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The law of the sea:
A powerful instrument



> Today, a raft of international treaties determines which state has jurisdiction over coastal waters and the seabed and where a country's fishing fleet may legally operate. However, the extraction of mineral resources from the ocean floor and climate change are confronting the international law of the sea with new challenges. Balancing the protection of the marine environment with intensive use of the oceans is also a difficult task.



A constitution for the seas

> Humankind has exploited the sea for centuries, and this has frequently led to conflict. With the adoption of the United Nations Convention on the Law of the Sea (UNCLOS) in 1982, the international community created a comprehensive framework for legal governance of the seas which, over time, has evolved into a powerful body of law. However, it cannot provide an answer to every problem that arises.

One set of rules for all states

The international law of the sea comprises all the legal norms pertaining to the sea and applicable to relations between states. It contains rules on the delimitation and exploitation of maritime areas as well as provisions on the protection and exploration of the oceans. However, some fields fall outside its scope; these include matters covered by national legislation, such as regulations on port and harbour operations, and maritime law, which in Germany is mainly enshrined in the Commercial Code and regulates activities such as the transportation of goods.

The end of legal freedom

For thousands of years, the sea was simply a source of food and was only of interest to people to that extent. With the rise of the great seafaring nations such as the Netherlands, Portugal and Spain from the 15th century onwards, however, these kingdoms increasingly sought to expand their spheres of influence. Access to mineral resources and other new commodities aroused ambitions and triggered a race to conquer the oceans, faraway islands and coastlines and thus achieve dominance in the world. This led to numerous wars and sea battles.

Early on, scholars sought answers to one important question: who does the sea actually belong to? It is a question which the international law of the sea has been unable to resolve satisfactorily to this day. From the outset, the quest for an answer was dominated by the tension between the concept of the freedom of the seas, or *mare*

liberum (the free sea), formulated by the Dutch philosopher and jurist Hugo Grotius (1583 to 1645), and the concept of *mare clausum (closed sea)* developed by the English scholar and polymath John Selden (1584 to 1654). The pivotal issue was – and is – whether the sea is international territory and all nations are free to use it, or whether it can be claimed by individual states. Neither of these two positions has ultimately prevailed, and the conflict between the positions is still apparent in the present structure of the international law of the sea.

Currently, the primary instrument of governance for the seas is the United Nations Convention on the Law of the Sea (UNCLOS), which was adopted in 1982 as the outcome of the Third United Nations Conference on the Law of the Sea (UNCLOS III). Various norms of customary international law supplement UNCLOS. The Convention is the most comprehensive international treaty ever concluded. It is based on the four Geneva Conventions on the Law of the Sea adopted in 1958: these are the Convention on the Territorial Sea and the Contiguous Zone; the Convention on the High Seas; the Convention on Fishing and Conservation of the Living Resources of the High Seas; and the Convention on the Continental Shelf. These treaties codified the – unwritten – customary law which had previously applied. For example, since the mid-17th century, countries had generally accepted that national rights applied to a specified belt of water, known as the territorial sea, extending from a nation's coastlines, usually for three nautical miles – roughly equivalent to the distance travelled by a cannon shot.

From the mid-20th century, the seas became an increasing focus of interest as a source of natural resources such

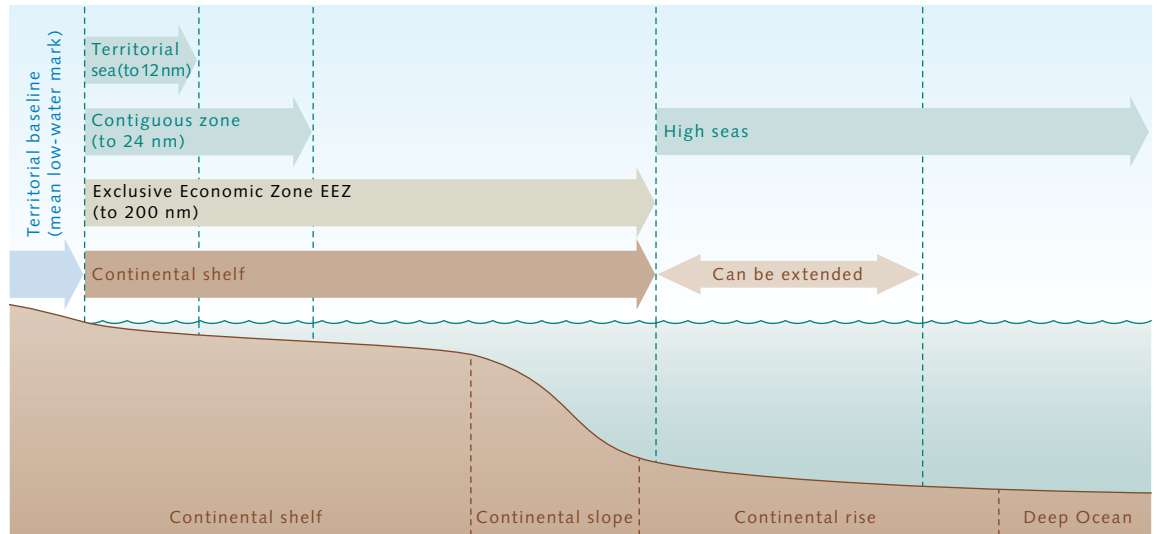


10.1 > The Dutch jurist Hugo Grotius (1583 to 1645) formulated the principle of “freedom of the seas”, arguing that the sea was international territory and all nations were free to use it. He immortalized his idea in his book *Mare Liberum* (also known as *De mare libero*) in 1609.

as oil and gas. Many coastal states therefore attempted to extend their national jurisdiction over ever-larger areas of the sea and the seabed. Some laid claim to a 200 nautical mile zone. The concept of “*mare liberum*” appeared to have been consigned to history. After an initial attempt to regulate the maximum permissible extent of the territorial sea in an international treaty failed in 1930, the four Geneva Conventions were finally adopted under United Nations auspices in 1958. The aim of these international agreements was to prevent the sea from being divided up, once and for all, between various countries. However, this aim was not achieved in full. For example, the discovery of major deep seabed deposits of manganese nodules in the eastern and central Pacific Ocean, at considerable distance from the coast, in the 1960s sparked new ambitions among the industrial countries (Chapter 7). At present, the key question being discussed is which nations can lay claim to the wealth of mineral resources located in the Arctic, which in future will become easier to access as the sea ice retreats.

