individual countries have very different geographic, socio-economic, and political characteristics, they are likely to attribute different levels of importance to marine environmental problems, or to the specific categories of these problems. This fact has important political and analytical consequences. Above all, state preferences determine the extent to which possible changes in ocean governance can obtain the necessary political support. The ability of states to agree on the content of these reforms depends to a great extent on a convergence in their preferences. Furthermore, specific variations in state preferences influence the characteristics of the issue-linkages and package deals accompanying the international cooperation. In brief, without exploring state preferences directly, contemporary research cannot provide a complete analysis of the current state of ocean environmental governance and its possible reforms (BLYTHE ET AL., 2021).

SALIENCE OF MARINE ENVIRONMENTAL ISSUES

This paper analyses the salience of marine environmental issues for individual states. In political science research, salience is often defined in terms of the importance that actors attribute to different policy issues (THOMSON, 2011; WARNTJEN, 2012). This understanding of salience recognises that

individual actors typically regard some policy issues as more important than others. Defined in this way, salience captures the intensity of an actor's interest in different issues and, together with concrete (substantive) positions on specific policy issues, constitutes one of the two dimensions of state preferences regarding international policy coordination (THOMSON, 2011). At the collective level, the salience that individual actors attach to policy issues results in an issue salience convergence/divergence (GUNDERSSON, 2024).

In political science and international relations, understandings of state preferences vary. According to rationalist approaches, preferences are based on cost-benefits calculations (LAKE & POWELL, 2009). They primarily reflect the substantive and fixed interests of actors (e.g. their interest in security or economic welfare). The effects of these interests on preferences can be further modified by the other basic properties of actors (e.g. their power capabilities), and partially also by the strategic characteristics of the external environment (e.g. the distribution of resources). Preferences are essentially exogenous to the interactions that occur among actors. According to constructivism, preferences often result not only from the cost-benefit logic, but also from the normative appropriateness of possible outcomes (JOHNSTON, 2001; WENDT, 1992). As for the basic interests, constructivism does not view these interests as fixed. In addition, constructivist approaches emphasise that preferences are endogenous to the interactions of actors. That is to say, the process of mutual socialisation can also influence preferences.

In this paper, we primarily proceed from the rationalist treatment of preferences. Consequently, we assume that states, when participating in ocean governance, primarily seek to satisfy their individual interests. These interests are rather broad and may involve economic and political benefits, as well as benefits stemming from environmental protection. The accrued benefits do not always need to be material. Furthermore, we assume that the geographic, socio-economic, and political characteristics of countries mediate the relationship between their basic interests and preferences. In this way, these characteristics play a crucial role in shaping the resulting preferences. At the same time, we do not exclude the possibility that state preferences can also change in response to actors' interactions. However, this possibility lies outside of the scope of our analysis.

As for salience, a different understanding of the concept can be found in existing research in comparative politics and international relations. From one perspective, salience is primarily an attribute of individual issues and reflects their relative importance within a given society (BRAUN, HUTTER & KERSCHER, 2016; WARNTJEN, 2012, P. 169). Alternatively, it may result from the normative importance of issues, or from their prominence in social discourse. In such cases, salience aligns with deeper norms and values recognised in the given society. By contrast, in this paper, we examine salience as an aspect of actors' preferences. In this understanding, salience refers to the intensity of the actor's interest in a particular issue (regardless of its specific preferences on the given issue) (TATHAM, 2012; WARNTJEN, 2012).

DATA AND METHODS

To study the salience of environmental problems, we analyse statements made by state representatives during the annual reviews of the implementation of the UNCLOS and other developments relating to oceans affairs and the law of the sea that take place in the UNGA (UNITED NATIONS, 2021). Our exploration is delimited by the years 1993 and 2020. 1993 is the first year for which the minutes of the annual reviews are available. 2020 was the last year for which these minutes were available at the moment when our research started. To distinguish the long-term views of states from their most recent attitudes, we further divide the explored time range into two periods: 1) the longer period between 1993 and 2009, and 2) the most recent period, namely the period from 2010 to 2020.

To analyse the statements in the annual debates, we employ text analysis as an established methodology for studying policy salience. More concretely, our analysis primarily relies on topic modelling. This methodology makes it possible to identify the latent features of a text without knowing its properties in advance (BENITES-LAZARO, GIATTI & GIAROLLA, 2018; BLEI, 2012; GRIMMER & STEWART, 2013; ISOAHO, MOILANEN & TOIKKA, 2019). In this paper, we use the Latent Dirichlet Allocation technique (LDA), often referred to as the most used and well-established tool in text analysis. Our application is based on a seeded variant of the LDA, as we partly pre-determine several relevant environmental topics to be estimated by the LDA. This reflects that the marine environment is just one of the topics addressed in UNGA debates, as they also deal with other important topics (such as the

functioning of global marine institutions, resolution of marine territorial disputes, or maritime safety and security). To map the structure of state preferences, we supplement our topic modelling analysis with k-means clustering. K-means clustering represents one of the most frequently used approaches in unsupervised machine learning (WAGGONER, 2020). It identifies a number of clusters of observations by minimising within-cluster variance and maximising between-cluster variance.

Our methodological choices correspond to our above outlined theoretical assumptions. Alternative perspectives that view actors' preferences as endogenous to their mutual interaction, or that conceptualise salience as a social or discursive property, would lead to different methodological choices. From such perspectives, a discursive analysis involving deeper textual analysis would be appropriate. By contrast, our essentially individualist approach aligns well with quantitative text analysis.

One potential concern is that the word frequency may not accurately reflect the true levels of salience of the different issues for the actors, but may rather represent instrumentally or pragmatically motivated rhetoric. In response to this concern, we argue that our analysis of the content of the annual reviews reveals that the actors' attitudes are relatively consistent and substantive. We take this as an indication that the frequency of references to each issue does, in fact, reflect the salience of various thematic issues for the actors involved.

