

Project information	
Project full title	EuroSea: Improving and Integrating European Ocean Observing and Forecasting Systems for Sustainable use of the Oceans
Project acronym	EuroSea
Grant agreement number	862626
Project start date and duration	1 November 2019, fifty months
Project website	http://www.eurosea.eu

Deliverable information	
Deliverable number	D1.7
Deliverable title	Report on the use of legal frameworks for ocean observing systems
Description	Several legal frameworks exist that are important for states conducting ocean observing activities or for which it would be relevant to include the necessity of ocean observing activities and development of ocean information products. Existing hard and soft law frameworks and mechanisms will be analysed to enable adequate adaptation of ocean observing system design at a regional and global level, with a focus on supporting sustained ocean observing and fit-for-purpose ocean information products.
Work Package number	1
Work Package title	Governance and Coordination of ocean observing and forecasting systems
Lead beneficiary	GEOMAR Helmholtz Centre for Ocean Research Kiel
Lead author	Erik van Doorn
Contributor	Paula Fernandes Veloso
Due date	28 February 2023
Submission date	28 February 2023
Comments	



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 862626.

Table of contents

Executive summary.....	1
1. Introduction.....	3
2. International regulation of ocean observing.....	3
3. Existing & emerging issues concerning the current regime	5
3.1. Definitions	5
3.2. What is not marine scientific research (legally)	6
3.3. Observing ships.....	7
3.4. Observing platforms other than ships.....	7
3.5. Duty to cooperate.....	9
4. Other legal instruments.....	10
5. On the law of the European Union.....	11
5.1. Biological diversity.....	12
5.2. European marine observation and data network	12
5.3. Integrated Maritime Policy.....	13
5.4. International Ocean Governance	13
6. First thoughts on possible solutions.....	15
Conclusion	17
Legal instruments	19
References.....	20

Executive summary

The issue

The 1982 United Nations Convention on the Law of the Sea (UNCLOS¹) requires coastal States to give consent to other States to conduct marine scientific research (including ocean observations) on their continental shelves or in their exclusive economic zones (UNCLOS, Art. 246(2)). Under normal circumstances, coastal States should give their consent to marine scientific research as long as the application is made at least six months in advance, and make sure to 'establish rules and procedures ensuring that such consent will not be delayed or denied unreasonably' (UNCLOS, Art. 246(3)). However, some of the global ocean observing networks under GOOS (Global Ocean Observing System) have reported issues that suggest that the current legal framework is not compatible with the operational reality of ocean observing and the digital age we live in.² In addition, the data are no longer only used for science but also to provide sustained information for direct societal benefit (such as forecasting extreme weather). Moreover, new technologies lead to forms of ocean observing that were not possible at the time when the rules came into being and thus the rules are outdated. The European Union (EU), as a regional agreement an ideal test bed for addressing this, could propose simplified procedures for obtaining consent for one EU Member State willing to conduct research in the exclusive economic zone of another, or create a notification scheme, such as the one currently used for the Argo Programme³.

How the EU can help

There is no legal EU instrument that regulates ocean observing. Applicable rules appear in different instruments (such as for environmental protection or disaster risk reduction); some binding and some not. The regulation of ocean observing often depends on the purpose for which one collects ocean data. The 2012 Treaty on the Functioning of the EU (TFEU⁴) states that the EU may set up joint undertakings or any other structure necessary to efficiently execute research (TFEU, Art. 187). This could provide a basis for harmonisation of the rules that are applicable to ocean observations, not only between the Member States but also within the Member State, if a domestic institution is mandated to be responsible for ocean observing and its regulation. The following five suggestions in order of priority and achievability could be used to change the current situation.

1. Create an EU level policy or regulation for ocean observing. For harmonising policy and legislation regarding ocean observing, an EU level policy or regulation is required. Considering the EU-wide value of ocean observations (for saving lives with accurate weather forecasting) and that many current policies and legislations are already at EU level, the EU principle of subsidiarity should be applied, as Member States would not be able to address these issues by working individually.

¹ <http://treaties.un.org/Pages/showDetails.aspx?objid=0800000280043ad5>

² <http://ioc.unesco.org/news/experts-warn-limits-ocean-observations-national-waters-likely-jeopardize-climate-change>

³ Whenever an Argo float draws closer to a State's EEZ perimeter, the State receives a notification and can opt whether to share the data from that float. In practice, 99 percent of coastal States choose to share the data through global data systems.

⁴ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A12012E%2FTXT>

2. Create a “Marine Scientific Research Clearance Office” – a single point of contact - in each Member State to shorten the time needed for clearance. At present, States that want to conduct observations in another State’s exclusive economic zone, must provide detailed information to seek consent at least six months in advance of the starting date of the observing campaign (UNCLOS Art. 248). If the coastal State does not react by the day the project commences, it is understood that the coastal State grants consent (UNCLOS, Art. 252), creating unnecessary unpredictability for planning marine scientific research. This Office could shorten this time to one month.
3. Create a standardised form to request clearance to be used throughout the EU such as proposed by the United Nations Division for Ocean Affairs and the Law of the Sea. Many EU Member States’ regulations are consistent with the Law of the Sea Convention but not necessarily consistent with each other as there is no explicit requirement for consistent interpretation and implementation of international rules. A standardised form could be adopted for the purpose of use within the EU. If an on-line form could be created, the applicant would be able to track the progress of the clearance request.
4. Establish ocean observations projects with the participation of Member States with a designated EU organisation. Art. 247 of the Law of the Sea Convention suggests that a coastal State that is a member of organisation, such as the EU, is deemed to have authorised marine scientific research project from that supranational organisation. It is of course open to other organisations to make use of the option in Art. 247, such as existing entities in the European context such as EMODnet, EuroGOOS or EOOS. EU Regulation 508/20145 defined the European marine observation and data network (or ‘EMODnet’) as a ‘network that integrates relevant national marine observation and data programmes into a common and accessible European resource’ (Art. 3(2)(4)). A marine scientific research project of an intergovernmental organisation within the EU could be instrumental in conveying the importance of data being gathered and its value to the coastal State, and can ensure the compliance of the international agreements concerning the inclusion of scientists from coastal States as well data-sharing standards.
5. Expand the harmonisation of the regulation of ocean observing in the EU to all European seas. According to Art. 123(c) UNCLOS, ‘States bordering an enclosed or semi-enclosed sea should cooperate [...] to coordinate their scientific research policies and undertake where appropriate joint programmes of scientific research’. This step would evidently require cooperation of, and agreement within all littoral states of seas of which parts fall within the scope of EU regulation such as the North Sea, the Baltic Sea, the Mediterranean Sea and the Black Sea.

⁵ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014R0508>

1. Introduction

Humankind has conducted ocean observations for centuries. Considering the rising significance of these observations for a variety of issues that humankind is currently battling with, it might come as a surprise that the legal framework for ocean observing is not as clear-cut as one might have hoped. It is common that more than one legal framework applies to a particular international activity. Yet regarding ocean observing, one has to ask oneself multiple questions in order to find out which of the existing legal regimes apply and – at least as important – which do not. It is essential to know who conducts the observations, where they take place and for what purpose. The answers to these questions will in most cases determine which legal frameworks apply to ocean observing. There is however no guarantee that there is always an obvious answer to these questions and this evidently has its effect on the regulations governing the activity. To give one example: ocean observing often takes place for more than one purpose at the same time.

Before considering the foundations of the governance framework for ocean observing on the international sphere, it is deemed necessary – admittedly with the risk of being superfluous – to set out what law does, what it can do and what it cannot do. In principle, law is almost always reactive. In other words, a certain activity first has to occur before legislators come up with rules that might apply to it. Sometimes, rules that were created with other activities in mind will apply to an activity that did not exist at the time when the rules were created. One could think here of the rules for marine scientific research that were written down with mainly research vessels in mind but which are now also applicable – to a large extent – to research that is conducted with gliders and other new research instruments and platforms. It hardly ever happens that States create rules for an activity that has yet to take place. However, in the marine environment, the developing legal framework for mining activities at the ocean floor beyond national jurisdiction is an example.