More scope for coastal states

Today, UNCLOS draws together the four Geneva Conventions – the “old” law of the sea – in a single unified treaty. In substantive terms, however, it actually goes further than the four. For example, under the “new” law of the sea, the rights of the coastal states are expanded, in some cases substantially, in both qualitative and quantitative terms. For example, each coastal state has exclusive rights to exploit the fish stocks in the Exclusive Economic Zone (EEZ) which extends to a distance of 200 nautical miles out from the coastal baseline. Under the Geneva Conventions, the EEZ did not exist. UNCLOS also provides the legal basis for the International Tribunal for the Law of the Sea (ITLOS), which commenced its work in Hamburg in 1996. However, the Tribunal is not the only judicial institution responsible for safeguarding compliance with UNCLOS. The states parties to UNCLOS are free to choose whether they wish to submit disputes concerning the interpretation and application of



10.2 > UNCLOS divides the sea into various legal zones, with the state's sovereignty decreasing with increasing distance from the coast. Every state has the right to territorial sea, not exceeding 12 nautical miles, in addition to its internal waters. In the territorial sea, the sovereignty of the coastal state is already restricted under international law, as ships of all states enjoy the right of innocent passage through it. In the contiguous zone, which may not extend beyond 24 nautical miles from the relevant baselines, the coastal state may merely exer-

cise rights of control, for example to prevent infringement of its customs regulations. In the Exclusive Economic Zone (EEZ), which extends for up to 200 nautical miles, the coastal state has sovereign rights for the purpose of exploring and exploiting the natural resources, whether living or non-living, of the waters. On the continental shelf, which may extend beyond the EEZ, the coastal state has sovereign rights for the purpose of exploring and exploiting the natural resources, whether living or non-living, on or under the seabed.

Jurisdiction
 "Limited jurisdiction" means that a state enjoys exclusive rights to make certain types of use of the resources of the EEZ and the continental shelf, such as the right to fish in these areas.

UNCLOS to ITLOS, or whether they prefer to apply to the International Court of Justice (ICJ) in The Hague or another international arbitral tribunal.

It took some years for UNCLOS to be accepted: most industrialized countries rejected it at first due to a number of highly contentious provisions on deep sea mining. For example, UNCLOS initially required these nations to share their deep sea mining know-how with the developing countries. Once the provisions had been watered down, reinforcing the position of the industrial nations, UNCLOS entered into force in 1994, 12 months after Guyana became the 60th country to sign the Convention and 12 years after its adoption. As of July 2009, 157 states had acceded to the Convention. Countries which have not acceded to UNCLOS are still bound by the provisions of the 1958 Geneva Conventions and the norms of customary international law.

Clear rules, clear limits

The international law of the sea establishes a framework for conduct, especially in relation to economic interests, with which compliance is mandatory. It regulates fishing and navigation and the extraction of oil and gas at sea. Also the exploitation of other resources of the deep seabed and the protection of the marine environment are regulated.

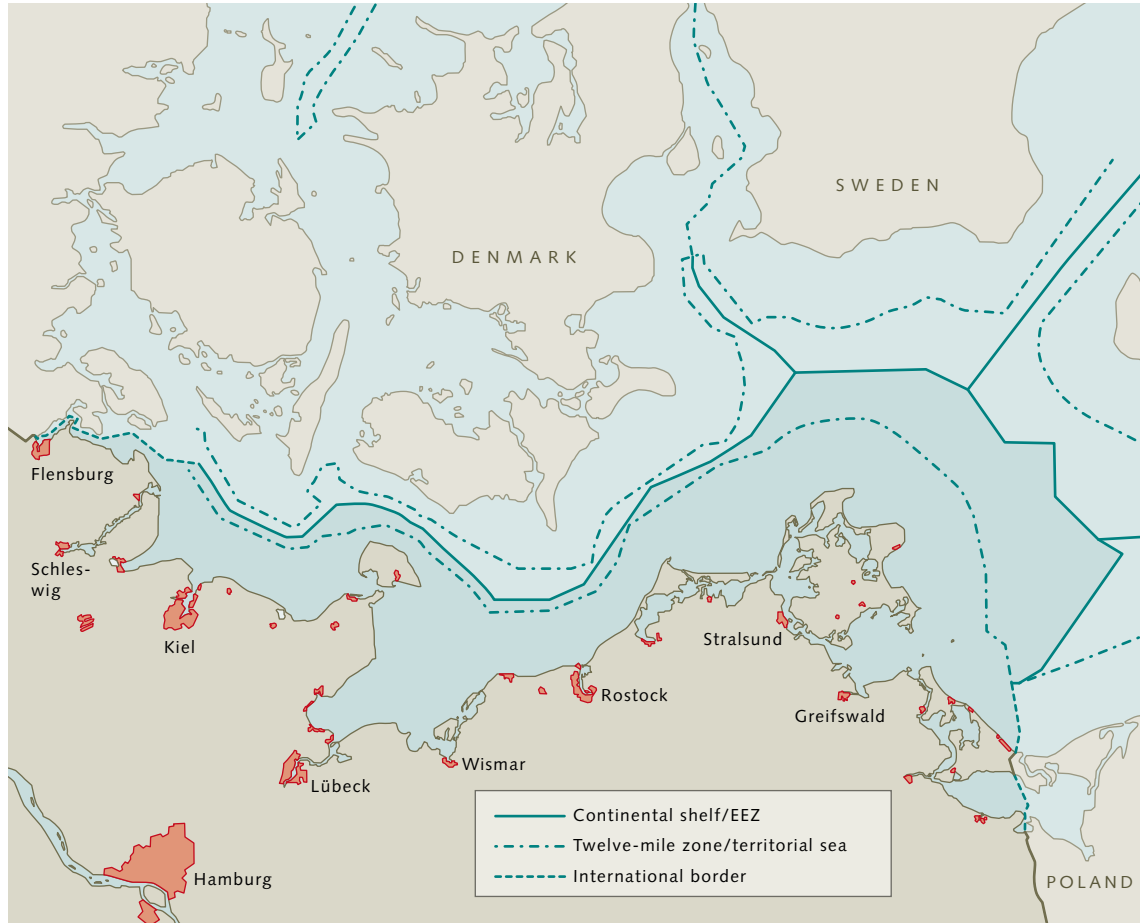
The law divides the seas into various legal zones. It defines the legal status and extent of these zones and establishes norms governing the rights and jurisdictions of the coastal and flag states in respect of these zones. A state's jurisdiction decreases as the distance from the coast increases. Jurisdiction ranges from full territorial sovereignty (in internal waters) to limited "aquitorial" sovereignty (in the territorial sea) and limited jurisdiction