The UNGA reviews, as a specific institutional platform, are a suitable data source for our research purposes for several reasons. First of all, the UNGA serves as the central body for the coordination and discussion of ocean environmental affairs (CORELL, 2017; HAKAPÄÄ, 2013; HARRISON, 2017; OUDE ELFERINK, 2004; SINGH, 2018). Its annual review of ocean affairs not only deals with the implementation of a concrete treaty (i.e. the UNCLOS), but has a considerably wider scope. It addresses all major ocean-related issues and the overall functioning of marine environmental institutions. Thus, although the UNCLOS and its implementing agreements cover some environmental problems more extensively than others, this has not reduced the scope of the reviews in practice. Furthermore, all states can participate in these reviews, as all UN member states are allowed to engage in them actively, regardless of whether they are parties to the UNCLOS. Lastly, the

reviews have already been taking place for three decades, which makes it possible to conduct a more long-term analysis.

Moreover, the UNGA reviews can be considered a very appropriate data source in comparison to the possible alternatives. The meetings of the UN Open-Ended Informal Consultative Process on Oceans and the Law of the Sea (ICP) concentrate on single and specific topics. The meetings of state parties of the UNCLOS are primarily concerned with procedural issues associated directly with the UNCLOS. Finally, the discussions that take place in sector-specific institutions (the Convention on Biological Diversity, the International Maritime Organisation, the Food and Agricultural Organisation, the UN Framework Convention on Climate Change, etc.) deal only with the topics that belong to the realm of the respective institution. Hence, none of these alternative institutions represent a case that would be more suitable for a comprehensive examination of the importance that states attribute to marine environmental issues than the UNGA reviews.

Our LDA analysis consists of two basic steps. First, we code all the words that were mentioned in the UNGA discussions between 1993 and 2020, and whose frequency meets a certain minimal level, regarding their connection to possible environmental issues. This analysis allows us to identify the following four environmental topics that were frequently and systematically discussed in the annual debates: sustainable fisheries, pollution, the loss of biodiversity, and climate change. Although it would be useful to differentiate a slightly higher number of environmental topics (or, for instance, to differentiate sea-based and land-based pollution as separate topics), our content analysis does not allow us to clearly identify additional topics based on a sufficient number of frequently used key terms. In any case, the four identified topics correspond to the major categories of marine environmental problems identified in the contemporary literature (BALGOS, CICIN-SAIN & VANDERZWAAG, 2015; MAHON & FANNING, 2009).

Second, we apply a seeded LDA. The inputs of this analysis are the transcripts of the UNGA annual reviews, the selected number of searched topics, the four predefined environmental topics, and the most relevant key terms associated with the predefined environmental topics and found in the previous step (see Table A1 in the Appendix). It needs to be mentioned

that, in addition to the states, 15 state groupings actively participated in the UNGA reviews during the years 1993—2020. While most of these groupings (usually the official UN regional groups) made only a very limited number of statements, four of them belonged to the most active participants, namely the Caribbean Community (CARICOM), the European Union (EU), the Pacific Islands Forum (PIF), and the Pacific Small Island Developing States (PSIDS). At the same time, some of the states that are members of these four groupings participate in discussions only occasionally and focus on specific topics that have national importance for them. Taking this into account, we include all of the 15 state groupings in our analysis as additional cases alongside the states. Since our initial explorations indicated that the inclusion of the names of states and state groupings could influence the content of the estimated topics, we exclude them from the text corpus (TOLOCHKO ET AL., 2024).

The subsequent modelling process estimates the pre-determined environmental topics alongside a number of residual topics that capture other major issues discussed in the annual reviews. Essentially, it calculates the probability of an association between the individual words in the debates and an estimated topic. The resulting model indicates the extent to which specific words are associated with each topic, and the probability that a given actor is linked to a particular topic. In this way, the model provides a concrete and quantified measure of topic salience for each actor.

To examine how the salience of specific environmental issues varies across actors, we apply a k-means clustering. In general terms, this method is used to identify clusters that include observations that are quite similar to each other (BOBBITT, 2020; WAGGONER, 2020). Simultaneously, observations from different clusters are dissimilar. We use the probability values associated with the four estimated environmental topics as the input data for clustering the actors. Following the general rules of k-means clustering, we first determine the number of searched clusters for each analysed period. To do this, we use the fviz_nbclust() function from the *factoextra* R package and the clusGap() function from the *cluster* package. The application of these functions determines an optimal number of clusters for each period.

Subsequently, we apply k-means clustering to assign each actor to one of the clusters. More specifically, we employ the kmeans() function

from base R. This allows us to identify the major groups of actors based on their varying levels of interest in specific marine environmental problems. Each cluster comprises actors who are relatively similar in how salient they perceive the estimated environmental topics to be.

EXPLANATORY FACTORS

To explain cross-national variation in the salience of marine environmental issues, this paper examines several explanatory variables related to the basic geographic, socio-economic, and political characteristics of states. In our explanatory framework, one geographic factor is the absolute size of a country's marine or coastal territory. The existing literature suggests that the size of this territory influences the extent of the marine environmental challenges a country faces (FOUQUERAY & PAPIRAKIS, 2019; FOX ET AL., 2011; GALLO, VICTOR & LEVIN, 2017). Consequently, the salience attributed to the protection of the seas may increase with the size of the country's marine/coastal area. Alternatively, state attitudes in this regard may depend on the relative size of their marine or coastal territory compared to their land area. From this perspective, marine environmental problems are most salient for states whose territory is largely composed of areas directly exposed to such problems (SCHNEIDER, LEIFELD & MALANG, 2013).

