

Regional ocean governance: Integrating and coordinating mechanisms for polycentric systems



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ABSTRACT

Regional ocean governance has been flagged as critical for successful achievement on SDG14 and other ocean related SDGs. The 20 ocean regions of the world are characterized by clusters of multilevel intergovernmental arrangements relating to EBM. Among the many needs for strengthening ocean governance in these regions is the development of effective regional integrating and coordinating mechanisms. These have been emerging somewhat organically. This study explores the clusters of regional agreements in the 20 regions to determine the extent to which integration mechanisms are in place or planned. It also looks at the extent to which the concept of governance polycentricity can be applied in these regions. Only four regions have established regional integration mechanisms thought to be needed for ecosystem-based management; while such mechanisms are planned in five others. Seven regions do have some level of intersectoral coordination such as within fisheries or environment or at a subregional level in a Large Marine Ecosystem (LME). Four regions show no sign of regional coordination. The study also the extent to which regional clusters of arrangements actually meet criteria for polycentricity based on governance theory. Regions have taken different approaches to regional integration mechanisms, but mostly based on working with a polycentric multilevel system of governance, rather than trying to tame it. There is both the need, and an untapped potential, for increased learning among regions regarding integration mechanisms and the polycentric structure and function of the regional clusters that they are seeking to integrate.

1. Introduction

Attention to regional and subregional levels for ocean governance has recently intensified [1–4]. There is also growing recognition that to be effective, governance must be multilevel - local, national, subregional, regional and global - with bidirectional linkages between the levels as well as lateral linkages within them [5–10]. This thinking is especially important for coastal and marine ecosystems where most issues are transboundary [11,12]. The importance of the regional level has been reinforced in the 2030 Agenda [13], which focuses attention on the need to build regional institutional capacity for ocean governance. Many consider integration and coordination across countries and sectors to be an essential aspect of regional ocean governance for the ecosystem-based management (EBM) and human well-being [14–18]. This paper looks at ocean regions globally and evaluates the extent to which mechanisms for integration and coordination (hereafter referred to as regional integration mechanisms) are either in place, planned, or even considered to be necessary.

Mahon and Fanning [19] (2019) identified 20 ocean regions and analysed the clusters of regional transboundary intergovernmental arrangements in place for ocean governance in each of them (Fig. 1). They explored the numbers of arrangements in each region and their characteristics such as issues addressed, origin, strength and extent of country engagement. They found that most regions had 10 or more arrangements at regional and subregional levels, reflecting what appears to be a high degree of multilevel polycentricity. They noted a high proportion of ‘indigenous’ arrangements, developed specifically by the countries of the regions rather than promoted by external/global agencies, indicating that there is potentially much more to regional ocean governance than FAO Regional Fisheries Bodies and the UN Environment Regional Seas bodies which have been the primary focus for decades. They also noted that many of the indigenous arrangements were regional multipurpose organisations and associated sectoral agencies that have the potential to mainstream ocean sustainability into national economic development and ocean governance [20].

The literature on ocean governance suggests that mechanisms and

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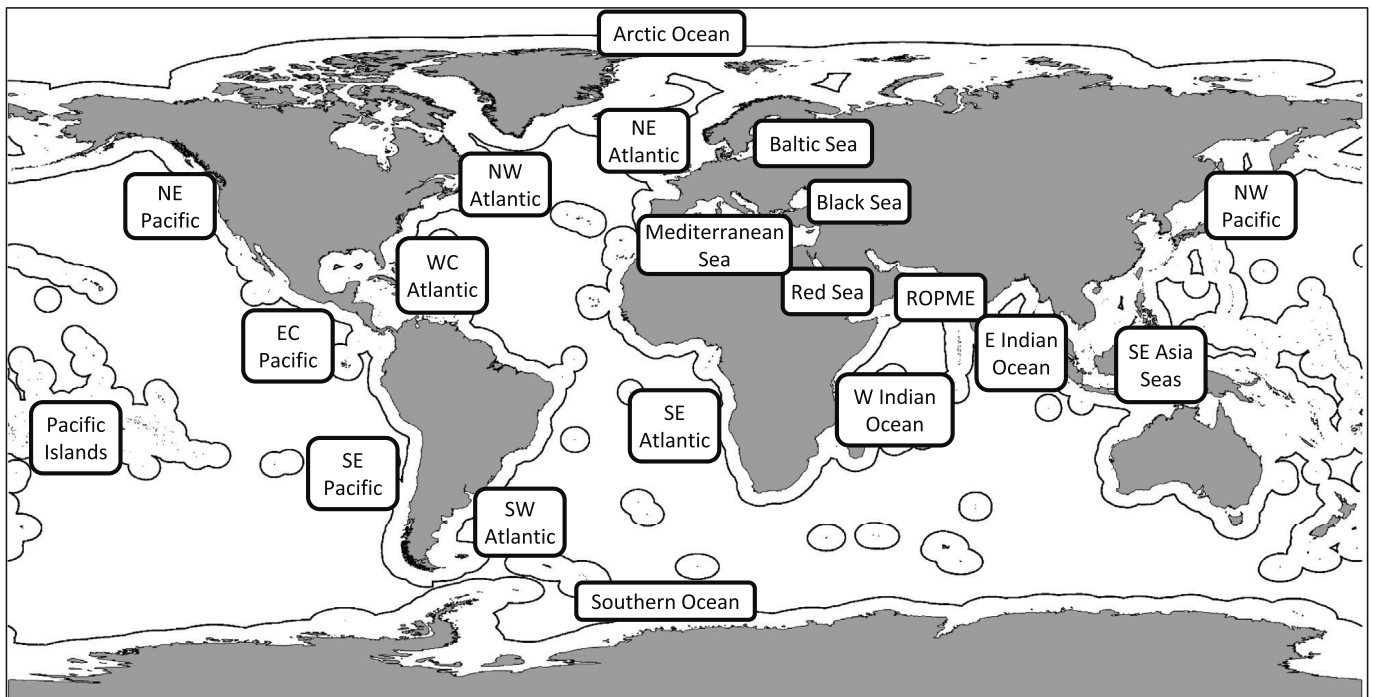