Considerations concerning law most likely being ‘too late’ leads to the following premise: this report deals with the legal framework for ocean observing as it stands now and with the law as it could be or even should be. The latter is also a task for politicians and other policy makers. The distinction might appear obvious but is nonetheless important. The law as it is will apply to ocean observing whereas the law as it could be or should be does not. The fact that law is thus often reactive can only be an encouragement to develop rules or amend the current legal framework in a sustainable way: resistant to future developments as much as possible and adaptable to these developments if necessary.

The law applicable to ocean observing exists on different levels that might all apply at the same time and should thus generally not contradict each other. These levels are international, regional (European Union (EU), for instance), national and – depending on the national legislation – also local. Much can be determined already on the basis of the international legal framework. Since this also applies at the other levels, it appears sensible to start at this level and consequently deal with the other levels. This report will thus start with the international rules and then discuss the EU rules. The former bears the name ‘international law’ (as proposed by Jeremy Bentham) or more traditionally the ‘law of nations’. The international law that applies to the marine environment is known as international law of the sea (not to be confused with ‘maritime law’, which is the field of private law that deals mainly with contracts in the shipping industry).

2. International regulation of ocean observing

International law of the sea traditionally reflects a balance of freedom for all States on the one hand and coastal sovereignty over adjacent waters on the other (O’Connell 1982). Freedom is close to absolute on the

high seas, the part of the ocean beyond national jurisdiction. Within national jurisdiction – up to a maximum of 200 nautical miles from the coastline – coastal States have a say in which activities are allowed. The rules on marine scientific research also reflect this balance (Soons 1982). States that engage in research argue generally in favour of freedom whereas coastal States – some more vocal than others – emphasise their exclusive rights in coastal waters. Coastal States have to walk a fine line when they are also engaged in research in the coastal waters of other states.

The 1982 United Nations Convention on the Law of the Sea – sometimes called the ‘constitution for the ocean’ – contains the legal framework for which States are entitled to what in the ocean. The regulations are a codification of age-old customary international law and negotiations that took place in the 1970s. All marine activities thus fall under the provisions of this Convention. The approach of the negotiators of the UNCLOS has been a dual one. The Convention deals with both spatial jurisdiction of States as well as functional jurisdiction. The former materialises in the division of the ocean in maritime zones. Following the adage ‘the land dominates the sea’, the further one is from the shore, the less power the coastal State has. All coastal States measure their maritime zones from the baseline. It is up to the coastal State to define this baseline. The default option is the low-water baseline (UNCLOS, Art. 5) with the main exception being the option to draw straight baselines for coastal States with a heavily indented coastline (UNCLOS, Art. 7), for instance Norway.

All waters landward of the baseline are internal waters of the coastal State where international law of the sea generally does not apply, but only the national legislation of the State concerned (UNCLOS, Art. 8(1)). Up to twelve nautical miles seaward from the baseline, the coastal State can claim a territorial sea in which it enjoys full sovereignty (UNCLOS, Art. 3). The main exception to this coastal State’s sovereignty is the right of innocent passage (UNCLOS, Art. 17). The carrying out of research and survey activities in the territorial sea renders the passage of a vessel no longer innocent (UNCLOS, Art. 19(2)(j)). It follows that coastal States ‘may adopt laws and regulations [...] relating to [...] marine scientific research and hydrographic surveys’ (UNCLOS, Art. 21(1)(g)). Moreover, coastal States ‘have the exclusive right to regulate, authorize and conduct marine scientific research in their territorial sea.’ The conduct of marine scientific research in a territorial sea thus requires the express consent of the coastal State (UNCLOS, Art. 245). This consent is a relatively new development. Until the second half of the twentieth century, scientists could easily obtain permission to conduct research in another State’s territorial sea (Knauss 1973; Mangone 1981; Soons 1982; Gorina-Ysern 2003).

On the continental shelf beyond the territorial sea (UNCLOS, Art. 76) and in the exclusive economic zone that a coastal State can claim up to 200 nautical miles from its baseline (UNCLOS, Art. 57), the coastal State enjoys sovereign rights over natural resources (UNCLOS, Artt. 77 & 56(1)(a)). Furthermore, the coastal State has jurisdiction regarding marine scientific research and ‘the establishment and use of artificial islands, installations and structures’ (UNCLOS, Artt. 56(1)(b), 60 & 80). On the continental shelf and in the exclusive economic zone, the coastal State also enjoys ‘the right to regulate, authorize and conduct marine scientific research’ (UNCLOS, Art. 246(1)). Yet, this right is not as exclusive as it is in the territorial sea. Coastal States still need to give consent to conduct marine scientific research on their continental shelves or in their exclusive zone (UNCLOS, Art. 246(2)) but this is not qualified as express consent as it is in the territorial sea. Under normal circumstances, however, they should give consent and they will have to ‘establish rules and procedures ensuring that such consent will not be delayed or denied unreasonably’ (UNCLOS, Art. 246(3)). The Law of the Sea Convention does not define what these normal circumstances are but just clarifies that diplomatic relations between the coastal State and the researching State are not a prerequisite (UNCLOS,

Art. 246(4)). Researching States need to provide the coastal State at least six months in advance of the starting date of the project with a list of information (UNCLOS, Art. 248). If the coastal State does not react in before the project commences, the grant of consent is implied (UNCLOS, Art. 252). Beyond continental shelves and exclusive economic zones, all States have the right to conduct marine scientific research (UNCLOS, Artt. 87(1)(f), 257, 143 & 256).

After the division in maritime zones – the spatial jurisdiction – the Law of the Sea Convention deals with issues subject to overarching regulation – the functional jurisdiction. These are the protection and preservation of the marine environment (Part XII), marine scientific research (Part XIII), transfer of technology (Part XIV) and peaceful settlement of disputes (Part XV). The right to conduct marine scientific research is irrespective of the geographical location of a State (UNCLOS, Art. 238). There is a duty to actively promote the publication and dissemination of information and knowledge (UNCLOS, Art. 244). Outside Part XIII, the Law of the Sea Convention addresses marine scientific research relating to the promotion of studies, scientific research programmes and exchange of information concerning marine pollution (UNCLOS, Art. 200; Hubert 2015). This duty is explicit for States surrounding enclosed or semi-enclosed seas (UNCLOS, Art. 123(b)). Newly industrialising States shall receive support to fulfil these obligations (UNCLOS, Art. 202).

3. Existing & emerging issues concerning the current regime

The rules set out above are applicable to ocean observing when States consider it as marine scientific research. Although the Law of the Sea Convention does not define what ‘marine scientific research’ is, interpretation of the Convention and subsequent practice of States clarifies that ocean observing for certain purposes does not qualify as marine scientific research. Part XIII of the Law of the Sea Convention, which contains the rules on marine scientific research, does consequently not apply to these exceptions. This leads to the aforementioned quintessential point of consideration regarding the governance of ocean observing: purpose.