(in the EEZ and continental shelf). The reference for the calculation of the various maritime zones is known as the baseline. The normal baseline is the mean low-water line along the coast as marked on charts officially recognized by the coastal state.

Waters on the landward side of the baseline belong to the state's internal waters. They form part of the national territory of the coastal state, which has complete jurisdiction over them. In some cases, however, it is not the low-water line which delimits the internal waters; this applies in cases where straight baselines or closing lines across a bay are drawn. The law of the sea permits this approach if the coast is characterized by deep indentations and inlets (as in Norway), if a chain of islands stretches along and immediately adjacent to the coast (as with the North

Frisian Islands) or if the coast has a bay. For example, the Wadden Sea, to the extent that it lies landwards of the outermost points of the North Frisian Islands, is just as much part of Germany's internal waters as the ports of Kiel, Hamburg and Bremen.

The territorial sea extends seawards of the baseline to a limit not exceeding 12 nautical miles. It is here that international law begins to restrict the sovereignty of the coastal state: ships of all states enjoy the right of innocent passage through the territorial sea. The coastal state may not make passage through the territorial sea subject to permission or similar restrictions. Under certain circumstances, however, it may take steps to channel ships in transit, e.g. by creating shipping lanes, in order to ensure the safety of navigation.



10.3 > Neighbours
Denmark, Germany, Poland and Sweden lie so close together that their Exclusive Economic Zones are limited to a narrow belt of water. In some areas, e.g. east of Flensburg, the limits actually lie within the twelve-mile zone.

A complex legal issue – protecting marine mammals

The protection of marine organisms is regulated not only by UNCLOS, but also by international environmental law and legislation adopted at national and European level. In its articles on the Exclusive Economic Zone (EEZ), UNCLOS contains numerous provisions on the management of fish stocks, and these provisions have been further elaborated in a number of more recent international agreements (Chapter 6). The same applies to the protection of marine mammals, a topic addressed as early as 1946 by the International Convention for the Regulation of Whaling, which is still in force today. Originally, the management of stocks of large whales was the key focus of attention, but following the almost complete collapse of commercially significant whale populations in the 1970s and 1980s, the states parties shifted the focus of the Convention towards species conservation by imposing a comprehensive moratorium on commercial whaling. The **International Whaling Commission** was established at the same time. For some years now, its annual meetings have been dominated by heated arguments between those countries which are in favour of a resumption of commercial whaling (mainly Japan) and the majority of other countries which are strictly opposed to whaling. At present, Japan circumvents the moratorium by invoking a clause in the Convention which authorizes the killing of whales for purposes of scientific research. However, as the whales killed are in fact utilized for commercial purposes, most experts in international law take the view that Japan's conduct is an abuse of the law. It is still unclear how the stalemate at international level between those in favour of whaling and those opposed to it can be resolved. From an economic perspective, whaling is a loss-making business, even in Japan. There is no doubt, however, that supporters of whaling are extremely dissatisfied with the work of the Commission, so they may continue to ignore the moratorium in future. A possible way out of the crisis would be a cautious easing of the moratorium. One option could be to agree a small catch quota for minke whales, which – in view of the positive development of stocks of this species – could be justified on ecological grounds. The prerequisite, however, would be stringent controls of whaling, including the presence of foreign inspectors on board the whaling vessels. A very limited resumption of commercial whaling could offer Japan a way out of illegality. But is this ethical? World opinion remains divided.