Another factor that can explain the attitudes of states to sea protection is the level of socio-economic development. The existing scholarship emphasises several reasons for which the varying levels of development lead to divergent state preferences related to environmental protection. Above all, some studies argue that developed countries have a greater interest in environmental quality due to the higher level of their economic and social modernisation (CLULOW, 2018; FOUQUERAY & PAPIRAKIS, 2019). As the so-called Kuznets environmental curve suggests, once economic development reaches a certain level, the interest in environmental protection is likely to increase. Furthermore, developed states have more extensive economic resources and can, therefore, devote more resources to environmental protection (ROBERTS & PARKS, 2006). Alternatively, developed and developing countries may prioritise different environmental issues (HALE, HELD, & YOUNG, 2013).

Political factors are represented in our explanatory framework by two explanatory variables: democracy and participation in multilateral

cooperation. Existing studies outline several causal mechanisms that lead to a positive effect of democracy on governmental efforts to protect the environment. Democratic political systems create favourable conditions for environmental protection due to the electoral accountability of policy-makers and the general interest of the median voter in the provision of public goods, including environmental quality (BÄTTIG & BERNAUER, 2009; CONGLETON, 1992; LI & REUVENY, 2006; PAYNE, 1995). In addition, the respect for civil and political rights that is characteristic of democracies enables environmental organisations to grow and develop their activities (LI & REUVENY, 2006; PAYNE, 1995; SCHULTZ & CROCKETT, 1990). As for involvement in multilateral cooperation, states that participate in a high number of multilateral environmental agreements are likely to share a belief that international cooperation is an appropriate way to deal with environmental problems. It can be assumed that such states highly internalised the key norms of international environmental cooperation, in particular the norm of sustainable development and the norm of environmental multilateralism (PETTENGER, 2013; RAUSTIALA & VICTOR, 1998). Consequently, they are also more likely to assign greater importance to international efforts aimed at managing marine environmental problems.

To test the effects of these explanatory variables, we create a series of ordinary least squares (OLS) regression models for each of the two examined periods. The salience values of individual actors for the four seeded topics, along with their aggregated sums, serve as the dependent variables in these models. Regarding the operationalisation of the independent variables, the main analysis measures the size of the marine/coastal territory using data on the size of national exclusive economic zones (EEZ) (SEA AROUND US, 2022). We calculate the ratio of marine/coastal territory to land territory as the ratio of the country's EEZ to its land area (WORLD BANK, 2022). The paper measures the level of development using GDP per capita (IBID.). To measure the level of democracy, the main analysis employs the political rights data of Freedom House (2022). Finally, the number of multilateral environmental agreements in which a country participates indicates the degree of its involvement in multilateralism (MITCHELL, 2020).

In the cases in which data is available on an annual basis, the values of the independent variables are based on their average values from all the years of the analysed period. To determine the values of the independent

variables for the state groupings, we calculate the averages of the values of all states that are members of the respective grouping. The values of some independent variables are highly positively skewed. We thus use their logs in the analysis. We also add the number of words contained in all the actors' statements in the UNGA reviews as a control variable in our regression models.

RESULTS

Salience of environmental topics, 1993–2009

Our analysis confirms that, for the 1993–2009 period, all of the four estimated seeded topics align well with the expected environmental topics, namely Biodiversity, Climate, Fisheries, and Pollution (see Table A2 in the Appendix). All, or almost all, of the key terms defined to signify these topics are among the 500 words most probably connected with the estimated topics. However, regarding Biodiversity the seeded topic does not concern only biodiversity, but mixes biodiversity with security issues. The words most probably associated with the six residual topics suggest the existence of the following residual topics for the 1993–2009 period: UNCLOS Institutions, Disputes and Security, Resources, and three other topics that have an unclear focus.

Altogether, 93 states and 13 state groupings made at least one statement in the annual debates during the 1993–2009 period. To construct a variable that captures the salience of marine environmental problems as such, we aggregate the probabilities of all four environmental topics. The sums of these probabilities (the variable Environment) vary significantly across the actors (see Graph 1). More specifically, three different groups of actors can be differentiated. For 7% of all the actors, environmental issues have a high importance, as their aggregated probabilities exceed 50%. Besides Canada, this group consists of small island states. A large group of actors (41%) assign medium salience to environmental issues, with aggregated probabilities between 30% and 50%. The number of actors characterised by low aggregated salience (below 30%) is similarly large, comprising 51% of the total.

GRAPH 1: AGGREGATED PROBABILITIES OF ENVIRONMENTAL TOPICS (1993–2009)E
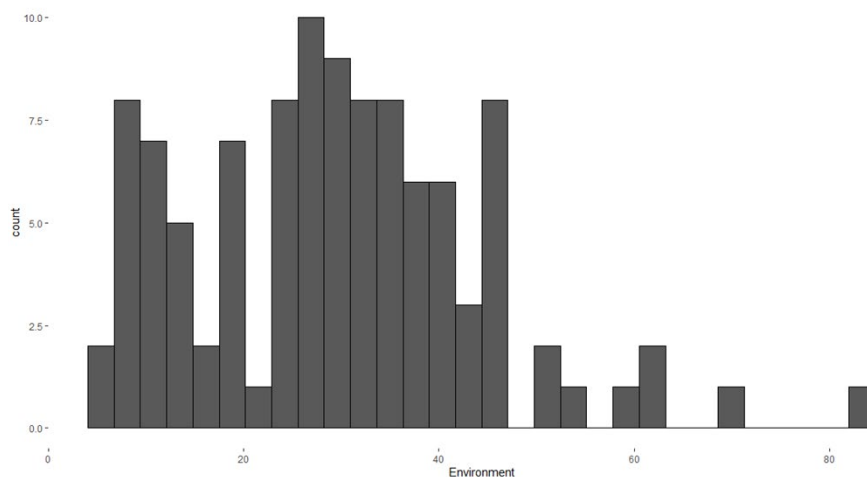
According to our calculations, producing four clusters is an optimal solution for analysing the respective period. Consequently, we search for four clusters of actors, using the probability values related to the four estimated environmental topics. Two of the four identified clusters, namely Clusters 1 and 4, resemble each other in two respects (Table 1 and Graph 2). First, for actors in these two clusters, more than one environmental topic is salient. In Cluster 1, Pollution is the most prominent topic (15%), but Biodiversity (8%), Climate (7%), and Fisheries (7%) are also referred to relatively frequently. In Cluster 4, the salience of Biodiversity (12%), Fisheries (9%), and Pollution (7%) is relatively balanced.