Fig. 1. The 20 ocean regions identified by Mahon and Fanning [?].

initiatives to address integration of global and regional ocean governance vary widely in scope, ranging from sectorally focused on fisheries or environment to overarching across all ocean sectors, and also in form, ranging from formal, binding treaties to informal, voluntary arrangements [11,21,22]. However, there is no systematic review and synthesis of such mechanisms for the ocean regions of the world. This companion paper to the analysis of regional ocean governance arrangements for EBM looks more closely at the multilevel clusters of regional arrangements with the aim of understanding what integration mechanisms are in place and what can be done to improve them [19]. First, it surveys the mechanisms for integration at regional and sub-regional levels in the 20 ocean regions that they identified. Then, it explores how these ocean clusters fit with current thinking about polycentric systems.

2. Polycentricity and modes of regional ocean governance

“Polycentric systems are characterized by multiple governing authorities at differing scales rather than a monocentric unit.” [6]. This observation was based primarily on studies at the metropolitan and global levels. However, regional ocean governance is also characterized by multiple governing authorities at differing scales, which has led to them being called polycentric systems in previous studies [19,22–24]. Jordan et al. [25], propose five characteristics, based on governance theory, that a polycentric system should exhibit; namely, that there should be: overarching rules, mutual adjustment of activities to foster collaboration and avoid conflict, willingness for experimentation, trust, and local action. Carlisle and Gruby also emphasise the first and last of these proposals [26]. If these criteria are strictly applied, the clusters identified by Mahon and Fanning [19] may not meet them.

Addressing questions such as what constitutes polycentricity for multinational governance arrangements is an emerging area of study. Jordan et al. [25] point out that polycentric systems have been variously referred to as fragmented, complex or multilevel in the literature, labels which they note appear to preconceive the nature of the system, rather than leaving avenues for description and investigation open. Their analysis of the global climate change regime concludes that it can be viewed as a polycentric system [10]. There are also other areas of

governance research, such as bricolage management and network governance, that seek to bring order to thinking on polycentric systems [27–30]. Clearly, the regional ocean governance clusters are not monocentric units, but might they be better termed fragmented systems or bricolages [27]?

The formulation of the relationship among these terms in Fig. 2 is used as a basis for a discussion of polycentricity in regional ocean governance arrangements after first examining the extent to which there are regional integration mechanisms in the clusters. Note that this paper takes a liberal approach to the criteria for polycentricity and consider all systems comprising multiple governing arrangements under a common set of rules to be polycentric (Fig. 2). However, these may meet the criteria for polycentricity to varying degrees. If there is little or no interaction among the arrangements, the system is considered to be fragmented polycentric. If there are clear attempts by