The harbour porpoise (*Phocoena phocoena*) is the only native species of cetacean inhabiting the North and Baltic Seas. In the German EEZ, harbour porpoises are found mainly at the Sylt Outer Reef, where the number of mother and calf pairs is particularly high, indi-



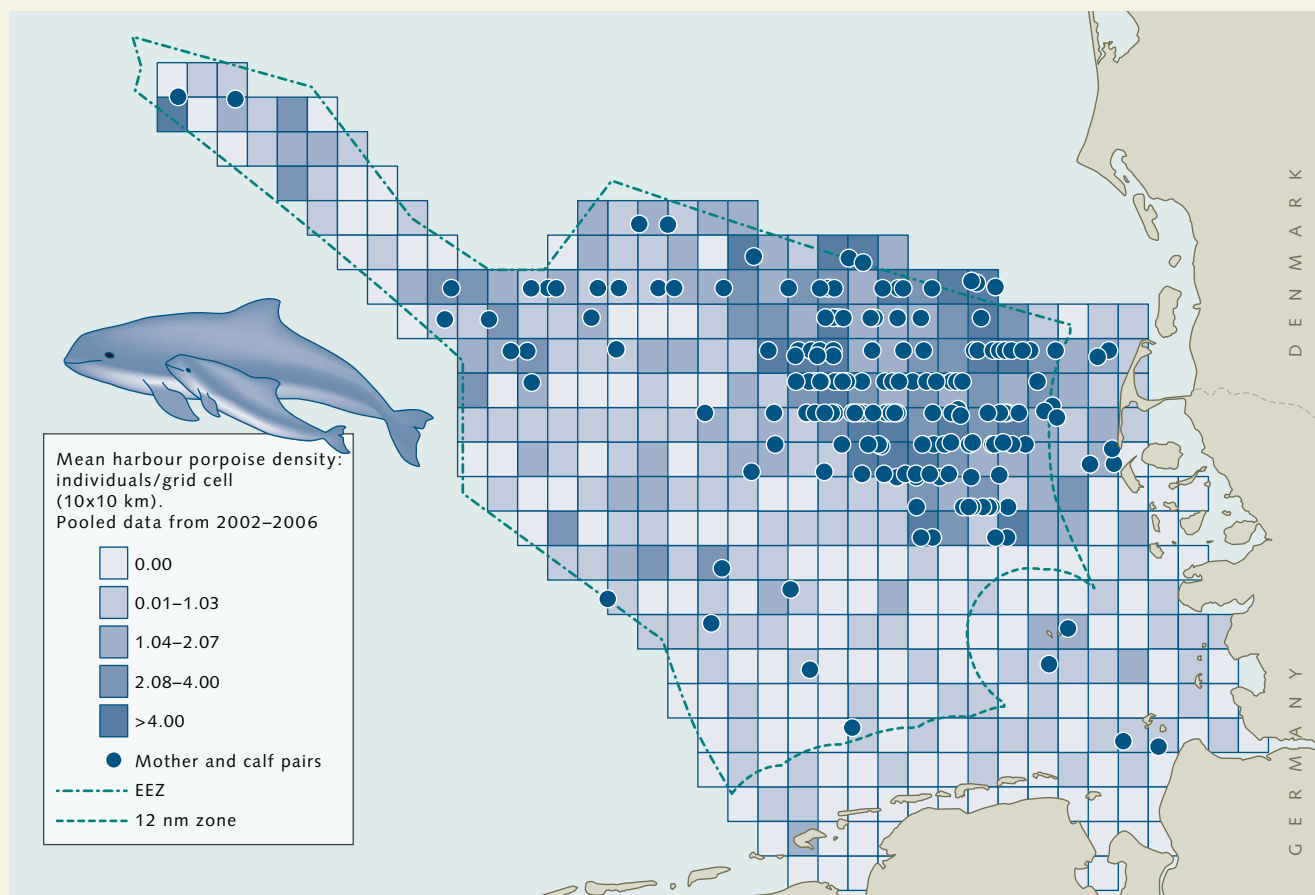
10.4 > Whereas most countries have agreed to protect whales, Japan is continuing to hunt them, as seen here in the South Pacific. The Japanese invoke a clause in the whaling moratorium which allows the killing of whales for scientific research purposes. Ultimately, however, their underlying interests are commercial.

10.5 > Off the German coast, harbour porpoises are mainly found at the northern periphery of the EEZ on the border with Denmark. As this example shows, transboundary species conservation schemes such as the EU's Natura 2000 system are essential to preserve marine mammals.

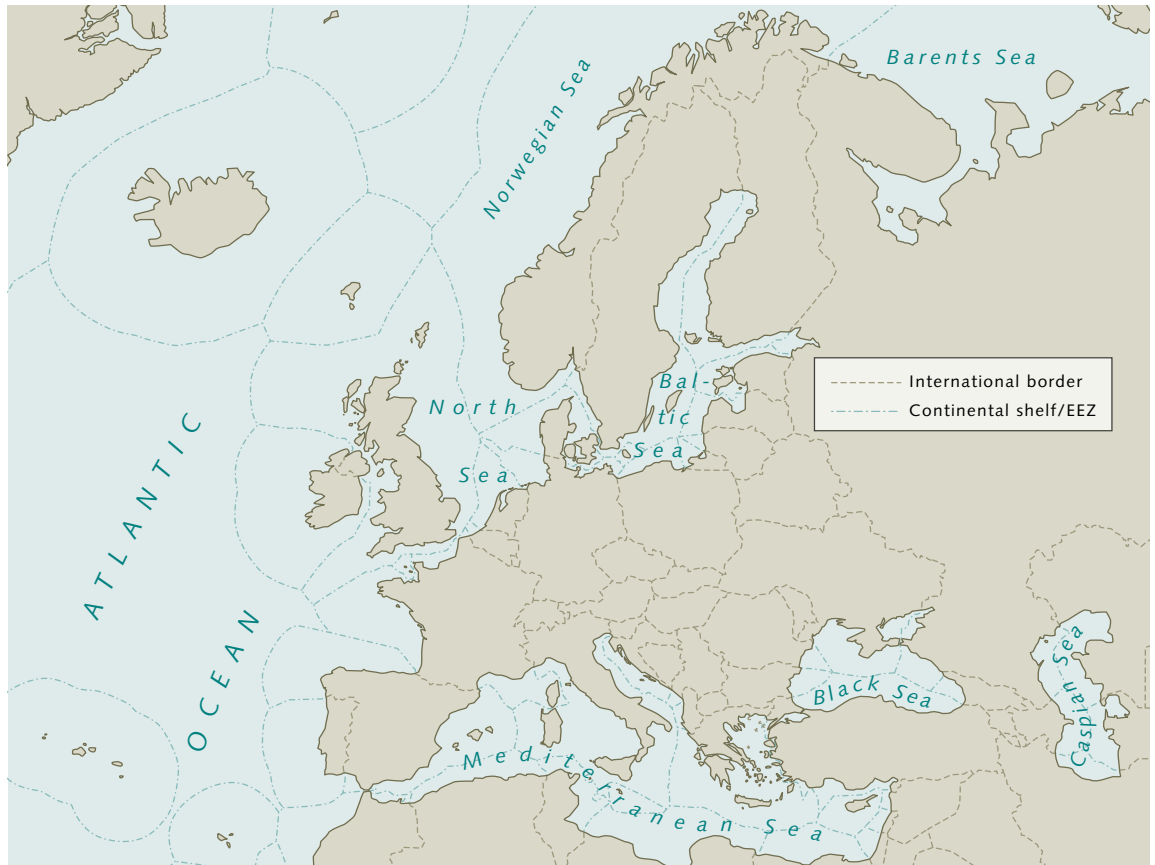
cating that this area is important for the species' reproduction. The intensive use of the German EEZ is having a major impact on harbour porpoise stocks. Fishing is a particularly relevant factor here as it reduces the porpoises' food sources. In other cases, harbour porpoises die as bycatch in fishing nets. Underwater noise pollution, caused for example by offshore structures such as wind turbines, can drive harbour porpoises off their ranges and can also cause direct damage to the animals' health. Pollution, too, can affect the health status of porpoise in various ways. Current legislation therefore aims primarily to make economically significant human activity in and on the seas more ecologically sustainable, with a view to protecting and preserving the harbour porpoise.

The Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas (ASCOBANS), for example, is significant here. However, in internal waters, the territorial sea and the EEZ, it is the nature conservation legislation adopted at the national level which is primarily relevant. Furthermore, in European waters, the legislation on species and habitat conservation introduced by the institutions of the European Union (EU) plays a key role. The EU's Habitats Directive, for example, covers the EU member states' internal waters and territorial sea, the EEZ and the continental shelf. This Directive aims to create a coherent European network of protected areas, known as "Natura 2000", as a key instrument to

preserve European species diversity. The Directive requires protected sites to include habitats of specific species, one of which is the harbour porpoise. Within the designated protected areas, any plan or project which is likely to have a significant effect on the environment, such as the construction of offshore wind farms, must undergo a stringent environmental impact assessment before it can be carried out. In some cases, however, a plan or project must nevertheless be carried out for imperative reasons, such as overriding public interest, in spite of a negative assessment of the project's implications for the environment. In such cases, the member state is required to adopt compensatory measures.



10.6 > In densely populated Europe with its many borders, the Exclusive Economic Zone (EEZ) often extends for less than 200 nautical miles. This applies to the Adriatic, the North Sea and the Mediterranean. Nonetheless, worldwide, around 90 per cent of all commercially relevant fish species are caught in the relatively narrow belt of water which forms the EEZs.



Adjacent to the territorial sea is the contiguous zone, which extends up to 24 nautical miles seawards from the baseline. In this area, which partly overlaps with the territorial sea, the coastal state may merely exercise rights of control. For example, it may verify compliance with or infringement of its national laws and regulations, including customs, fiscal, immigration or sanitary laws and regulations, within its territorial sea. Further out to sea, there is the Exclusive Economic Zone (EEZ), which stretches to 200 nautical miles seawards of the baseline.

Unlike the internal waters and the territorial sea, the EEZ does not form part of the national territory. Here, the coastal state merely has specific limited rights which apply not to the maritime area itself but only to the resources existing within it. As the term “Exclusive Economic Zone” implies, only the coastal state may erect and

utilize structures such as oil platforms and wind turbines here, or engage in fishing: third countries are excluded from such activities. This is highly significant from an economic perspective: for example, around 90 per cent of all commercially relevant fish species occur in the coastal states’ EEZs. This figure is even more striking given that these economic zones make up just 35 per cent of the seas’ total area.

The coastal state also has jurisdiction over marine scientific research. The conduct of marine research activities by third countries in the Exclusive Economic Zone therefore generally requires the authorization of the coastal state. In matters pertaining to the protection and preservation of the marine environment, too, the coastal state enjoys specific rights in the Exclusive Economic Zone. It alone may propose the designation of a marine

protected area within its EEZ to the International Maritime Organization (IMO) in order to protect the area concerned against pollution from ships. However, a coastal state may not assert territorial claims to any part of the Exclusive Economic Zone. All states enjoy freedom of navigation in the EEZ and have the right to lay sub-marine cables and pipelines there.

UNCLOS also contains specific provisions relating to the continental shelf, of which parts may lie well beneath the EEZ. Like the EEZ, this is an area of jurisdiction where only the coastal state has the right to explore and exploit natural resources. Nature and law dictate that every coastal state in the world has a continental shelf, but the width of that shelf varies considerably, according to geological conditions. As the law stands, however, each coastal state may claim a continental shelf of up to 200 nautical miles. If the natural continental shelf extends beyond 200 nautical miles, an even larger area can be designated as the continental shelf. In that case, under international law, the maximum outer limit may not exceed 350 nautical miles from the baseline or, alternatively, 100 nautical miles seawards from the 2500 metre isobath.

In cases where a coastal state intends to establish the outer limits of its continental shelf beyond 200 nautical miles, it is required to provide evidence to the UN Commission on the Limits of the Continental Shelf (CLCS) that the submarine area concerned is genuinely a natural prolongation of its territory. The Commission scrutinizes the geological and hydrographic data submitted and finally makes a recommendation. The outer limits of the shelf established by a coastal state on the basis of these recommendations are final and binding.