Second, each of these two clusters includes approximately one quarter of the actors. Cluster 1 comprises mostly developing countries, with a significant share of small developing island countries (the AOSIS, Bahamas, Barbados, Belize, the CARICOM, Fiji, Guayana, the Maldives, Papua and New Guinea, St. Vincent and the Grenadines, Trinidad and Tobago). Among the larger developing countries, Nigeria and Bangladesh are associated with this cluster. It also includes two developed coastal or island states, namely Monaco and Malta. Cluster 4 is more heterogeneous since it includes considerable numbers of both developed (e.g. the EU, Japan, Norway) and developing countries (e.g. Brazil, Mexico, India, Indonesia, South Africa). At the same time, the countries associated with this cluster are, on average, relatively large countries.

Cluster 2 is characterised by a moderate salience of Climate (10%) and Pollution (10%). However, Fisheries (28%) is by far the most salient topic in this cluster. In terms of its membership, Cluster 2 is relatively small, comprising only 10% of the actors. It includes five OECD countries (Australia, Canada, Iceland, New Zealand, and the USA) and six actors representing small island states (the Federated States of Micronesia, the Marshall Islands, Palau, the PIF, the PSIDS, and the Solomon Islands).

None of the four environmental topics attains a high or even moderate salience among the members of Cluster 3, which includes approximately one third of all the actors. It is notable that many EU member states are assigned to this cluster (Austria, Croatia, Cyprus, the Czech Republic, Germany, Greece, Finland, Italy, Slovakia, Sweden, the UK). At first glance, this appears striking since EU member states are otherwise relatively highly supportive of environmental protection. Moreover, the EU as such is associated with Cluster 4. However, this result is entirely reasonable, given that EU member states individually made only a very limited number of statements during the annual reviews. Typically, they emphasised specific topics of particular national importance, while relying on the EU to provide a systematic presentation of views on marine environmental issues. Without the EU member states, the Western European and Other States Group (WEOG) and the Eastern European Group (EEG), Cluster 4 is still sizable, involving 23 actors (that is, 22% of the actors that actively participated in the annual reviews). These actors are primarily large or middle-sized developing countries (e.g. Argentina, China, Chile, Colombia, Iran, Malaysia, Philippines, Turkey).

Therefore, the k-means clustering essentially suggests the presence of three specific groups of countries. The first group, a large one, includes countries that view all four, or at least three, of the environmental topics as salient. Simultaneously, the specific environmental topics achieve relatively comparable levels of salience within this group. The second group, a small one, comprises countries that consider Fisheries to be by far the most important issue, followed by Climate and Pollution. Finally, some countries do not frequently refer to any of the four environmental topics. The correlations between the probability values of the four environmental topics do not indicate the presence of a central line of contestation. Each topic shows only a moderate correlation with some of the others (see Table 2).

TABLE 1: PROBABILITIES OF ENVIRONMENTAL TOPICS (1993–2009)

Cluster	Biodiversity (%)	Climate (%)	Fisheries (%)	Pollution (%)	Actors	Actors (%)
1	8	7	7	15	28	26%
2	6	10	28	10	11	10%
3	3	4	4	3	36	34%
4	12	4	9	7	31	29%

GRAPH 2: CLUSTERS OF ACTORS (1993–2009)
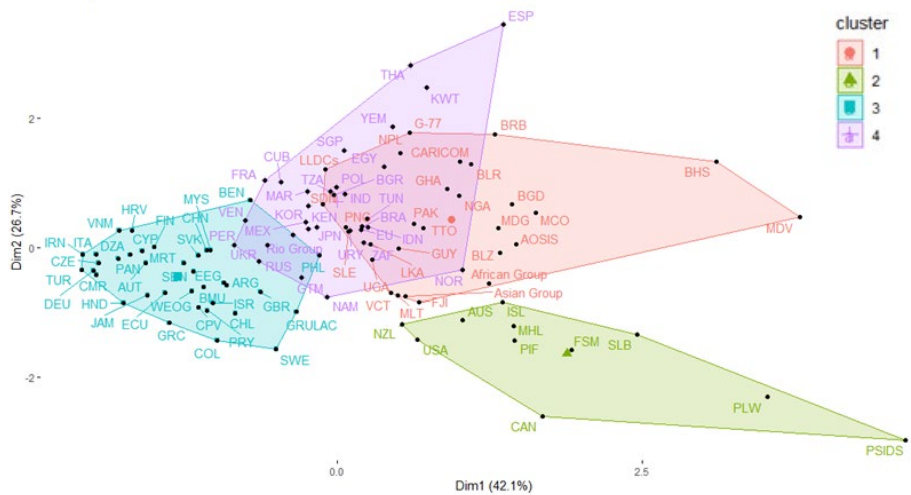
TABLE 2: CORRELATION OF SALIENCE DIMENSIONS

|	Biodiversity	Climate	Fisheries	Pollution	Environment
	1993-2009				
Biodiversity	1.000	0.042	0.110	0.350***	0.580***
Climate	0.042	1.000	0.360***	0.340***	0.580***
Fisheries	0.110	0.360***	1.000	0.130	0.720***
Pollution	0.350***	0.340***	0.130	1.000	0.660***
Environment	0.580***	0.580***	0.720***	0.660***	1.000
	2010-2020				
Biodiversity	1.000	0.440***	-0.150	0.310**	0.610***
Climate	0.440***	1.000	-0.110	0.380***	0.810***
Fisheries	-0.150	-0.110	1.000	-0.071	0.330**
Pollution	0.310**	0.380***	-0.071	1.000	0.540***
Environment	0.610***	0.810***	0.330**	0.540***	1.000

Note: The values are Pearson correlation coefficients, ʼp<0.1; *p<0.05; **p<0.01; ***p<0.001.