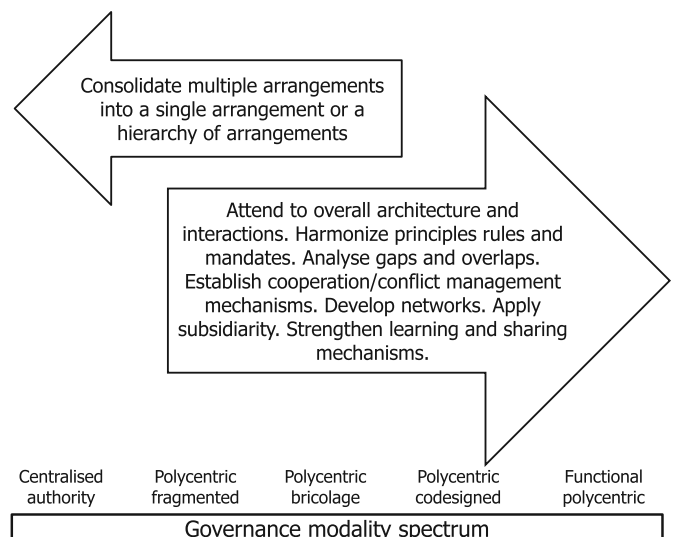


Fig. 2. A governance modality spectrum indicating the relationship among some key stages and processes for moving between them.

some members to manage the existing set of arrangements to avoid gaps and overlaps and increase effectiveness, the system is considered to be a polycentric bricolage. If attempts to manage go to the extent of intentionally redesigning the set of arrangements with their cooperation, including establishing integration mechanisms, the system is termed codesigned polycentric. Finally, a system that fully meets the criteria for polycentricity of Jordan et al. [25] can be termed functional polycentric. It is assumed that moving from earlier stages of polycentricity towards functional polycentricity will lead to a more integrated system as required by ecosystem based management (EBM) and to more effective governance. Moving in that direction may involve many types of analyses and/or interventions as summarized in the arrow pointing to the right in Fig. 2 [31]. Alternatively, frustration with complexity and apparent chaos and dysfunctionality may lead to proposals that governance arrangements be consolidated to form a centralized authority [11,32] Underdal 2010. However, this type of reorganization is seldom feasible with clusters of intergovernmental arrangements in which countries have already invested considerable time and effort. Notably, on this point Ostrom [6] concludes that an important lesson from global and metropolitan studies is “that simply recommending a single governance unit to solve global collective-action problems [...] needs to be seriously rethought.” This lesson may also apply to transboundary arrangements at the regional level, but evidence that polycentric systems will perform better at this level is still lacking.

It has been argued that polycentric systems, while often appearing to be complex, chaotic and fragmented, may have several advantages over centralized systems and be more ordered than they initially appear [22,24,33,34]. They may provide “multiple mechanisms for mutual monitoring, learning, and adaptation of better strategies over time” [6]. Polycentricity may also facilitate subsidiarity in which problems can be addressed at the most relevant and capable scale. Gruby and Basurto [34] argue that decentralised decision-making in “nested polycentric systems is advantageous because, through the involvement of resource users, local knowledge can inform the design of diverse, context-specific rules, while larger organisations (including but not limited to governments) can enhance local capacity to deal with noncontributors or local tyrants, share and invest in information, and coordinate cross-boundary problems.”

It has been argued by several authors that one aspect of strengthening polycentric systems is to promote integration and coordination among the constituent arrangements [6,16,29,35]. As indicated in the arrow pointing right in Fig. 2, this may include a wide variety of strengthening activities. Consequently, there has been an emphasis on ocean governance integration mechanisms, based on the frequent observation that fragmented polycentricity of ocean governance is a major problem at global, regional and national levels [1,4,17,21,36–38]. Governance fragmentation is also a broader global problem that extends beyond oceans [39,40]. The magnitude of this problem became more prominent with the focus on EBM in Agenda 21 and has been further emphasized for oceans following the development of the ocean SDG [3,4,41]. Two facets of fragmented polycentricity are (1) when the sectoral arrangements for ocean governance do not interact to consider the implications of one sector for another, and (2) when several arrangements in the same sector have responsibility for a geographical area or ecosystem that should be treated as a unit. The latter is related to the problem of ‘fit’ in which institutional arrangements do not match the geographic scope of the problems to be addressed [8,18,42].

The approach taken has been guided by research conducted under the International Human Dimensions Programme on Global Environmental Change (IHDP), in particular the volume by Oberthur and Stokke [43] on ‘Managing Institutional Complexity: regime interplay and global environmental change.’ Stokke and Oberthur focusing primarily at the global level, noted that while numerous efforts at interplay among arrangements could be identified, few were formally designed to address integration in an overarching way [44]. Instead, they noted that integration was often an emergent process based on the

partners or undertaken unilaterally by one of the partners. They also noted that at times, external agencies such as NGOs or the private sector took on the coordination role.