3.1. Definitions

The problem starts when one searches for definitions. The Law of the Sea Convention does not define marine scientific research, survey activities or hydrographic surveys. From the wording, however, it becomes clear that the former does not include the latter two (Soons 1982). This leads back to the fact that the Law of the Sea Convention, in its part on the territorial sea, distinguishes between the two (UNCLOS, Art. 21(1)(g)). States like China and India take issue with this practice of, among other States, the United States (as highlighted by Rothwell & Stephens 2016). The collection of data concerning water depth, wind speed and direction does not fall under research activities in the territorial sea. This is simply a normal activity in relation to the operation of a ship. If one uses the data also for other purposes, the situation becomes somewhat unclear (Soons 1982; Huh & Nishimoto 2017). An example is the sea surface temperature data that commercial vessels collect in order to stay in the Gulf Stream. This would not be considered a research activity but it might change when these data will be used for scientific studies (Knauss 1991). When the research activity qualifies as marine scientific research, States shall also ‘actively promote the flow of scientific data’ (UNCLOS, Art. 244(2)). In case marine scientific research takes place on the continental shelf or in the exclusive economic zone of another State, the coastal State can request access ‘to all data and samples derived from the marine scientific research’ (UNCLOS, Art. 249(1)(c)). Moreover, the coastal State can request an assessment of these data, samples and results or assistance in the assessment or interpretation (UNCLOS, Art. 249(1)(d)).

If Part XIII of the Law of the Sea Convention on marine scientific research does not apply to a specific research activity, other parts of the same Convention might still be applicable. Fisheries research, for example, like stock assessments, is generally not considered to fall under Part XIII but as an integral part of the provisions on marine living resources. That means that as soon as a research project 'is of direct significance for the exploration and exploitation of natural resources, whether living or non-living', the coastal State can withhold consent for the project (UNCLOS, Art. 246(5)(a)). The same is true for 'drilling into the continental shelf, the use of explosives or the introduction of harmful substances into the marine environment (UNCLOS, Art. 246(5)(b)). In this regard, the following quote from even before the conclusion of the Law of the Sea Convention captures the problem: 'The oceanographic community, with justification, feels that it has played the role of the sacrificial lamb. To a large degree, it has been responsible for the breakthroughs that have made marine resource development a reality on a large scale. Now in the name of protecting these newly available resources its ability to conduct research is being severely circumscribed' (Scholz 1980).

3.2. What is not marine scientific research (legally)

The above would mean that marine scientific research, as used in the Law of the Sea Convention, would exclude any data-collecting activities that scientists specifically conduct for the exploitation of natural resources (Soons 1987). Data that are only remotely significant for the exploration and exploitation of natural resources might still fall under marine scientific research as used in the Law of the Sea Convention (Soons 1987).

States developed the rules on marine scientific research with ships in mind, as instruments for marine scientific research. The wide array of ocean observing instruments that is currently in use might thus not necessarily fall under Part XIII of the Convention. The EuroSea proposal list many platforms for the conduct of research activities: "A wide range of platforms and systems constitute the current global ocean observing infrastructure, including satellite observations, research vessels, autonomous floats, underwater gliders, fixed-point observatories, sea level stations, high frequency radar and autonomous surface vehicles" (page 5). From the lists, research vessels fit probably best in the regulations contained in Part XIII of the Convention. The law of the sea does not cover satellites (Soons 1982; Rothwell & Stephens 2016). Remote sensing for the purpose of ocean research thus appears to be free (Danilenko 1988). As a side note, atmospheric science conducted by research vessels is likely also not marine scientific research (Knauss 1991). When it comes to the use of fixed-point observatories in exclusive economic zones, the coastal State might also withhold consent for any research activities (UNCLOS, Art. 246(5)(c)).

The third exception – where ocean observing might not count as marine scientific research - concerns sustained ocean observations, although the terminology is not universal (Wegelein 2005). Towards the end of the negotiations of the Law of the Sea Convention, the chairman of the committee responsible for the regulations on marine scientific research addressed some worries of the World Meteorological Organization (WMO). He stated that 'routine observation and data collecting which was not covered by Part XIII of [the UNCLOS] and that they were in the common interest of all countries and had undoubted universal significance.' Thus, Part XIII of the UNCLOS 'would not create any difficulties and obstacles hindering adequate meteorological coverage from the ocean areas, including areas within the exclusive economic zone' (Yankov 1982). No State objected and more importantly, subsequent State practice appears to be generally in line with the statement (on the statement, see Bork *et al.* 2008). The term 'operational oceanography' (as opposed to experimental research) came up at the negotiations in the early 21st century for a notification scheme for Argo floats. The United States, for example, consider floats to fall under operational oceanography and not marine scientific research, leading to the conviction that floats do not need clearance

from a coastal State when they approach their exclusive economic zone. Moreover, in the history of Argo floats, there is only one known occasion where a coastal State objected to an Argo float collecting data in its exclusive economic zone (in 2019).

3.3. Observing ships

Ships that collect data still have to deal with legal uncertainties. For many observing ships that are not research vessels, it is not always clear which legal regime applies. When the crews of these vessels conduct ocean observation voluntarily, the additional issue is that – if they fall under Part XIII of the UNCLOS – one very often also cannot know six months in advance which exclusive economic zones the ship will enter. A similar challenge occurs for sailing regattas where the participating yachts might have taken ocean observing instruments on board. Sailing regattas are interesting for scientists because the yachts often cover parts of the ocean otherwise not visited by other vessels. Yet it is obvious that one cannot know six months in advance which exclusive economic zones these yachts will visit. Moreover, all of the above assumes that it is clear for every part of the ocean if it is either high seas on the one hand or the exclusive economic zone or territorial sea of a particular coastal State on the other hand. Many of the boundaries between exclusive economic zones of coastal States are not settled yet. Furthermore, a multitude of coastal States might lay claim on the same part of the ocean. In these cases, it is not unlikely that it becomes impossible to receive clearance to conduct ocean observations.

3.4. Observing platforms other than ships

Yet the use of autonomous floats, autonomous surface vehicles and underwater gliders in exclusive economic zones might cause the largest challenges, at least from a regulatory perspective. The negotiators of the Law of the Sea Convention made an attempt to cover the deployment of potential new research installations and equipment. Unfortunately, the resulting Art. 258 makes the existing rules also applicable to these new technologies. If these platforms are used for applied research – being of direct significance for resource exploration and exploitation, for example - then the coastal State can impose a wide range of conditions and most likely exercise jurisdiction (UNCLOS, Art. 249(2); Rothwell & Stephens 2016). The Law of the Sea Convention appears to point in the direction of the owner state also being able to exercise jurisdiction (UNCLOS, Art. 262; Papanicolopulu 2017). The coastal State in whose exclusive economic zone the equipment is deployed will be able to exercise functional jurisdiction over the equipment (Papanicolopulu 2017). This would likely trump any jurisdiction that the emplacing State can exercise (Churchill & Lowe 1999; Bork *et al.* 2008).

If States use floats, gliders and the like for pure research – that is: not directly related to exploration or exploitation of natural resources – in other states' exclusive economic zones, there appears to be no reason why the coastal State should withhold its consent (Churchill & Lowe 1999). When gliders are used to collect data on hurricanes or other weather phenomena, for instance, in other words 'information necessary to prevent and control damage to the health and safety of persons' (UNCLOS, Art. 242(2)), the coastal State is expected to allow deployment of such equipment (Nordquist *et al.* 1991). Gliders constitute one additional concern (besides making physical, chemical and biological measurements): they register the water depth with high precision and spatial-scale. States might regard this as a defence risk.

Within the Global Ocean Observing System, there exists a wide array of networks, each representing a different kind of ocean observing platforms or systems. For many of these networks, to provide the required information under Art. 248 UNCLOS six months in advance is very difficult. Drifting buoys and floats, for instance, will move with the currents. It is thus impossible to forecast where a drifter or a float will be in six

months' time. The gliders mentioned above, usually used to forecast storms just a few days in advance, have a similar problem. Although they are semi-autonomous, strong currents might still change their course into exclusive economic zones. Since gliders contain technology that only developed after the conclusion of the Law of the Sea Convention, coastal States often have the procedure in place for researching states to apply for consent to conduct observations with this kind of technology. In sum, '[t]he solution would be to obtain, before deploying the equipment in any area of the seas, the prior consent of all the coastal states of which the slightest possibility exists that the glider or profiling float might enter their EEZ. Such a requirement would, however, place a disproportionately heavy burden on the researching state. This not only would thwart the practical effect of the freedoms of the high seas, but also would disproportionately inhibit the freedom of marine research, both of which are important parts of the UNCLOS legal regime' (Bork *et al.* 2008).