However, there is still disagreement within the international community concerning the legal implications of a Commission recommendation. The Commission has no powers of judicial control: scrutiny by the CLCS is merely intended to ensure that the limits of the continental shelf are established in compliance with scientific standards. The CLCS is not a paper tiger, however: a recommendation by the Commission, once published, puts a coastal state under considerable political pressure. Any

deviation must be justified, and not once has a recommendation by the CLCS been disregarded.

The outer limits of the Exclusive Economic Zone mark the start of international waters (the high seas). This term applies to the water column beyond the EEZ rather than to the seabed. The high seas are open to all states. No state may subject any part of the high seas to its sovereignty. The “freedom of the high seas” – just as Hugo Grotius envisaged – comprises, in particular, freedom of navigation, freedom of fishing, and freedom of marine scientific research.

The non-living resources of the seabed beyond the continental shelf on the seaward side have been declared part of the common heritage of mankind. Extraction of the manganese nodule deposits located in this area (Chapter 7) will henceforth be subject to rules that are geared towards the benefit of mankind as a whole and take into particular consideration the interests and needs of the developing countries. Mining operations will be organized and monitored by the International Seabed Authority (ISA) based in Kingston, Jamaica, which was established specifically for this purpose by the states parties to UNCLOS. The ISA is responsible, in particular, for ensuring the equitable sharing of the benefits arising from deep seabed mining activities. Notably, half the seabed areas for which industrialized nations in future acquire exploration and mining licences are reserved for the developing countries. At present, however, extraction is still unprofitable and the requisite technology is lacking. Only time will tell how well the rules operate in practice.

As a “constitution for the seas”, UNCLOS merely provides the normative framework for international legal governance of the oceans and leaves a number of questions unanswered. This applies especially to aspects which have only been recognized as significant, based on new scientific findings, since UNCLOS was adopted in 1982. There have been new discoveries of ore deposits in the seabed, for example. Global warming is also causing changes. UNCLOS may therefore need to be supplemented by additional treaties in response to these new challenges.

Continental shelf

There is a legal and a geological definition of the term “continental shelf”. Legally speaking, the term denotes the zone which extends out to a maximum limit of 200 nautical miles seawards from the baseline. Geologically, the term is applied to the broad, relatively shallow submarine platform adjacent to the coast, which slopes gradually to an average depth of 130 metres. The steep continental slope with a gradient of up to 90 degrees adjoins it on the seaward side.

The limits to the law of the sea

> The changes in the marine environment resulting from global warming are clearly revealing the limits to the law of the sea in its present form. The Arctic ice sheets are shrinking, opening the way to the long-hidden mineral deposits in the seabed and sparking a new rush for resources. Another hot topic at present is to what extent humankind is permitted, as the law stands, to interfere with the marine ecosystem in order to cushion the impacts of climate change.

Underwater land grab

Most experts agree that climate change is causing the Arctic ice cap to melt faster. From an economic perspective, this is a very interesting development: firstly, because it could open up alternative and much shorter shipping routes during the summer months, such as the Northwest Passage and the Northern Sea Route, thus benefiting international trade, and secondly, because it will make the oil and gas deposits thought to lie under the Arctic seabed much easier to access. With the Arctic littoral states now vying for control over these natural resources, the public was given an initial taste of things

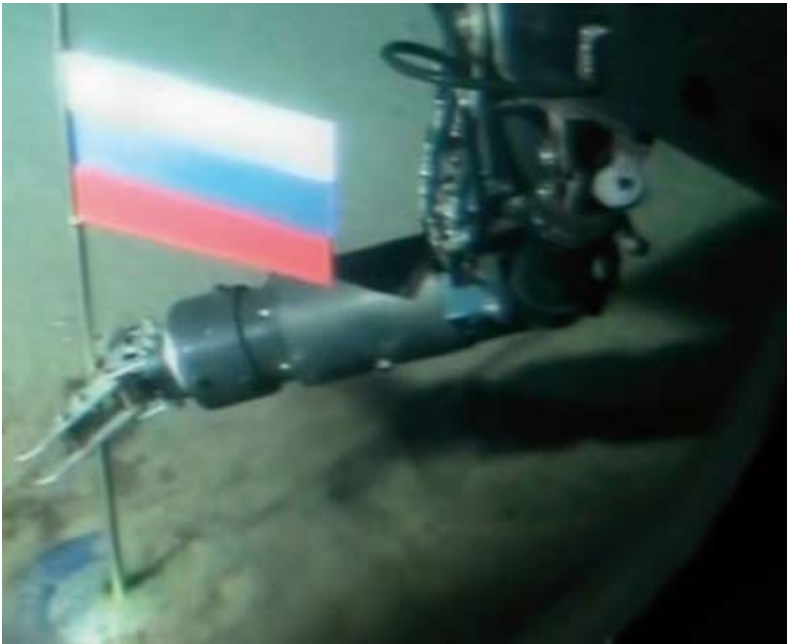
to come on 1 August 2007, when Russia – using manned mini-submarines – planted a Russian flag on the seafloor at the North Pole and symbolically proclaimed the area concerned to be Russian territory.

Besides Russia, the other Arctic littoral states – Denmark (Greenland), Canada, Norway and the United States – have also launched expeditions to prove that areas of the ocean floor are submerged prolongations of their territories, prompting media speculation about the possible outbreak of an “ice-cold war” in the polar north.