3. Methods

This study uses the 20 ocean regions defined globally by Mahon and Fanning [19] (Fig. 1). It also uses the same set of regional ocean governance arrangements upon which their analysis is based. These arrangements are the multilateral agreements for ecosystem based ocean governance and the institutional measures put in place to facilitate their implementation. The arrangements and supporting literature for each region were examined to determine what integration mechanisms, if any, were in place or planned for regional ocean governance. The literature reviewed includes: the texts of multilateral agreements and their protocols, their rules of procedure, reports of the meetings of their parties; Strategic Action Plans, Terminal reports and other documents of Global Environment Facility Large Marine Ecosystem (LME) Projects; and the wider marine policy literature. For each of the 20 regions, a narrative account of integration mechanisms is provided in the supplementary material. The narratives first examine if there is an overall integration mechanism. They then look at integration mechanisms within fisheries and environment, across both fisheries and environment, or, when there are two or more LMEs in the region, at the LME level. A fuller explanation of the agreements reviewed and the criteria for inclusion of the arrangements can be found in Mahon and Fanning [19] and its supplementary material.

These mechanisms were classified into the categories shown in Table 1. Fisheries and environment are considered to be the two key sectors relating to ecosystem based management. Environment includes arrangements for pollution, habitats and biodiversity. Integration at the level of LMEs is included because it has been argued that LMEs are the appropriate ecosystem scale for ocean governance [45]. Therefore, when there are two or more LMEs, having integration mechanisms at the LME level only may be adequate for EBM. However, there could still be benefits from integration among LMEs within a region, such as sharing information and experiences.

Whether the regional approaches to integration are hierarchical or polycentric is examined by assigning each region to one of the categories shown in Fig. 2 according to the criteria in Table 2.

4. Results

The narratives provided in the supplementary material are summarized in Table 3. Table 3 also shows the integration category considered to be in place for each region as defined in Table 1 and the approach of the integration mechanism according to the categories in Table 2.

The distribution of integration mechanism categories is shown in

Table 1
Categories of regional integration mechanisms found in the 20 ocean regions.

Code	Description
0	Nothing in place or planned
Planned	
1	Integration mechanism for fisheries or environment
2	Integration mechanisms for fisheries and environment
3	Integrating mechanism for at least one Large Marine Ecosystem (LME) in the region
4	Overall integration mechanism (including all LMEs in the region)
Already in place	
5	Integration mechanism for fisheries or environment
6	Integration mechanisms for fisheries and environment
7	Region covered by subregional mechanisms (including all LMEs in the region)
8	An overarching integration mechanism is in place

Table 2
Approaches to regional integration or coordination in ocean regions.

Status of system		
Code	Name	Description
1	Centralized authority	The approach being used or developed is hierarchical with a single body or an overarching that directs all other arrangements
2	Fragmented polycentric	Multiple centers of authority for which there is minimal evidence of interaction
3	Polycentric bricolage	Multiple centers of authority for which there is evidence of a body that is playing, or attempting to play role of coordinator
4	Codesigned polycentric	Multiple centers of authority (most of) which have collaborated to design an integration mechanism
5	Functioning polycentric	Multiple centers of authority among which there is a functioning codesigned integration mechanism

Fig. 3. Only four regions have what can be considered to be an overall integrating mechanism for sustainable use of ocean ecosystems in place (Antarctic, Arctic, Pacific Islands, Southeast Pacific) (Fig. 3). No region has a full suite of subregional LME level mechanisms in place; however, in the SE Atlantic region the Benguela Current Commission is operational for that LME and mechanisms are planned for the other two LMEs, which, if implemented, would provide full coverage of LMEs. Notably, six regions are working towards the establishment of overall mechanisms. Of the four regions where no indications of integration were found, two, NW Atlantic and NE Pacific are largely dealt with bilaterally by the USA and Canada.

The distribution of integration level in Fig. 3 indicates that there is considerable scope for progress with regional integration if it is to achieve the level that is thought to be required for EBM. Whereas, evidence for the cause and effect relationship between integration and governance effectiveness is lacking, well-structured governance architecture and process are considered by many to be an important context for effectiveness [4,8,21]. The number of instances in which mechanisms are planned suggests that the realization they are needed, is relatively recent. It is notable that in several cases this realization has been promoted by Global Environment Facility (GEF) LME Projects and the mechanisms have been planned for in the Strategic Action Programmes (SAPs) developed by these projects.

The assignment of the regional clusters of arrangements to the categories of governance modality in Fig. 2 is summarized in Fig. 4. The only regions where integration was found to be, or to be aiming to be, explicitly hierarchical, are the Antarctic and the Southeast Pacific. Five regions are considered as being fragmented. In the remaining 13 regions there are various levels of recognition of the need to address the deficiencies of polycentric systems, but for the most part this appears to go only as far as managing what is there rather than codesigning and implementing specific mechanisms. Nonetheless, the approach being taken in most regions takes the idea of multilevel polycentricity into account.