Obviously, it is also impossible to know if sensors will enter a particular exclusive economic zone when scientists attached this sensor to marine animals. Therefore, animal-borne sensors create similar problems as drifters, floats and gliders. Animals behave even less predictably than drifters, floats and gliders. The argument that animals do not create any impediment on the coastal State's sovereignty or sovereign rights might lead to the conclusion that animal-borne sensors by-pass the framework of consent in Part XIII of the Law of the Sea Convention as remote sensing has done before (Kraska *et al.* 2015).

The Assembly of UNESCO's Intergovernmental Oceanographic Commission (IOC) noted in 1999 'the absence of a specific international legal instrument regulating profiling floats, drifting buoys, and other similar objects deployed in the oceans' (IOC Assembly Resolution XX-6). It did so in reaction to the fast-growing amount of Argo floats. Although the Assembly considered 'that the Argo project shall be fully consistent with' the Law of the Sea Convention, it concluded in the same resolution 'that concerned coastal states must be informed in advance, through appropriate channels, of all deployments of profiling floats which might drift into waters under their jurisdiction, indicating the exact locations of such deployments' (IOC Assembly Resolution XX-6). The wording of this resolution hints at a change in attitude towards new observation technologies since the conclusion of the UNCLOS. The still existing right of coastal States to withhold consent is no longer explicitly stated. Instead, concerned coastal States should now just be informed.

Almost a decade later, the Assembly of the IOC adopted the Guidelines for the Implementation of Resolution XX-6 of the IOC Assembly Regarding the Deployment of Profiling Floats in the High Seas within the Framework of the Argo Programme (IOC Assembly Resolution EC-XLI.4). The coastal State's right to be informed, if they so desire, forms the basis of these guidelines. This information contains at least the place and time of deployment and which data the sensors on the float can collect, among other things. The guidelines deal specifically with floats that are deployed on the high seas and might drift into a particular exclusive economic zone. The coastal State will have to be notified 'reasonably in advance of the expected entry of the float into the EEZ' (IOC Assembly Resolution EC-XLI.4). This is notably different, and likely shorter, than the six months required by the Law of the Sea Convention. Although the Argo Notification Scheme is not legally binding and limited in its application to Member States of the IOC, it appears to work very well, is highly successful and has been extended to include more than the initial sensors. A similar solution for other kinds of installations or equipment, such as drifters, gliders or animal-borne sensors, might thus be worth considering. As shown by the timespan between the first resolution and the adoption of the guidelines, this might be time-consuming though.

Cooperation between the IOC and the World Meteorological Organization (WMO) goes back decades and is regarded both fruitful as well as indispensable (Dexter & Treglos 2010). In 2019, the World Meteorological

Congress (WMC) recognised that ‘there is no regulation in place for the collection of marine meteorological and oceanographic measurements within EEZs in support of operational applications of’ the WMO (Resolution 45 (Cg-18)). The resolution urges Member States of the WMO to facilitate voluntary observing ships that conduct marine meteorological and oceanographic observations and collect data for the safety of navigation and the protection of life and property in exclusive economic zones. Furthermore, it urges them to adopt legislation in this regard and emphasises the ‘continuing legality and importance’ of these observations. In a further resolution, the Congress decides in favour of close collaboration between the WMO and the IOC when it comes to ‘facilitating oceanographic observation in coastal regions in support of Earth system prediction and climate services’ (Resolution 46 (Cg-18)). Like the resolutions of the IOC Assembly, the WMC resolutions are not legally binding and can only urge member states to do something. It has nonetheless potential for other instruments or platforms that collect marine meteorological data like drifters or gliders when all member states of the WMO agree on its importance, necessity and inevitably transboundary characteristics.

3.5. Duty to cooperate

The duty to cooperate is present throughout the Law of the Sea Convention, also in the part on marine scientific research as touched upon above. In addition, cooperation between the researchers and the coastal State specifically might also help in the promotion and easier conduct of ocean observations. The coastal State has the right to participate or being represented in the scientific research projects ‘especially on board research vessels and other craft or scientific research installations, when practicable’ (UNCLOS, Art. 249(1)(a)). The last word is important because it is likely that there might be differences in interpretation regarding what is practicable. This rule is likely to have the status of customary international law and would thus be binding upon any State. This is not the case for the right of the coastal State to involvement in the planning of the research project (Gorina-Ysern 2003, 335). The coastal State will not have to bear costs of the projects nor will there be remuneration (UNCLOS, Art. 249(1)(a)). Moreover, States shall actively promote ‘the transfer of knowledge resulting from the marine scientific research, especially to developing States’ (UNCLOS, Art. 244(2)). This could strengthen the autonomous capabilities of newly industrialising States and programmes providing education and training to technical and scientific personnel will contribute to this aim as well (UNCLOS, Art. 244(2)). The Argo Project, for instance, has a tradition of giving away floats.

Beyond the legal obligations, cooperation in the described form might subsidiarily lead to a better understanding of the data itself but also of the necessity of ocean observations. In some cases, the lack of understanding of data and their necessity might contribute to an increased chance of withholding consent by the coastal State. Increased cooperation and transfer of knowledge might consequently also lead to increased understanding of the need for ocean observations, which in itself might result in coastal States becoming more eager to allow ocean observations in waters under their jurisdiction. With some creative interpretation, this causal chain also appears implicitly in the resolutions of the IOC Assembly and the WMC. The United Nations Decade of Ocean Science for Sustainable Development could support these forms of capacity building. Some of the Sustainable Development Goals (SDGs) are thematically very much related to this Decade. Especially SDG 13 on Climate Action and evidently SDG 14 on life below water have great potential to raise awareness for the indispensability of ocean observations. The SDGs are not binding on the Member States of the United Nations but guide them clearly towards particular actions.

The necessity of ocean observing and its consequent importance in, for instance, the combat against climate change has a clear legal component. A somewhat longer quote from more than three decades ago describes this beautifully: ‘Another possibility here is that coastal states may change their views about the value to

them of MSR. That is, if the changes noted above in use of the sea begin to change the ocean environment in ways that are directly harmful to coastal interests, conceivably the feelings of hostility toward MSR may begin to diminish and change. While the jury is certainly still out on the so-called greenhouse effect, whatever might be responsible for changes in the ocean, some states may suffer more than others because of their particular location and characteristics. For example, if significant sea level rise does occur, low-lying islands or states may incur substantial damage. It may occur to such states that it is inadvisable to encourage or support placing restrictions on the conduct of research at sea when that research may contribute to knowledge that could benefit these states' (Burke 1990, 541). It is difficult to deny that this argument has become all the more important since it was made.

Many of the ideas to simplify the conduct of ocean observation would likely find fertile ground in a regional context, not least because inconsistency in consent procedures among coastal States is rather cumbersome. One encouragement comes from Art. 123(c) UNCLOS: 'States bordering an enclosed or semi-enclosed sea should cooperate [...] to coordinate their scientific research policies and undertake where appropriate joint programmes of scientific research'. Examples might be the Arctic Ocean, the Baltic Sea, the Black Sea and the Mediterranean Sea. Bilateral or regional agreements could contain simplified procedures for obtaining consent or create a notification scheme. Furthermore, these agreements could encourage 'the availability of research results, participation, assistance, training, transfer of technology, etc.' (Soons 1982; Soons 2007). Homogenous political and economic circumstances might help the creation of these agreements (Soons 1982; Soons 2007).