Salience of environmental topics, 2010–2020

In the topic model covering the second period of our investigation, i.e., the years 2010–2020, all four of the estimated seeded topics correspond to the intended environmental issues (Table A3). All, or almost all, of the terms that we selected for the purpose of estimation are among the 500 words most probably associated with the four estimated topics. The 2010–2020 model also contains the following six residual topics: Disputes and Security I. and II., BBNJ treaty, Resources, and two topics with an unclear focus (the topic of the BBNJ treaty covers specific topics related to the negotiations on the treaty, which do not always have an environmental basis).

In the 2010–2020 period, 70 states and 12 groupings participated in the annual debates. At the aggregated level, we detect a significant cross-national variation in the salience of environmental topics (Graph 3). For 19% of the actors, environmental topics represent more than 50% of the total content across all the covered topics. These actors are mostly small island developing states. For a sizable group (44%) of the actors, the share of environmental topics ranges between 30% and 50%. Finally, for 36% of all the actors the share of environmental topics is below 30%. The number of actors with high or medium levels of aggregated salience for environmental topics thus considerably increased compared to the 1993–2009 period.

GRAPH 3: AGGREGATED PROBABILITIES OF ENVIRONMENTAL TOPICS (2010–2020)
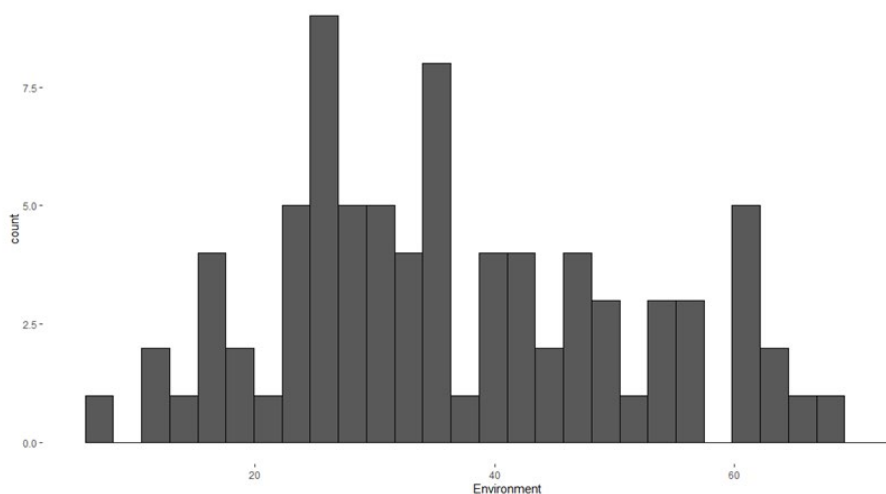
Our analysis reveals that five important clusters of actors can be recognised. A certain similarity exists between three of them, namely Clusters 2, 3, and 5 (Table 3 and Graph 4). Above all, each of these clusters is associated with a high salience of one to three environmental topics, specifically Biodiversity, Climate, and/or Pollution. In particular, Cluster 3 is characterised by a high salience of all these three topics. Countries associated with Cluster 2 often mention Biodiversity and Pollution in their statements, and, to a lesser extent, Climate. Cluster 5 is connected with a high salience of Biodiversity, followed by Climate and Pollution. These three clusters also resemble each other in terms of their size (Cluster 2 – 27% of the actors, Cluster 3 – 17%, Cluster 5 – 18%). Cluster 3 is predominantly composed of small island states. The memberships of Clusters 2 and 5 are rather heterogeneous.

Cluster 4 includes actors who view two environmental topics as salient, namely Biodiversity and Fisheries. However, they consider Fisheries significantly more salient (23%) than Biodiversity (9%). This cluster is the smallest one and comprises two OECD countries (New Zealand and the USA) and several other, mostly Latin American countries (Argentina, Colombia, Chile, Peru, Venezuela). Cluster 1 involves 22 actors that do not frequently mention environmental issues in their statements, with the partial exception of Biodiversity. Although the composition of this cluster is heterogeneous, it is notable that it involves several large developing countries (China, Malaysia, the Philippines, South Africa, Thailand, Vietnam).

Therefore, the k-means clustering for the 2010–2020 period yields results that are largely consistent with those from the previous period. Even the 2010–2020 period is characterised by the presence of three main groups of countries: 1) countries that generally pay large attention to environmental topics, 2) countries that prioritise Fisheries, and 3) countries that do not frequently refer to environmental topics. However, the cluster analysis suggests that the divide between the first two groups of countries became more substantial during the 2010–2020 period. This finding is further supported by the correlations of the probabilities of the specific environmental topics. While the probability values for Biodiversity, Climate, and Pollution show moderate correlations with each other in the post-2009 period, none of them is correlated with Fisheries (Table 2). These observations indicate the presence of a central, underlying division in the preferences of the actors.