5. Discussion

5.1. Regional coordination mechanisms

While only four of the regional ocean clusters described by Mahon and Fanning [19] were found to have clearly identifiable established overarching mechanisms for integrated policy development and coordination, several such mechanisms were planned and many other efforts at intrasectoral and cross sectoral coordination were identified. These findings and the documentation associated with the diversity of existing and planned mechanisms indicate that integration and coordination are topics of concern to practitioners in most regions. Mechanisms appear to have been emerging organically at the regional level and reflect a variety of approaches. The interpretation of these mechanisms and approaches is based only on the literature. Further progress with understanding how these mechanisms are structured (architecture), how they came about and have evolved (agency), the constraints that they face and their effectiveness, will require direct engagement with the people working with them in each region. This

would be a significant comparative analysis undertaking of a scale that might be most efficiently facilitated by a global level agency, within the context of a global level programmatic approach to ocean governance, such as proposed by Mahon and Fanning [19]. It must also be noted that the regional clusters in this analysis include only intergovernmental arrangements, and that to be comprehensive, the scope of further investigation must include the private sector, civil society and all other regional bodies.

Among the established overarching mechanisms, the Pacific Islands Forum (PIF) and its Council of Regional Organisations of the Pacific (CROP) is the most prominent example. Two other mechanisms developed expressly for coordination are the Antarctic Treaty System (ATS) and the Arctic Council. The former takes a hierarchical approach in part due to the remoteness of the region, the fact there are no permanent settlements there, and the emphasis on peaceful use and conservation [47]. Yet there are still six arrangements there to be coordinated, of which all do not come under the ATS, so there is still a degree of polycentricity to be considered. The Arctic Council does consider the polycentricity in that region by recognising the importance of the multilevel suite of actors and their mandates. However, most of the arrangements coordinated by the Arctic Council are its working groups. As noted in Table 3, there are many other arrangements that are not covered by the Arctic Council [48].

In several other regions there have been substantial, but partial, attempts at promoting integration. Among these mechanisms there is a significant diversity in agency, scope, etc. In the Mediterranean, one of the most challenging regions due to the large number of countries and the diversity of language, culture and development, coordination for sustainable development is approached through the establishment of the Mediterranean Commission on Sustainable Development (MCSDD) in 1996, in association with the Barcelona Convention whose Secretariat supports the activities of the MCSDD. In the southeast Pacific, the interaction between the FAO, CPPS and the Secretariat for the Lima Convention, appears to be promoting EBM [49](UNEP-WCMC, 2017). In Southeast Asia, PEMSEA, a home-grown coordination body emerged as a bottom-up response to a perceived lack of regional policy/coordination capability. In still other regions, an ocean specific mechanism for overarching policy development and coordination may be partially taken up by the Secretariat of the Regional Seas Convention (or its counterpart). For example, the commissions in the Black and Baltic Seas serve as partial integrating mechanisms; the BSC by design and HELCOMM by adopting and performing this role without a mandate [50,51]. However, the lack of a mandate may mean that linkages between the major issues of Regional Seas Conventions, such as pollution and environment/biodiversity, with other sectors, notably fisheries, shipping, oil and gas production and tourism, remain weak or absent. In many regions there are Memoranda of Understanding (MOUs) between key partners aimed at promoting cooperation.

Clearly, the type of integrating mechanism that is in place or planned will depend partly on how countries and their regional organisations perceive what the future governance architecture for the region should be, and partly on the need to work with already established and operational institutions. Most regions are indeed oriented towards mechanisms that engage existing arrangements to strengthen and

Table 3
Summary of integration mechanisms and approaches among ocean regions.