The BlueMED Strategic Research and Innovation Agenda of 2018 sees the observing systems and operational oceanography as one of the challenges for the Mediterranean Sea. The goals in order to meet this challenge lead to more detailed actions in the Agenda. The Strategic Research and Innovation Agenda of the Black Sea Commission of 2019 aims at the development of an 'innovative, fit for purpose observation and data sharing systems (combining ecology and social data)' (Black Sea Strategic Research and Innovation Agenda 2019, 6). The Agenda lists then many actions that are necessary to reach this goal. Strengthening 'the collection, observation, monitoring and dissemination of relevant data on the Arctic marine environment' is also one of the strategic actions of the Arctic Council's Arctic Marine Strategic Plan (2015, 12).

Following bilateral or regional arrangements, a potential next step is a project under the auspices of an intergovernmental organisation. Art. 247 UNCLOS suggests that a coastal State that is a member of such organisation is deemed to have authorised projects under the auspices of that very organisation. So far, only the IOC has implemented this provision for its own use but it has never been used (Soons 2007). It is of course open to other organisations to make use of the option in Art. 247 UNCLOS.

4. Other legal instruments

The Law of the Sea Convention is often seen as the basis for rules on marine scientific research but it is not the only international legal instrument applicable to it. Others are the 1992 United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD) of the same year, the CBD's 2010 Nagoya Protocol, many global and regional fisheries agreements, and the non-binding SDGs. The text of the UNFCCC is specific about research and observation in that all state parties shall '[p]romote and cooperate in scientific, technological, technical, socio-economic and other research, systematic observation and development of data archives related to the climate system' (UNFCCC, Art. 4(1)(g)). For this purpose,

they shall also support and further develop both international as well as intergovernmental efforts in this field (UNFCCC, Art. 5(a)&(b)). The Paris Agreement reaffirms this in its Art. 7.

At the end of 2022, the State Parties to the CBD adopted a global framework for biological diversity for the coming decade. An analysis of this framework focusing on the marine aspects might re-affirm the significance of ocean observing. Another instrument, the Sendai Framework for Disaster Risk Reduction, is not legally binding but weather- and climate-related disasters and especially the forecast thereof directly relates to the need for ocean observations. As already mentioned, scientists often use gliders for the collection of data on storms and hurricanes and this is often done on short notice. Tsunami-warning system evidently also depend on ocean observing.

5. On the law of the European Union

Within the framework of EU legislation, there is no one overarching legal instrument that covers the regulation of ocean observing. The applicable rules appear in myriad different instruments of different legal status, meaning that these legal instruments can be binding for the Member States and / or citizens of the EU or non-binding. The regulation of ocean observing depends very often on the purpose for which one collects ocean data. If this occurs for fisheries management, the regulation is different from when it occurs for the collection of data related to climate change or shipping. Due to the spread of provisions over different thematic areas, there is still a clear lack of harmonisation concerning the rules on both the planning as well as the implementation of scientific projects that vessel from one Member State conduct under the jurisdiction of another Member State (see already Gragl 2014 but still applicable). The current international requirement to obtain permission to do so six months in advance is in many cases unworkable. Yet, the EU 'may set up joint undertakings or any other structure necessary for the efficient execution of' research in the EU (Treaty on the Functioning of the European Union (TFEU), Art. 187). This could provide a basis for harmonisation of the rules that are applicable to ocean observations as set out above, not only between the Member States but also within. The lack of a centralised institution that is responsible within the State can lead to cumbersome procedure.

Many of the ideas to simplify the conduct of ocean observation would likely find fertile ground in a regional context, not in the least because inconsistency in consent procedures among neighbouring coastal States can be cumbersome and run counter to agreed regional priorities. It can now happen that neighbouring States collect very similar data in very similar parts of the ocean where increased cooperation between them and eased access to each other's exclusive economic zones would prevent the collection of less relevant data. One encouragement comes from Art. 123(c) UNCLOS: 'States bordering an enclosed or semi-enclosed sea should cooperate [...] to coordinate their scientific research policies and undertake where appropriate joint programmes of scientific research'. Examples might include the Arctic Ocean, the Baltic Sea, the Black Sea and the Mediterranean Sea. Bilateral or regional agreements could contain simplified procedures for obtaining consent or create a notification scheme, for instance the one in existence for Argo floats. Furthermore, these agreements could encourage 'the availability of research results [including data], participation, assistance, training, transfer of technology, etc.' (Soons 1982; Soons 2007). Homogenous political and economic circumstances might help the creation of these agreements (Soons 1982; Soons 2007), thus the EU is an ideal test bed. Many States' regulations are fully consistent with the Law of the Sea Convention but not necessarily consistent with each other as there is no explicit requirement for consistent interpretation and implementation of international rules.

EU law is divided into primary and secondary legislation (regulations, directives, decisions, recommendations, opinions, resolutions, declarations and action programmes). Treaties form the EU's primary law and EU institutions make EU secondary law. Only regulations are fully legally binding to all Member States. Other EU legal acts, such as recommendations and opinions, have a political focus and are not legally binding. Resolutions, declarations and action programmes are also not legally binding but constitute forms of actions from EU legal order.

Within the EU primary legal framework, the Treaty on European Union (TEU; Artt. 3(3) & 21(2)(f)) and the TFEU (Artt. 11 & 179(1)) stipulate the need to promote scientific and technological development in order to achieve the protection and improvement of the environment and the sustainable management of natural resources. However, there is no specific provision in the EU treaties for ocean governance and ocean observation, only the statement that the conservation of marine biological resources under the common fisheries policy (CFP) is an exclusive EU competence (TFEU, Artt. 3(1)(d) & 38-43) and that the Union and the Member States have shared competence regarding the environment (TFEU, Art. 4(2)(e)) and fisheries (except conservation of marine biological resources; TFEU, Art. 4(2)(d)). Briefly, this means that Member States transferred competence to the EU regarding the conservation of marine biological resources as part of a general fishing policy and also that, regarding environment and other fisheries matters, Member States can legislate and adopt legally binding acts when the EU does not do it.

Within the scope of EU secondary legislation, the EU established through its institutions specific Regulations, Directives and other legal acts related to ocean governance and maritime policy, among them the Common Fisheries Policy, the Habitat and Birds Directive, the Integrated Marine Policy, the Marine Strategy Framework Directive (MSFD) and rules on marine spatial planning. The EU itself shares competence regarding ocean observing with its Member States (TFEU, Artt. 4(3) & 2(2)). The data collection is however dependent on the Member States (Long 2012). The regulations and policies with a link to ocean observations are found in thematic areas (Gragl 2014).

5.1. Biological diversity

The Common Fisheries Policy is arguably one of the oldest of the marine policies (EU Regulation 1380/2013; Gragl 2014, 427). For the data collection necessary to manage fish stocks sustainably, the EU is dependent on its Member States (EU Regulation 1380/2013, Art. 27) as stated above as well but also the Scientific, Technical and Economic Committee for Fisheries, the International Council for the Exploration of the Sea and regional fisheries management organisations like the General Fisheries Commission for the Mediterranean.

In the 21st century, the Marine Spatial Planning Directive was added to the EU framework for the conservation of nature as well as the Marine Strategy Framework Directive. The former lists as a minimum requirement for marine spatial planning the use of best available data (Directive 2014/89/EU, Artt. 6(1)(e) & 10). The latter aims at achieving a good environmental status for European seas (Directive 2008/56/EC, Art. 3(5)). In order to do so, ocean observations appear quintessential (Directive 2008/56/EC, Artt. 8-11).