TABLE 3: PROBABILITY OF ENVIRONMENTAL TOPICS (2010–2020)

Cluster	Biodiversity (%)	Climate (%)	Fisheries (%)	Pollution (%)	Actors	
1	8	4	4	5	22	27%
2	11	7	6	10	22	27%
3	16	29	6	11	14	17%
4	9	4	23	6	9	11%
5	19	8	6	8	15	18%

GRAPH 4: CLUSTERS OF ACTORS (2010–2020)
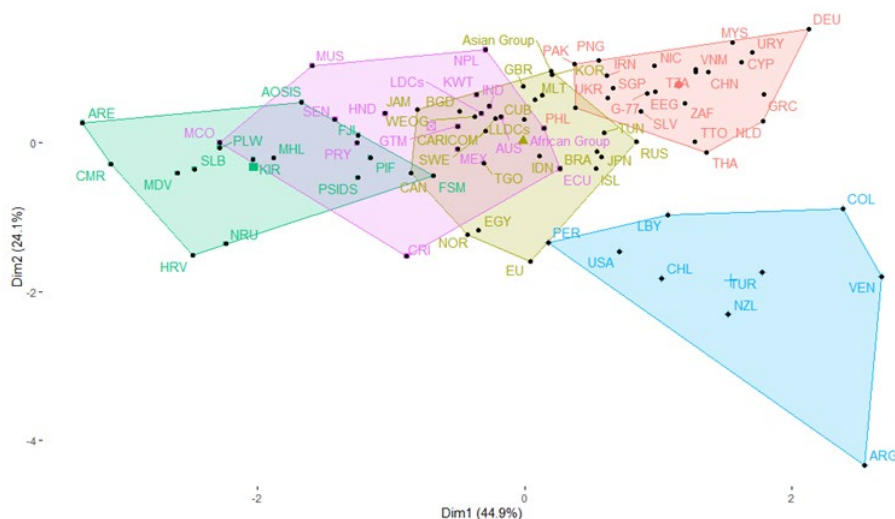
Explanatory results

In the regression models for the 1993–2009 period, the salience of environmental topics is primarily associated with a state's geographic characteristics (Table 4). The probabilities of Climate and Pollution, alongside the aggregated probabilities of environmental topics, are positively and statistically significantly connected with the ratio of the marine territory to the land territory. Furthermore, the absolute size of the marine territory – the other of the two examined geographical factors – has a positive and statistically significant effect on Fisheries. The OLS analysis also shows that although democracy has a positive and significant effect on Fisheries, it is negatively associated with Biodiversity. Contrary to our initial expectation, the salience of Pollution decreases with the level of economic development, although the relationship is not very strong. Likewise, multilateral

involvement is negatively associated with the salience of marine environmental issues, but this relationship is not, or is only weakly, significant, depending on the specific dependent variable.

TABLE 4: EXPLANATORY RESULTS, 1993–2009

	Biodiversity	Climate	Fisheries	Pollution	Environment
Marine territory	0.064 (0.157)	-0.123 (0.084)	0.575** (0.197)	-0.177 (0.147)	0.349 (0.367)
Marine/land territory	0.126 (0.353)	0.944*** (0.190)	0.532 (0.443)	1.299*** (0.329)	2.890*** (0.824)
Development	0.669 (0.568)	-0.233 (0.305)	0.283 (0.713)	-1.052* (0.530)	-0.305 (1.326)
Democracy	-0.873* (0.401)	0.308 (0.215)	0.925' (0.502)	0.172 (0.373)	0.512 (0.935)
Multilateralism	-0.006 (0.018)	-0.009 (0.009)	-0.049* (0.023)	-0.018 (0.017)	-0.085' (0.043)
Statements	0.000 (0.000)	0.000 (0.000)	0.000*** (0.000)	-0.000 (0.000)	0.000** (0.000)
Constant	5.261 (3.674)	6.869*** (1.976)	-3.209 (4.606)	16.830*** (3.424)	25.589** (8.568)
Observations	106	106	106	106	106
R2	0.010	0.286	0.310	0.220	0.275

Note: 'p<0.1; *p<0.05; **p<0.01; ***p<0.001.

The results for the second period of our investigation confirm the explanatory power of the ratio of the marine area to the land area (Table 5). This variable is positively and statistically significantly associated with Biodiversity, Climate, Pollution, and the aggregated probabilities of environmental topics. The absolute size of the marine area maintains its positive association with Fisheries. Neither the level of development nor the political variables systematically influence(s) the references to marine environmental issues in the UNGA reviews, with the exceptions of a negative effect of democracy on Pollution, a positive effect of multilateralism on Pollution, and a negative effect of multilateralism on Climate.

Therefore, the explanatory analysis of both analysed periods yields one very important finding: the division between the countries that prioritise Fisheries and the countries that pay more balanced attention to specific environmental issues, which was identified in the descriptive part of this paper, is not random. It has a deeper reasoning related to the geographic characteristics of countries. Consequently, these characteristics

also determine the distribution of the aggregated salience of marine environmental issues across countries.

TABLE 5: EXPLANATORY RESULTS, 2010–2020

	Biodiversity	Climate	Fisheries	Pollution	Environment
Marine territory	-0.255 (0.180)	0.026 (0.288)	0.480' (0.255)	-0.145 (0.135)	0.076 (0.518)
Marine/land territory	0.714* (0.305)	2.401*** (0.489)	-0.596 (0.433)	0.625** (0.299)	3.202*** (0.880)
Development	0.063 (0.577)	-0.316 (0.924)	0.301 (0.818)	-0.159 (0.443)	-0.093 (1.662)
Democracy	-0.266 (0.377)	0.255 (0.604)	0.602 (0.535)	-0.475' (0.283)	0.112 (1.086)
Multilateralism	-0.018 (0.020)	-0.068* (0.033)	-0.017 (0.029)	0.034* (0.015)	-0.069 (0.059)
Statements	-0.000 (0.000)	-0.000 (0.000)	0.000** (0.000)	0.000 (0.000)	0.000 (0.000)
Constant	16.880*** (4.468)	12.940' (7.156)	-3.740 (6.335)	9.004** (3.359)	35.278** (12.868)
Observations	82	82	82	82	82
R2	0.115	0.410	0.163	0.043	0.232

Note: 'p<0.1; *p<0.05; **p<0.01; ***p<0.001.