Region	Overall integration	Category	Approach
Antarctic	The Antarctic Treaty System (ATS) is the integrating mechanism for this region and brings together other conventions as well as internal binding measures on a diversity of conservation and peaceful use matters.	8	1
Arctic	The Arctic Council is a non-binding cooperation agreement with issue specific committees that serves as an integrating mechanism in this region. However, there are many arrangements to the south that overlap the Arctic and that are not part of the Arctic Council's activities.	8	5
Baltic Sea	There is currently no formal integrating ocean governance mechanism for this region. HELCOM has adopted an integrating role and will coordinate ocean SDG implementation in this region. Connection with other sectoral organisations will be needed. The Baltic Sea LME and this region coincide exactly.	6	3
Black Sea	Black Sea Commission for Bucharest Convention has limited sectoral scope and no formal mandate to coordinate, but is doing so, at least at the technical level. The LME and the Black Sea coincide. The BS SAP (2002) aimed at establishing coordination but this has not happened	5	3
East Central Pacific	There is no overarching integrating mechanism in this region. The Regional Seas convention is not yet in force.	1	2
Eastern Indian Ocean	There is currently no integrating ocean governance mechanism for this region. The Bay of Bengal LME (BOBLME) Project has identified the need for an integrating mechanism and its SAP proposes a 'consortium' (rather than a Commission). However, the details of the consortium have not been elaborated and will be developed in the next phase of the project. Note that the BOBLME focus leaves a large amount of ocean space in this region unaddressed.	4	3
Mediterranean Sea	Several regional integration mechanisms exist, including for sustainable development in general, but none are comprehensive across sectors and across the northern (European Union) and southern groupings of coastal countries. Whereas the Regional Seas Mediterranean Action Plan and its Mediterranean Commission on Sustainable Development, the foremost integrating mechanism in the region, cover pollution, biodiversity and ICM, linkages with fisheries are weak.	5	4
Northeast Atlantic	There is no overarching integration mechanism. Formal integration consists of MOUs between the OSPAR Convention and both the Northeast Atlantic Fisheries Commission (NEAFC) and the North Atlantic Salmon Conservation Organization (NASCO) and there is considerable technical interaction at the level of the IGOs and through the International Council for Exploration of the Sea (ICES). The ICES WG on LMEs recommends that EBM be approached at the level of individual LMEs within this region.	4	3
Northeast Pacific	There is no overarching integration mechanism and one may not be needed. The USA and Canada have a long history of bilateral cooperation on ocean matters. Also, LMEs in the north of this region are primarily within the jurisdiction of either the USA or Canada and are nationally managed.	0	3
Northwest Atlantic	There is no overarching integration mechanism and one may not be needed. The USA and Canada have a long history of bilateral cooperation on ocean matters. Also, LMEs in this region are primarily within the jurisdiction of either the USA or Canada and are nationally managed.	0	3
Northwest Pacific	There is no overarching integrating mechanism in this region. The Regional Seas action plan provides some integration for environmental issues but is not connected to fisheries.	1	2
Pacific Islands Region	There is a longstanding and well-structured institutional structure for coordination and integration of regional ocean governance, the Pacific Islands Forum (PIF). It brings together key regional agencies in its Council of Regional Organisations of the Pacific (CROP). It is also well connected to national and regional political arrangements at the highest level and is supported by a mechanism for science inputs, the Pacific Commission.	8	5
Red Sea	No formal crosscutting integrating mechanism could be found for this region. The Red Sea Strategic Action Programme (SAP) did address institutional cooperating for transboundary issues but largely at the project level. Recent Global Environment Facility (GEF) project efforts have focused on MPA management.	0	2
ROPME	There is currently no formal integrating ocean governance mechanism for this region. The ROPME arrangement has adopted an integrating role and is seeking to connect with other sectoral bodies.	4	3
Southeast Asia	There is currently no overarching integration mechanism for this region. There are several transboundary LMEs and these are addressing integration at the LME level to varying degrees, but none of them has an overarching mechanism either. A few organisations in the region such as the Coordinating Body on the Seas of East Asia (COBSEA) and the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) have played a coordinating role for various ocean issues.	5	3
Southeast Pacific	The Permanent Commission for the South Pacific (CPPS) is a longstanding mechanism for integration of marine affairs in this region. It provides the secretariat for the Lima Convention and has MOUs with many global and regional arrangements relevant to the region. The decisions of the Permanent Commission for the South Pacific (CPPS) are not binding and it has no management authority. Most recently it has been pursuing matters related to ABNJ.	8	1
Southeast Atlantic	This large region has three LMEs, each with its own initiatives for integration across sectors. However, only the mechanism for the Benguela Current LME is well advanced and is clearly hierarchical. Those for the other two LMEs are tending to polycentricity. There are some overarching arrangements for fisheries and environment for most of the region, and overarching that is the Africa Maritime Strategy for the entire continent.	4	2
Southwest Atlantic	There are few regional ocean governance arrangements to integrate in this region and no integrating mechanism could be found.	0	2
Western Central Atlantic	Prior to the Caribbean Large Marine Ecosystem CLME + Project there was no regional intersectoral integration mechanism for the entire region, despite there being several regional and subregional mechanisms for fisheries and environment. The one regional organization with the mandate to play the coordinating role has neither the capacity nor the interest in taking up this role. The CLME + SAP, endorsed by 25 + countries, established an Interim Coordinating Mechanism with the intention of transitioning this into a Permanent Policy Coordinating Mechanism by 2020.	4	4
Western Indian Ocean	There is currently no integrating ocean governance mechanism for this region. The Agulhas and Somali Current Large Marine Ecosystems (ASCLME) Project has functioned in this capacity in the past and the Nairobi Convention is seeking to fill this gap. Overarching these is the Africa Maritime Strategy for the entire continent. In 2015 the Nairobi Convention COP adopted a resolution to promote regional ocean governance as per the Africa Integrated Maritime Strategy 2050 and in particular to pay attention to governance in adjacent Areas Beyond National Jurisdiction) ABNJ.	4	4