5.2. European marine observation and data network

EU Regulation 508/2014 defined European marine observation and data network (or 'EMODnet') as a 'network that integrates relevant national marine observation and data programmes into a common and accessible European resource' (Art. 3(2)(4)). Nevertheless, the only statement about marine observation and data network in this Regulation relates to the support that the European Maritime and Fisheries Fund (EMFF),

replaced by the European Maritime, Fisheries and Aquaculture Fund (EMFAF; EU Regulation 2021/1139, Art. 65), may give to the 'initiatives to co-finance, purchase and maintain *marine observation systems and technical tools for designing, setting-up and running an operational European marine observation and data network system* which aims to facilitate the collection, acquisition, assembly, processing, quality control, re-use and distribution of marine data and knowledge, through cooperation between Member States and/or international institutions concerned' (EU Regulation 508/2014, Art. 83(2)(c); emphasis added). Furthermore, EMODnet was defined as 'a partnership assembling marine data and metadata in order to make those fragmented resources more available and usable by public and private users by offering quality-assured, interoperable and harmonised marine data'. This Regulation established conditions for EMFAF to increase data quality and share through the European marine observation and data network (EMODnet) under shared management (EU Regulation 2021/1139, preamble (45), Artt. 2(2)(3), 32(c) & 52).

5.3. Integrated Maritime Policy

EU Regulation 508/2014 also provided the legal basis for integrated maritime governance, Integrated Maritime Policy (IMP) and maritime spatial planning (MSP), which are specific policies for ocean governance and ocean observing in the EU. The IMP should have its operations supported by the EMFF (currently EMFAF; EU Regulation 508/2014, Artt. 5 (d), 6(6), 82, 83(1) & 91). The IMP has as its goal to provide an overarching context in which the different policy areas could be coordinated.

5.4. International Ocean Governance

In 2018, the European Parliament adopted a resolution on international ocean governance, which provided important guidelines for improving the EU ocean governance and ocean observing framework. The resolution urges the Commission to extend 'existing EU research and observation tools and activities, including the European Marine Observation and Data Network (EMODnet), in order to establish a shared database, the European Earth Observation Programme (Copernicus), the European Global Ocean Observing System (EuroGOOS), and the Joint Programming Initiative 'Healthy and Productive Seas and Oceans' (JPI Oceans), all with the aim of creating an international marine and maritime data network' (§ 146). It further stresses the importance of a whole spectrum of marine data and encourages consequently 'scientific observation and exploration of the oceans' (§ 151). It also emphasises 'the need to move forward towards fit-for-purpose ocean observation systems, access to marine data and handling of large quantities of data' (§ 169). Greater resources should be dedicated to marine scientific research, 'such as interdisciplinary research and sustained ocean and coastal observation' (§ 158). The promotion of interdisciplinary research on issues such as climate change, the impact of human activities on coastal and marine ecosystems, operational oceanography as well as the protection and exploitation of marine biodiversity was already emphasised by the Commission a decade earlier (COM (2008) 534 final; Long 2012, 452). Finally, the 2018 Resolution of the European Parliament calls on the Commission to report regularly to Parliament on the progress made towards truly global ocean observation platforms' (§ 167).

The European Commission has been working on possible solutions for the problem faced by different actors at a national and at an EU level regarding shared responsibility and lack of coordination between stakeholders on ocean governance and European ocean observing systems. A former European Commissioner responsible for research and innovation has stated greater added value could be achieved 'pooling resources or coordinating initiatives at the EU level, such as in observation of the seas or in research on marine biodiversity' (as quoted by Long 2012). The Commission launched a public consultation at the end of 2020 to collect opinions from private industry, public authorities, researchers and civil society on that subject with

the specific goal to ‘engage those who fund observations, those who make observations, those who use observations and those who manufacture or sell equipment for ocean observations.’ There has been no outcome from that event yet but hopefully the Commission will release a more precise and specific legislation in line with practice in the field of ocean observation.

In 28 April 2021, the EU published the ‘Union Space Programme’ (Regulation (EU) n.º 2021/696)⁶ which repealed Regulation n.º 377/2014 that established the EU Copernicus Programme legal framework (Earth observation programme). According to the Copernicus Regulation⁷, the Copernicus Programme consists of three components that shall be linked and interfaced: ‘(a) a service component ensuring delivery of information in the following areas: atmosphere monitoring, marine environment monitoring, land monitoring, climate change, emergency management and security; (b) a space component ensuring sustainable spaceborne observations for the service areas referred to in point (a); (c) an in situ component ensuring coordinated access to observations through airborne, seaborne and ground based installations for the service areas referred to in point (a).’

Therefore, the EU Copernicus⁸ Programme created the ‘Copernicus Marine Environment Monitoring Service (Copernicus Marine Service)’⁹ to provide ‘information on the state and dynamics of physical ocean and marine ecosystems for the global ocean and the European regional marine areas, in support of marine safety, contribution to monitoring of waste flows, marine environmental, coastal and polar regions, and of marine resources as well as meteorological forecasting and climate monitoring.’

⁶ Regulation (EU) 2021/696 of the European Parliament and of the Council of 28 April 2021 establishing the Union Space Programme and the European Union Agency for the Space Programme and repealing Regulations (EU) No 912/2010, (EU) No 1285/2013 and (EU) No 377/2014 and Decision No 541/2014/EU.

⁷ Article 2 (2) of Regulation (EU) No 377/2014 of the European Parliament and of the Council of 3 April 2014 establishing the Copernicus Programme.

⁸ As set out in Preamble (71) of Regulation (EU) 2021/696, ‘Copernicus should ensure an autonomous access to environmental knowledge and key technologies for Earth observation and geo-information services, thereby supporting the Union to achieve independent decision-making and actions in the fields of, inter alia, the environment, climate change, marine, maritime, agriculture and rural development, preservation of cultural heritage, civil protection, land and infrastructure monitoring, security, as well as the digital economy.’

⁹ Preamble (25) and Article 5 (1) (b) of Regulation (EU) No 377/2014 of the European Parliament and of the Council of 3 April 2014 establishing the Copernicus Programme and repealing Regulation (EU) No 911/2010 established that ‘Copernicus should include a service component ensuring delivery of information in atmosphere monitoring, marine environment monitoring, land monitoring, climate change, emergency management and security. In particular, Copernicus should deliver information on the state of the atmosphere including at the local, national, European and global scale; information on the state of the oceans, including through the setting-up of a dedicated European grouping for marine monitoring; information in support of land monitoring supporting the implementation of local, national and European policies; information in support of climate change adaptation and mitigation; geospatial information in support of emergency management, including through prevention activities, and civil security including support for the Union’s external action. The Commission should identify appropriate contractual arrangements fostering the sustainability of service provision.’

Moreover, the EU Space Programme Regulation brought the legal framework for the use of ‘spacecraft’ (including satellites)¹⁰, ground-based radars, lasers and telescopes (SST sensor)¹¹, observation data from ground-based, seaborne or airborne sensors (‘Copernicus in-situ data’)¹², ‘autonomous driving and unmanned vehicles and drones’¹³ and set out that ‘[r]esearch infrastructures, in particular in-situ observing networks would constitute essential elements of the in-situ observation infrastructure enabling the Copernicus Services.’¹⁴ This Regulation provided a new legal framework for the operation of those instruments but only with focus in the components of the Union Space Programme (Galileo, Copernicus, European Geostationary Navigation Overlay Service, Space Situational Awareness and GOVSATCOM) that are managed by the European Commission¹⁵.

6. First thoughts on possible solutions

Already a decade ago, Long (2012) made many suggestions that would now still be valid to fulfil the desires of the European Parliament as advocated in its 2018 Resolution. Long mainly focuses on the possibilities for harmonisation and this appears indeed the first step that the EU could and should aim at with regard to the governance of ocean observations. Long questions the need within the EU to apply for research permissions through the traditional diplomatic channels and proposed a “MSR Clearance Office”. An advantage of such a specialised office could be a potential shortening of the six-month ahead requirement for such application as laid down in the Law of the Sea Convention (Art. 248) to, for instance, just one month. Moreover, a standardised form such as the United Nations Division on Ocean Affairs and the Law of the Sea propose could be adapted for the purpose of use within the EU (Long 2012). In sum, ‘[t]he streamlining of the administrative procedures that apply to foreign vessel MSR will reduce the cost of obtaining scientific data for policies such as the transport, fisheries, environmental, and climate change policies.’ (Long 2012)

¹⁰ Article 2 (1) of Regulation (EU) 2021/696 of the European Parliament and of the Council of 28 April 2021 establishing the Union Space Programme and the European Union Agency for the Space Programme defined ‘spacecraft’ as an ‘orbiting object designed to perform a specific function or mission, such as communications, navigation or Earth observation, including **satellites**, launcher upper stages, and a re-entry vehicle’.