As the regression models mainly demonstrate the effects of the two geographic factors, we conduct an additional regression analysis that examines possible interaction effects between these factors and the other independent variables. These interaction effects are indeed statistically significant in several cases in the 1993–2009 period (see Tables A4-5 in the Appendix, which report all the models in which both the main factor and its interaction effect were significant). There is a positive and statistically significant interaction between Marine territory and Development, and also between Marine territory and Democracy, in the case of Fisheries. This means that a larger marine territory increases the salience of Fisheries particularly in the cases of countries that are economically developed or democratic. Likewise, Development and Multilateralism increase the influence of the ratio of the marine territory and the land territory on Climate (the interaction term containing Multilateralism is not statistically significant at the 0.1 level, but comes very near to it).

For the 2010–2020 period, our analysis does not identify the presence of such interaction effects. An exception is the interaction effect between Marine territory and Development in the case of Fisheries, which is

nearly statistically significant at the 0.1 level. Finally, the additional analysis also shows that in the case of the ratio of the marine area to the land area, the interaction effects are negative in two instances. The influence of Marine/land territory on Climate in the 1993–2009 period is weaker in the cases of democratic countries. Likewise, the influence of the same variable has a weaker effect on Climate in the cases of countries that highly participate in multilateral environmental treaties in the 2010–2020 period.

Overall, the findings of the regression analysis show that the attitudes of countries to the importance of marine environmental issues are primarily determined by geographic factors. The level of economic development and the political variables played a secondary role in affecting these attitudes in the first period of our investigation, when they interacted with the effects of geographic factors regarding some of the salience dimensions. These interaction effects are essentially absent in the more recent period. This suggests that as the marine environment becomes more threatened, socio-economic and political differences among countries have an even weaker effect than they had earlier.

ROBUSTNESS CHECKS

To check the robustness of our findings, we make three additional analytical steps. First, we re-estimate the OLS models using alternative measures for the independent variables. For the size of the marine/coastal territory, we replace the size of the EEZ with a logged length of the national coastline (CIA, 2022). We also replace the EEZ/land area ratio with a ratio of the length of the coastline to the land area. We include alternative measures for democracy and participation in multilateralism: civil liberties values (FREEDOM HOUSE, 2022) and the number of international organizations in which the given country participates (PEVEHOUSE ET AL., 2020), respectively. We also replace GDP per capita with GDP to control for a possible effect of national economic capabilities (WORLD BANK, 2022).

This alternative operationalization essentially confirms the results of the previous OLS models and the importance of the geographical factors, with two partial exceptions (the results of this additional analysis are available upon request). First, the EEZ/land area ratio (or the coastline/land ratio) is not statistically significantly associated with some of the

dependent variables in several models when multilateralism is measured with the number of IOs, and when GDP replaces GDP per capita. However, both the IOs variable and GDP negatively correlate with the EEZ (coastline)/land ratio, which may explain the weakening of this predictor when the two above-mentioned variables are included in a model. Moreover, even in such models the effect of the EEZ/land area ratio is nearly statistically significant at the 0.1 level. Second, the effect of the size of the EEZ (or the length of the coastline) on Fisheries is not statistically significant in some of the control models for the 2010–2020 period. Nevertheless, even in these models this effect is nearly statistically significant at the 0.1 level.

In the second analytical step, we replicate all the OLS models from the main analysis, excluding the now specific categories of actors. More concretely, we subsequently exclude landlocked countries, countries participating in the four most active state groupings, and all state groupings from the statistical models. These steps do not substantially alter the findings of the main analysis (the results are available upon request).

Third, to control for the influence of our predefinition of the four seeded topics on the analysis of a latent policy space, we estimate a completely unsupervised topic model, i.e. a model that does not include any seeded topics. From the 10 topics identified by an unsupervised model for the 1993–2009 period, two are closely connected with environmental issues and, more concretely, with fisheries. The unsupervised model does not include topics that would correspond to climate change and pollution, and it only refers to biodiversity in connection with a topic related to the negotiations on the BBNJ treaty. However, this does not invalidate the findings of the main analysis, as the only conclusion drawn from the unsupervised model is that biodiversity, climate change, and pollution were relatively less salient in the pre-2010 UNGA discussions than fisheries and other central non-environmental topics. For the 2010–2020 period, the unsupervised model contains three topics related to the environment: Pollution, Biodiversity, and Climate; Fisheries; and Fisheries and Climate. Therefore, even the unsupervised model identifies pollution, fisheries, biodiversity, and climate change as the four main environmental topics in the post-2009 period. Yet, it is also noteworthy that one of the topics (Fisheries and Climate) puts into question the existence of a division between actors

attributing high salience to fisheries and actors emphasising climate change, which was suggested by the main analysis.

Additional OLS models that use the probability scores from the unsupervised models confirm that a significant relationship exists between sustainable fisheries and the geographical variables in the 1993–2009 period (these results are available upon request). Likewise, the analysis of the 2010–2020 period proves a positive and statistically significant relationship between the EEZ/land area ratio and the salience of climate issues (the topic Fisheries and Climate), and a positive and significant relationship between the absolute size of the marine territory and sustainable fisheries. Yet, contrary to the findings from the main analysis, the model based on the topic Pollution, Biodiversity, and Climate is not statistically significantly associated with the EEZ/land area ratio. However, this does not invalidate the finding of the main analysis as the seeded topic model reflects the content of the respective environmental topics more accurately than an unsupervised model.

DISCUSSION

Our analysis of the annual debates in the UNGA shows that a large majority of the states and coalitions devote a considerable part of their statements to ocean sustainability. During the 1993–2009 period, nearly half of the actors had an aggregated probability of 30% or higher of referring to environmental topics. This figure increased to almost two-thirds of the actors during the 2010–2020 period. This demonstrates that the number of actors who regard marine environmental issues as salient is large. This is a circumstance that is likely to have a positive effect on the potential reforms of the marine environmental cooperation.