coordinate polycentric, multilevel governance systems [23,24,52,53]. The activities that may be needed to strengthen a regional system will be varied and context specific. They may include any or all of those shown in the arrow pointing to the right in Fig. 2. So far, only the Benguela Current Commission (BCC) in the BCLME has been established with a binding overarching mandate for ocean management; and

even in that case only for EEZs. It is notable that this trend to coordination rather than 'command and control' has been despite the widespread influence and promotion of overarching commissions based on binding agreements by the 'governance module' of the World Bank funded LME initiative [11].

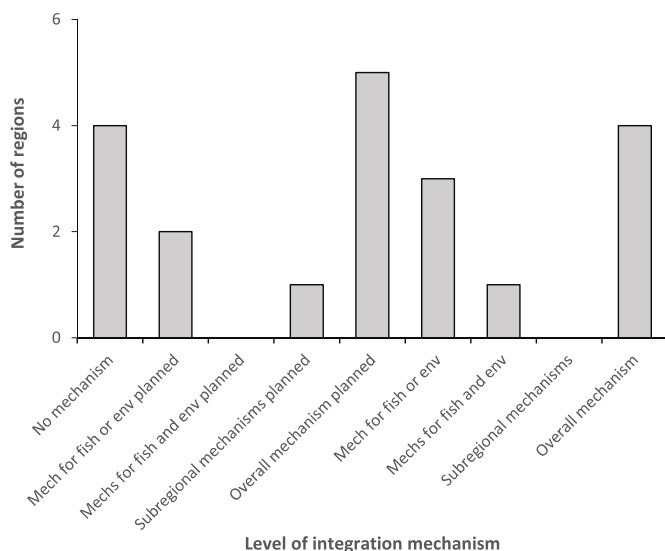


Fig. 3. The frequency of occurrence of the level of integration mechanisms in ocean regions based on the criteria in Table 1.

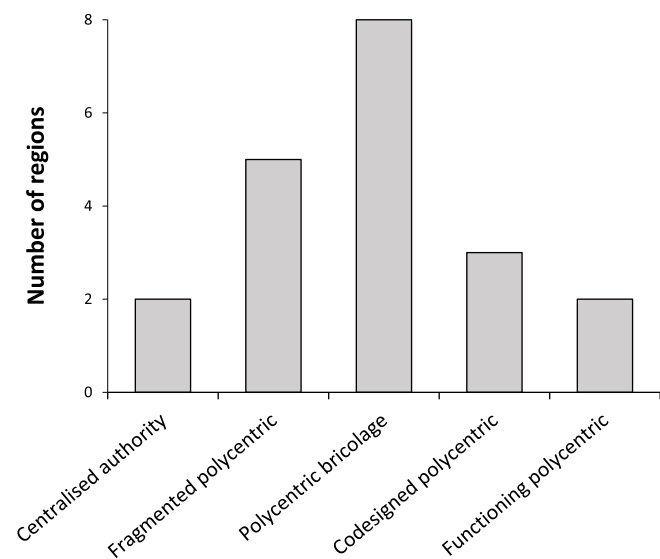


Fig. 4. The frequency of occurrence of governance modality among ocean regions, based on the categories in Table 2.

5.2. Are regional ocean governance clusters polycentric systems?

There has been much discussion in the literature on the criteria for recognition of polycentric multilevel systems [25,30]. To pursue this question, the regional ocean governance clusters are evaluated with reference to the five propositions of Jordan et al., [10]. Regarding the proposition that *there should be overarching rules*, all ocean governance arrangements and systems can be considered as having an overarching set of rules in the form of the United Nations Convention on the Law of the Sea (UNCLOS) [54]. UNCLOS is wide ranging in specifying obligations for conservation and management of all conceivable activities relating to the ocean, and suffices to meet that criterion. The proposition that *there should be mutual adjustment*, is the one that is most illuminated by the present study. In most regions there is a variety of interactions among arrangements, even going as far as to establish various types of integration mechanisms to promote interactions. The fact that most of these recognise the reality of multiple governing authorities and are seeking to coordinate among them is further evidence that interactions are a primary concern, even if not fully developed. The