Bickering over borders

But to what extent do the Arctic territories form part of the coastal states’ continental shelf? This is still an unresolved question. If the answer is affirmative, the United Nations Convention on the Law of the Sea (UNCLOS) grants the Arctic state on whose continental shelf they are located the exclusive rights to exploit any resources potentially existing there. These resources would, in consequence, not be subject to the rules applicable to the common heritage of mankind, which are administered by the International Seabed Authority. The Arctic states are currently attempting to prove that geologically, their continental shelf extends for more than 200 nautical miles out into the Arctic Ocean. As explained above, in this case too, the maximum outer limit may not exceed 350 nautical miles from the baseline or, alternatively, 100 nautical miles seawards from the 2500 metre isobath. In the Arctic, the – permissible – combination of these two methods would offer Russia, in particular, the prospect of extending its continental shelf to the maxi-

10.7 > On 1 August 2007, Russian explorers captured the attention of the world’s media when they planted their national flag on the seafloor in the Arctic Ocean.





10.8 > Prolongation of the continental shelf in the Arctic. The Gakkel Ridge is shown in red on the right. The area marked in red on the left cannot be claimed by any littoral state as it is circumscribed by the 2500 metre isobath. The Lomonosov Ridge lies to the left of the Gakkel Ridge between two 2500 metre isobaths.

mum possible extent. There are just two relatively small areas (“donut holes”) in the Arctic which could not be claimed by any littoral state: the first is the Gakkel Ridge, an oceanic ridge which lacks a “natural” connection with the continental margins, while the second area is circumscribed by segments of the 2500 metre isobaths.

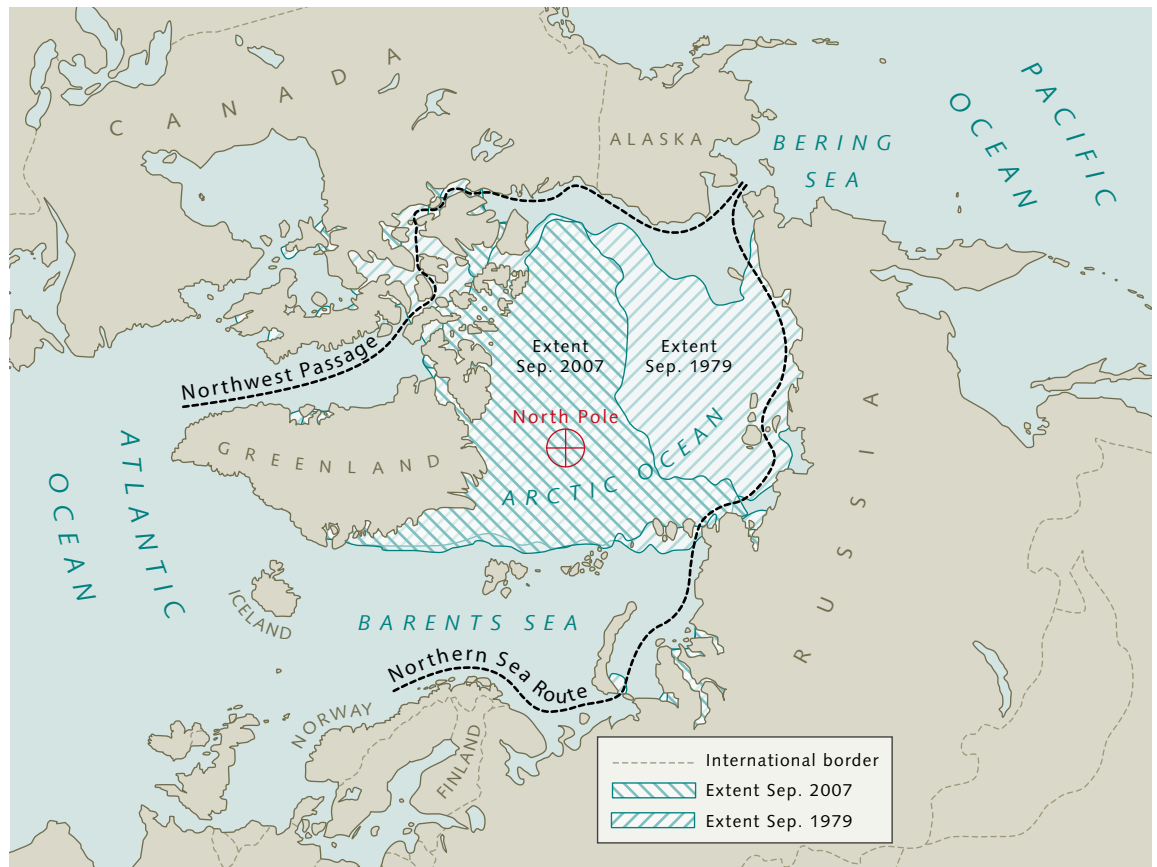
The situation in the Arctic is further complicated by the fact that an exception to the rule on measuring the outer limit of the continental shelf applies here. UNCLOS makes a distinction between “oceanic ridges”, which are not directly connected to the continental margins, “submarine ridges”, and “submarine elevations”. On submarine ridges, UNCLOS states that the outer limit of the continental shelf shall not exceed 350 nautical miles from the baselines from which the breadth of the territorial sea is measured. In other words, only the 350 nautical mile cut-off line applies to submarine ridges: the

outer limit of the continental shelf cannot be measured according to the 2500 metre isobath, which in the case of submarine ridges is, by its very nature, a more advantageous method of calculation. If the feature concerned is merely a submarine elevation, however, this restriction to the 350 nautical mile method does not apply. This is because unlike submarine elevations, submarine ridges generally consist of volcanic rock and are hence formed from a different material than the continental shelf. Although connected, they therefore differ in origin. Submarine elevations, by contrast, are similar in composition to the continental margin. In other words, the elevation and the continental shelf are geologically identical.