¹¹ Article 2 (8) of Regulation (EU) 2021/696 of the European Parliament and of the Council of 28 April 2021 establishing the Union Space Programme and the European Union Agency for the Space Programme defined ‘SST sensor’ as a ‘device or a combination of devices, such as **ground-based or space-based radars, lasers and telescopes**, which is able to perform space surveillance or tracking and that can measure physical parameters related to space objects, such as size, location and velocity’.

¹² Article 2 (15) of Regulation (EU) 2021/696 of the European Parliament and of the Council of 28 April 2021 establishing the Union Space Programme and the European Union Agency for the Space Programme defined ‘Copernicus in-situ data’ as ‘**observation data from ground-based, seaborne or airborne sensors**, as well as reference and ancillary data licensed or provided for use in Copernicus’.

¹³ Preamble (4) of Regulation (EU) 2021/696 of the European Parliament and of the Council of 28 April 2021 establishing the Union Space Programme and the European Union Agency for the Space Programme.

¹⁴ Preamble (21) of Regulation (EU) 2021/696 of the European Parliament and of the Council of 28 April 2021 establishing the Union Space Programme and the European Union Agency for the Space Programme.

¹⁵ Article 9 (1) of Regulation (EU) No 377/2014 of the European Parliament and of the Council of 3 April 2014 establishing the Copernicus Programme established that ‘[t]he Commission shall have overall responsibility for Copernicus and for the coordination among its different components. It shall manage the funds allocated under this Regulation and oversee the implementation of Copernicus including the setting of priorities, user involvement, cost, schedule, performance and procurement.’

Within an EU Member State, the MSR Office could function as a spider in the web and disseminate information to the coast guard, ministries and possibly other government institutions. In addition, it might be wise to set up the MSR Office in such a way that is instrumental in the monitoring of the researching state's compliance with the clearance given. Implementation of Artt. 249 to 254 UNCLOS is crucially important in this regard (Long 2012).

Long also provides ideas on how this harmonisation could be achieved in either a political or legal manner. His first example is rather on the political level and concerns the – as he calls it - tightening up of 'existing administrative procedures in the Member States to ensure that they are fully consistent with' the Law of the Sea Convention and preferably also consistent among the Member States. A Communication of the Commission would be able to achieve this goal, or otherwise an Action Plan, Guidelines or a Roadmap. The Council or the Commission can also adopt a Recommendation. All these measures are thus non-binding (Long 2012). A legally binding option would be a European Parliament and Council Regulation (Long 2012). As mentioned above, such a Regulation is directly legally binding for all Member States of the EU. This is likely to be more advantageous in order to reach a goal than a Directive, which every member state would have to implement (Long 2012).

After listing the legal options, it is no less essential to analyse the feasibility of these options coming to fruition. In other words, one needs to answer the question if Member States would allow or have allowed the EU to take action. According to the principle of subsidiarity, the EU can generally only regulate when the aim of the regulation – or policy – can only be achieved on the European level. That means that if Member States would be able to achieve the goal themselves, the EU would not be allowed to act. It seems however evident that in the case of harmonising policy and legislation regarding ocean observing, the EU level is the better choice (Long 2012). Such a policy or regulation will then still have to be proportional and should not go beyond the goal in mind (Long 2012). It appears that there is a likelihood that both the principle of subsidiarity as well as that of proportionality would not create an impediment for the Commission to act upon the encouragement of the Parliament (see also Long 2012).

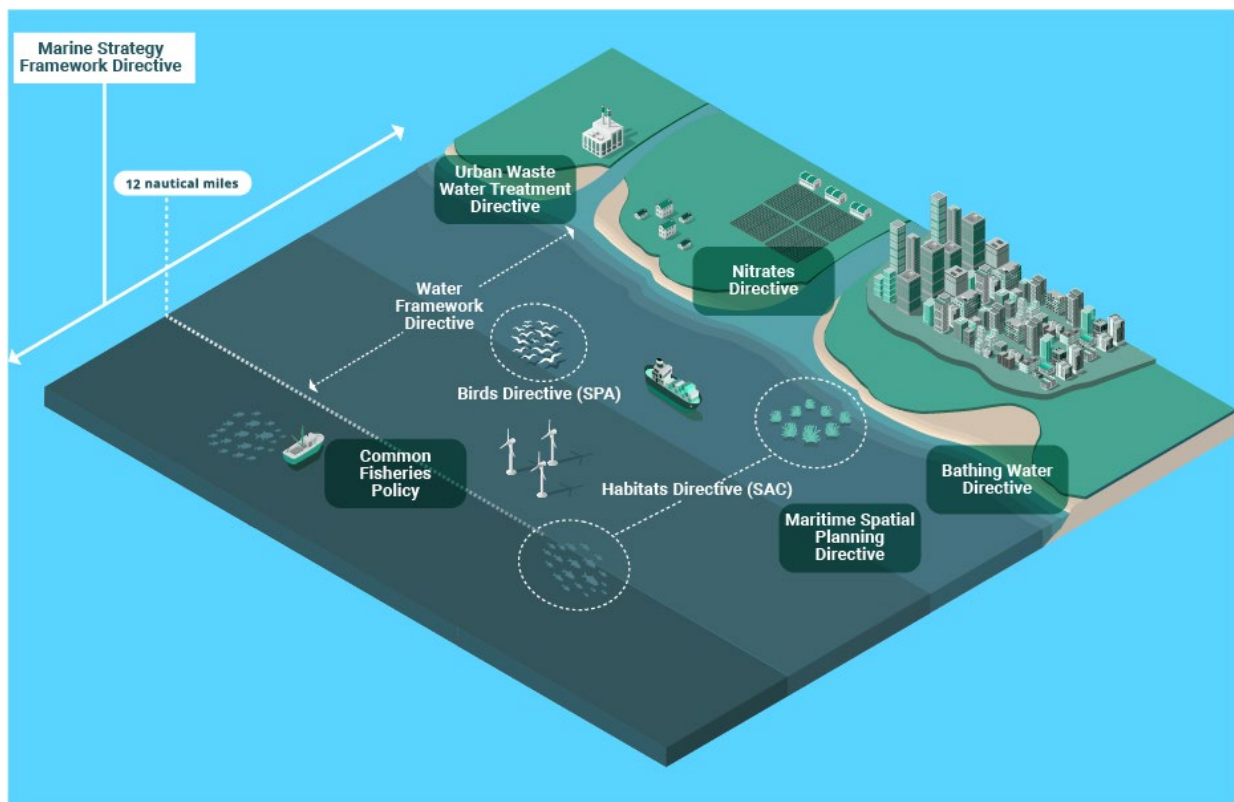


Figure 1. European Directives regulating marine-related elements¹⁶

Conclusion

As stated, the deciding factor in international regulation of ocean observing appears to be for which purpose the observations occur. This leads to a thematic approach in regulation. When the observations relate to the exploration or exploitation of natural resources, the coastal State will likely exercise jurisdiction. It becomes increasingly difficult when data are multi-purpose. As soon as multi-purpose data also relate to natural resources, however, the coastal state will still exercise jurisdiction. In the hypothetical case that one can conduct the ocean observations for the same purpose in the marine environment and from outer space, two different regimes will be applicable even though the data might for the same purpose. Evidently, this is where the location of ocean observing plays a role.