proposition that *there should be willingness for experimentation*, was not assessed in this study and would be better explored with individuals for the regions as stated above. There is certainly a diversity of approaches to promoting interaction and cooperation among regions, but it cannot be determined if these are due to deliberate experimentation or simply the need to get on with ocean governance. The proposition, that *there should be trust*, can probably be considered as being part of the evident willingness of arrangements in most regions to work together, at some level, to improve governance. As integration mechanisms emerge, it can be expected that trust, or at least means of verification will grow. Finally, regarding the proposition that *there should be local action*, the extent of, and motivations for, this will require more in-depth engagement with regional actors to determine. Overall, from this preliminary analysis, it can be concluded that several of the key conditions for regional ocean governance systems being viewed as polycentric are met. There also appears to be a clear intention in most systems to move towards fully functional polycentricity (Fig. 2). However, in some regions such as Southeast Asia and the Southwest Atlantic political tensions may make it unlikely that this will happen soon. Consequently, the role of what is essentially an intergovernmental NGO, PEMSEA, in Southeast Asia is of critical importance in bricolage management.

5.3. Further research on regional ocean governance clusters

There is much for regional ocean governance practitioners to gain by engaging with the conceptual development of polycentricity thinking and associated topics of institutional complexity, bricolage management, network governance, etc. [26–31,51]. Despite their prominence in the literature, these emerging academic concepts are seldom explicitly found in the applied regional ocean governance literature. The European regions (The Baltic, Mediterranean and Black Seas) are exceptions, as they have been the subject of much academic research. The same is true of the Western Central Atlantic and the Western Indian Ocean, but to a much lesser extent. In most regions, practitioners have been getting on with addressing the practical problems they face, such as overlaps and gaps in mandates, duplication of effort, mismatch between governance and ecosystems, inefficient use of funds and inadequate arrangements for science inputs. They have been pursuing fixes to these problems in the context of existing institutional arrangements and political realities. Thus, integration has been emerging, in some cases over decades, as the accumulated outcomes of these efforts. As also observed by Jordan et al. [25] in the global climate change arena, academic thinking and analysis are for the most part just beginning to catch up with what has been happening on the ground.

There is considerable scope for further research on regional ocean governance clusters. This paper has looked only at what is in place regarding intergovernmental arrangements. Evaluation of the extent to which the integrating arrangements are functioning as intended, and if so, whether they are producing the desired outcomes (are effective) is a critical next step. Also of interest is the extent to which regional governance may be able to adapt to address Areas Beyond National Jurisdiction (ABNJ) [1,49], and is likely to become a more prominent need when the new global agreement on Biodiversity Beyond National Jurisdiction is concluded [55]. Similarly, comparative analysis of capacity and best practices for adaptation for regional ocean governance in the face of a rapidly changing and increasingly variable climate in areas within national jurisdiction is also much needed. Finally, approaches to, and capacity for, holistic governance needed to address the rapidly increasing emphasis on Blue Growth in most ocean regions should be a priority research topic [56].

6. Conclusions

This study concludes that it is appropriate to refer to the majority of regional ocean governance clusters as polycentric systems in various stages of becoming functional. Integrated policies are recognised as not

only the most difficult type of ‘policy mixes’ to develop, but also the most difficult to implement successfully as they have multiple levels, actors and jurisdictions [57,58]. Consequently, there are very few regions in which efforts to establish integration mechanisms have progressed far enough for their performance to be evaluated, as has been done for the Pacific Islands Region [59]. In most cases, evaluation and learning can only be based on the apparent soundness of what is planned based on principles of good governance architecture and process, rather than on effectiveness as measured by outcomes [46]. Nonetheless, it seems that there is considerable potential for regions to learn from one another as they proceed [60]. To this end, a regional ocean governance learning exchange mechanism that focuses explicitly on this aspect of regional ocean governance and that can bring those studying conceptual aspects such as multilevel systems polycentricity and network governance together with regional practitioners, could make a valuable contribution to understanding the strengths and weaknesses of regional integration mechanisms for oceans [61]. If carried out within the context of a programme such as the GEF International Waters, it could provide the opportunity for governance researchers and practitioners to combine theory, experience and practice. The analysis by Jordan et al. makes it clear that there is value in pursuing this type of research and that findings and recommendations may be relevant across a wide range of governance arenas and levels [25]. This is especially urgent given the need to address pressing challenges such as response to climate change, governance of ABNJ, coordination of the ocean related SDGs and demands for blue growth.

Declarations of interest

None.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.marpol.2019.103589>.

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