So to determine whether the structural features of the Arctic seabed are submarine ridges or elevations, a geological analysis of the rock must first be carried out. And this is exactly where the problem lies in the Arctic: it has

Oceanic ridges
Oceanic ridges are formed when underwater tectonic plates drift apart and magma rises from the Earth's interior at this fracture point. Over time, this creates a ridge which may reach a height of several thousand metres. Oceanic ridges are generally located mid-ocean, some distance away from the continental shelf areas and continental slopes.

10.9 > The area covered by Arctic sea ice has been shrinking for many years, offering access to untapped oil and gas deposits during the summer months in future. It could also open up new shipping routes, such as the Northwest Passage and Northern Sea Route, which are much shorter than the Panama and Suez Canal routes.



numerous submarine mountain ranges. According to prevailing opinion, all of them – with the exception of the Gakkel Ridge – are connected in some way with the continental margins and could thus be regarded as integral parts of the continental shelf of one or more littoral states. Their geological composition will therefore be the crucial factor in determining which of UNCLOS's provisions ultimately applies. Russia, for example, takes the view that the Lomonosov Ridge is a submarine elevation within the meaning of the Convention, such that the 2500 metre isobath rule would apply. However, explorations carried out to date indicate that geologically, the Lomonosov Ridge is not a natural component of Russia's continental margin.

So which country will ultimately be able to lay claim to the Arctic seabed? That will depend on how the Commis-

sion on the Limits of the Continental Shelf (CLCS) evaluates the data submitted by the coastal states. And time is pressing: for countries such as Russia, which acceded to UNCLOS before 13 May 1999, the deadline for submission to CLCS of data relating to the prolongation of its continental shelf beyond 200 nautical miles expired on 13 May 2009. It is likely to be many years before all CLCS's recommendations are available. Countries which acceded to UNCLOS after 1999 or whose accession is planned must submit their documents within 10 years of accession. For Canada, the deadline expires in 2013, while Denmark's deadline is 2014. Given that new oil and gas deposits were discovered in the Arctic seabed in 2004, it remains to be seen whether the states parties to UNCLOS will opt to extend the deadline envisaged in the Convention. However, the Commission is not responsi-

ble for the delimitation of the continental shelf between states with opposite or adjacent coasts. In such cases, UNCLOS merely obliges the states concerned to effect agreements in order to achieve an equitable solution. Moving in that direction, in the Ilulissat Declaration of 28 May 2008, the five Arctic states reaffirmed their commitment to the international law of the sea and the orderly settlement of any possible overlapping claims.

The law of the sea and climate change mitigation

One of the most pressing issues on the climate policy agenda is reducing emissions of CO₂, a climate gas. This issue has implications for the law of the sea as well. At present, great hopes rest on the storage of atmospheric CO₂ in the oceans and seabed. From a law-of-the-sea perspective, however, this is a complex issue, as is apparent from a topical example, namely the fertilization of the oceans with iron providing plant nutrients. The idea is to stimulate primary production of phytoplankton, which, gradually sinking to the sea floor, would remove CO₂ from the atmosphere over the longer term. The concept was trialled in the Indo-German “Lohafex” marine re-

search project in 2009. The question which arises, however – not only in relation to Lohafex – is whether this type of **geo-engineering** activity is compatible with the law of the sea as it stands. Although UNCLOS contains detailed provisions on the protection of the marine environment, it makes no reference to the permissibility of geo-engineering measures in general or iron fertilization in particular. The dumping of waste and other matter at sea is generally prohibited, however, and this prohibition is fleshed out in two other international treaties: the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, adopted in 1972 (London Convention – LC), and the 1996 London Protocol (LP) which tightened and specified the provisions of the London Convention. Accordingly, in October 2008, the states parties agreed that legitimate scientific research should not conflict with the objectives of the London treaties, which means that iron fertilization of the oceans on a commercial basis continues to be prohibited. There was some discussion as to whether industrial enterprises should be able to fertilize the oceans to stimulate algal growth and thus qualify for carbon credits, but it is now accepted that iron fertilization on a commercial basis is prohibited.

Carbon Credits

The term “carbon credits” means the same as “emissions allowances”. These allow industrial enterprises, such as power plants or cement works, to emit a specific amount of carbon dioxide (CO₂). If a company installs technical systems to reduce its CO₂ emissions, it uses up fewer of its emissions allowances. This means that it can sell the surplus to other companies which are still producing high levels of emissions and therefore need more allowances. CO₂ reduction measures, which often generate additional costs, thus become economically viable.

CONCLUSION

The future of the law of the sea

Under pressure from climate change, species extinction, overfishing and maritime navigation, the law of the sea – the constitution for the seas – faces numerous challenges. There is ongoing tension between the freedom of the seas and their territorialization as epitomized by the concept of “mare clausum”. While occasional amendment of established provisions may be required in response to new knowledge and developments, this invariably harbours the risk of expanding national jurisdiction over the sea. The United Nations Convention on the

Law of the Sea (UNCLOS) must always be the starting point for any legal analysis. With this Convention, the international community’s desires and aspirations have been incorporated into a framework which enjoys almost universal acceptance and which has so far proved to be more flexible and open than often assumed. UNCLOS will therefore continue to develop its normative effect in the international law of the 21st century. The prerequisite, however, is states’ willingness to cooperate and seek peaceful solutions to any disputes that may arise – especially in view of, and in response to, the new challenges arising on and beneath the seas.

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Publication details

Project manager: Jan Lehmköster

Editing: Tim Schröder

Copy editing: Dimitri Ladischensky

Editorial team at the Cluster of Excellence: Dr. Kirsten Schäfer,

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Design and typesetting: Simone Hoschack

Photo-editing: Petra Kossmann

Graphics: Walther-Maria Scheid

Printing: Druckhaus Berlin-Mitte GmbH

Paper: Recysatin, FSC-certified

ISBN 978-3-86648-012-4

Published by: maribus gGmbH, Pickhuben 2, 20457 Hamburg

www.maribus.com