However, our results also identify three circumstances that may hinder this cooperation. First, almost one third of the actors address environmental topics only marginally in their speeches in the annual debates. As decision-making in international institutions usually requires a consensus for the adoption of important reforms, this number is significant. The presence of such a high number of countries that pay low attention to environmental problems can constitute an important obstacle for the deepening of the marine environmental cooperation.

Second, countries have partially heterogeneous views on the prioritisation of specific environmental issues. A significant division exists between a small group of actors for whom Fisheries are by far the most salient topic and the majority actors who emphasise the other three environmental topics. Moreover, our results also show that this division is not random and stems from the different geographic circumstances of countries. The absolute size of the coastal/marine territory increases the salience of sustainable fisheries. Countries that have a large marine/coastal territory, compared to their land areas, regard climate change and pollution as particularly crucial challenges for the marine environment. Furthermore, an additional variation exists among the actors that focus on topics other than fisheries, namely the variation in how frequently they refer to Biodiversity, Climate, and Pollution.

Third, according to one of the above presented observations, the actors for whom the environmental problems are highly salient are mostly small island states. This suggests that there can potentially be a negative relationship between the interest in marine environmental protection and the size of power capabilities. Such a state of affairs would not bode well for further progress on marine environmental cooperation since a state's ability to advance particular issues depends at least in part on its capabilities. To explore this relationship more in-depth, we examine bivariate correlations between national GDP and salience (see Table 6). These correlations confirm that the salience of environmental topics other than Fisheries, as well as the aggregated salience of environmental issues, is indeed negatively associated with power capabilities. On the contrary, the salience of fisheries is weakly positively related to national capabilities.

These findings have two implications for negotiations on marine environmental cooperation. First, given that specific groups of countries tend to put an emphasis on different environmental topics, these negotiations may benefit from issue-linkages. Simultaneous discussions on further cooperation regarding multiple marine environmental problems may increase the number of countries that view an enhanced mutual cooperation as desirable. Second, although numerous countries consider biodiversity, climate, and pollution salient, these topics are, at the same time, often regarded as such by countries with low power capabilities. Given these limited capabilities, it is particularly crucial for these countries to

form effective coalitions. In addition, they must be prepared to engage in efforts to persuade more powerful states that progress on these environmental issues is necessary.

TABLE 6: CORRELATIONS OF NATIONAL GDP AND SALIENCE

	1993–2009	2010–2020
Biodiversity	0.078	-0.329**
Climate	-0.489***	-0.683***
Fisheries	-0.120	0.170
Pollution	-0.491***	-0.161
Environment	-0.340***	-0.498***

Note: The table displays bivariate correlations between national GDP and the seeded environmental topics. The values are Pearson correlation coefficients; 'p<0.1; *p<0.05; **p<0.01; ***p<0.001.

CONCLUSION

This paper made a contribution to the contemporary literature on ocean environmental governance by showing the importance of a direct analysis of state preferences. Countries attribute a varying importance to the protection of the oceans, as well as to the specific problems that damage the marine environment. To analyse the current functioning of ocean governance, as well as the feasibility of its reforms, it is necessary to examine the salience of concrete marine environmental problems for states.

Regarding future research, we suggest four particular directions. First, future studies should extend our knowledge about state preferences regarding marine environmental cooperation by focusing on institutional venues other than the UNGA. These alternative venues are, compared to the UNGA, less suitable for a comprehensive analysis such as the one conducted in this paper. Yet, they certainly represent appropriate empirical cases for studying the attitudes of countries to the salience of selected sectoral issues, as well as their substantive views on cooperation in concrete sectors of ocean protection.

Second, a deeper inquiry into the factors that influence state preferences is needed. A statistical analysis included in this paper identified a division that exists between countries with large EEZ/land area ratios and countries with large EEZs. Although a statistical analysis is suitable

for identifying and verifying such a relationship, it cannot provide a deeper explanation of it. Therefore, the causes of the cross-national variation in the prioritisation of marine environmental problems require further analysis. Ideally, such an analysis should include case studies focusing on a limited number of countries, which may provide a more direct means for studying the processes in which countries formulate their preferences regarding sea protection.

Third, the presented analysis demonstrates the relevancy of political science research and text analysis for the study of marine environmental cooperation. Up to now, several disciplines have extensively studied ocean issues, but the number of studies anchored primarily in political science remains relatively low (MONDRÉ & KUHN, 2022). Consequently, only limited research exists on the politics of ocean environmental governance (BLYTHE ET AL., 2021). By outlining important divergences that exist in the views of states, the paper shows the importance of the political side of ocean governance. Simultaneously, it illustrates the potential that text analysis and topic modelling as still rather novel approaches in the study of ocean issues have for a further exploration of these issues.

Fourth, although we assume that the salience of marine environmental issues is mainly determined by important national characteristics, we acknowledge that state positions can also be shaped by their mutual interactions. Even the UNGA annual debates analysed in this paper may lead to partial shifts in state positions. In addition, states also coordinate their positions on marine issues and cooperation using formats based on their regional proximity or other shared affinities. This mutual coordination can also partly influence state positions. Possible external influences on state preferences constitute another important area for research.

APPENDIX

The Appendix will be available online at CJIR website (cjir.iir.cz).

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NOTE

AUTHOR BIOGRAPHY

Jan Karlas is an Associate Professor in International Relations and the Head of the Department of International Relations at the Faculty of Social Sciences, Charles University, Prague. In his research, he concentrates on international institutions. He is an author of numerous academic publications, including articles in prominent international journals (e.g. *Cooperation and Conflict*, *Contemporary Security Policy*, *Environmental Politics*, *Journal of Common Market Studies*, *Journal of European Public Policy*, *West European Politics*).

Jan Mazač graduated in International Relations at the Faculty of Social Sciences, Charles University in Prague, where he is currently continuing his doctoral studies as an internal doctoral student. His professional interests include energy security and energy and climate policy in the EU. He is also an associate researcher at the Institute of International Relations in Prague.