Now one approach is to stay within this current approach and try to improve the regulation for fisheries stock assessment, climate research and hydrography all separately from each other; a rather bottom-up approach. Applying the old rules to new methods of ocean observing would be consistent with Art. 258 UNCLOS but would not solve all problems. Especially advanced clearance is difficult to obtain in the case of floats and gliders, for instance. One could also attempt to turn the whole system upside-down and regulate all observations conducted for the same purpose in the same manner, no matter where the observing takes place. This would require a complete revision of existing law, likely take away regulating capabilities from states and consequently unlikely to happen. It would however solve the problem – not explicitly addressed

¹⁶ EEA-ETC/ICM, prepared for WISE Marine portal, <http://water.europa.eu/marine>.

in this brief – of observing instruments that float nearly uncontrollably in and out of maritime zones with different regulatory regimes. It would also give the opportunity to structure a governance framework more along the lines of the Global Ocean Observing System’s Essential Ocean Variables (EOVs), a concept that is already familiar within the scientific community. Every EOv could then have its own appropriate regulatory framework. One crucial question is then if one always knows at the moment of observing for which purposes the observation might be used.

However unlikely this option might seem in the near future, the functioning of international law provides another option. When a sufficient amount of States behaves consistently in a certain way over a considerable period of time and these States have the conviction that their behaviour is legal, this very practice can become customary international law without the immediate need of a legally-binding instrument. The way in which the international community now widely considers that operational oceanography – or better: sustained ocean observations – are not part of marine scientific research developed in a similar fashion as customary international law does. The applicable WMO resolutions seem to reflect customary international law on this topic. This kind of resolutions, be it from the WMO or other international organisations, could initiate or affirm new legal developments.

The negotiation of new legally binding rules is of course also an option. Efforts to do so started already in the 1960s but postponed during the LOSC negotiations. The latest draft of the Convention on the Legal Status of Ocean Data Acquisition Systems, Aids and Devices dates back already almost three decades. It appears to have been a lack of interest among member states of the International Maritime Organization shortly after that prevented progress on this project (Bork *et al.* 2008).

Legal instruments

Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions, *A European strategy for marine and maritime research: a coherent European research area framework in support of a sustainable use of oceans and seas* (Brussels, 3 September 2008) COM(2008) 534 final.

Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive) *Official Journal L* 164 (25 June 2008) 19–40

Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning *Official Journal L* 257 (28 August 2014) 135–145

Regulation (EU) No. 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy *Official Journal L* 354 (28 December 2013) 22–61

Regulation (EU) No. 508/2014 of the European Parliament and of the Council of 15 May 2014 on the European Maritime and Fisheries Fund *Official Journal L* 149 (20 May 2014) 1–66

Regulation (EU) 2021/1139 of the European Parliament and of the Council of 7 July 2021 establishing the European Maritime, Fisheries and Aquaculture Fund *Official Journal L* 247 (13 July 2021) 1–49

Resolution of the European Parliament on international ocean governance: an agenda for the future of our oceans in the context of the 2030 Sustainable Development Goals (2017/2055(INI), 16 January 2018) *Official Journal C* 458 (19 December 2018) 9–33

Treaty on European Union (TEU) 31 *International Legal Materials* 247 (1992)

Consolidated version of the Treaty on the Functioning of the European Union (TFEU) *Official Journal C* 326 (26 October 2012) 47–390

United Nations Convention on the Law of the Sea (UNCLOS) 21 *International Legal Materials* 1261 (1982)

United Nations, Office of Legal Affairs, Division for Ocean Affairs and the Law of the Sea, *Marine Scientific Research: A revised guide to the implementation of the relevant provisions of the United Nations Convention on the Law of the Sea* (United Nations, New York; 2010)

References

- Bork *et al.*, K., 'The Legal Regulation of Floats and Gliders—In Quest of a New Regime?' 39 *Ocean Development & International Law* (2008) 298–328
- Burke, W., 'Commentary' in: A.H.A. Soons (ed.), *Implementation of The Law of the Sea Convention Through International Institutions* (Honolulu, 1990) 539-541
- Churchill, R.R. & A.V. Lowe, *The Law of the Sea* third edition (Manchester, 1999)
- Danilenko, G.M., 'Space Technology and Marine Scientific Research' 12 *Marine Policy* (1988) 247-255
- Dexter, P. & Y. Treglos, 'The World Meteorological Organization need for ocean science' in: G. Holland & D. Pugh (eds.), *Troubled Waters: Ocean Science and Governance* (Cambridge, 2010) 274-281
- Gragl, P., 'Marine Scientific Research' in: M. Fitzmaurice & N.A. Martínez Gutiérrez (eds.), *The IMLI Manual on International Maritime Law Volume 1: The Law of the Sea* (Oxford, 2014) 396-430
- Gorina-Ysern, M., *An International Regime for Marine Scientific Research* (Ardsley, New York, 2003)
- Hubert, A.-M., 'Marine scientific research and the protection of the seas and oceans', in R. Rayfuse (ed), *Research Handbook on International Marine Environmental Law* (Cheltenham and Northampton, 2015) 313-336
- Huh, S. & K. Nishimoto, 'Art. 245' in: A. Proelss (ed.), *United Nations Convention on the Law of the Sea. A Commentary* (München etc., 2017) 1643-1649
- Knauss, J.A., 'Development of the Freedom of Scientific Research Issue of the Third Law of the Sea Conference' 1 *Ocean Development and International Law* 1 (1973) 93-120
- Knauss, J.A., 'Legal Regime of Marine Scientific Research According to the UN Convention on the Law of the Sea: Prospects' in: T.A. Clingan, Jr. & A.L. Kolodkin (eds.), *Moscow Symposium on the Law of the Sea* (Honolulu, 1991) 293-302
- Kraska *et al.*, J., 'Bio-logging of marine migratory species in the law of the sea' 51 *Marine Policy* (2015) 394-400
- Long, R., 'Regulating Marine Scientific Research in the European Union: It Takes More than Two to Tango' in: M.H. Nordquist *et al.* (eds.), *The Law of the Sea Convention: US Accession and Globalization* (Leiden & Boston, 2012) 428-491
- Mangone, G.J., 'The Effect of Extended Coastal State Jurisdiction over the Seas and Seabed upon Marine Science Research' 9 *Ocean Development and International Law* 3/4 (1981) 201-218
- Nordquist *et al.*, M.H. (eds.), *United Nations Convention on the Law of the Sea 1982. A Commentary* vol. IV (Dordrecht etc., 1991)
- O'Connell, D.P., *The international law of the sea* vol. I (I.A. Shearer (ed.); Oxford, 1982)
- Papanicolopulu, I., 'Art. 258' in: A. Proelss (ed.), *United Nations Convention on the Law of the Sea. A Commentary* (München etc., 2017) 1731-1737

Rothwell, D.R., & T. Stephens, *The International Law of the Sea* second edition (Oxford & Portland, Oregon; 2016)

Scholz, W.S., 'Oceanic research: International law and national legislation' 4 *Marine Policy* 2 (April 1980) 91-127

Soons, A.H.A., *Marine Scientific Research and the Law of the Sea* (Deventer etc., 1982)

Soons, A.H.A., 'Marine Scientific Research Provisions in the Convention on the Law of the Sea: Issues of Interpretation' in: E.D. Brown & R.R. Churchill (eds.), *The UN Convention on the Law of the Sea: Impact and Implementation* (Honolulu, 1987) 365-372

Soons, A., 'The Legal Regime of Marine Scientific Research: Current Issues' in: M.H. Nordquist *et al.* (eds.), *Law, Science & Ocean Management* (Leiden & Boston, 2007) 139-166