

# Chapter 26

## A Short History of the Use of Seas and Oceans

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**Abstract** The history of ships and shipping technologies reveals the history of use and perception of the sea by human beings. It also serves as an example to reveal a paradigm shift in terms of sustainable management of seas and oceans. Utilization of the sea has always been strongly motivated by the basic needs of human beings. People have been obtaining resources from the sea since the Stone Age, and beginning in the early Middle Ages and continuing especially in the early modern era, there has been increased frequency of trading contacts, at first limited to coastal areas and ultimately crossing oceans. If large sea battles that led to ships being used as floating “battle positions” can be said to have dominated the stage of the sea in the seventeenth and eighteenth centuries, in the late nineteenth century and especially the twentieth it was pleasure trips and research issues that turned ships into hotels and laboratories on the water. Ships and shipping have always operated in interaction with human benefits, technologies, and the environment.

Over the past four decades, there have been decisive discussions about how to deal with our seas and oceans in the context of finite natural resources. As seen from a larger historical perspective, concern about sustainable use occupies a comparatively brief interval in human history. Nevertheless, in what follows the current concerns are not interpreted as a passing fashion but rather as being representative of a new societal consensus borne through paradigm shift. In the field of shipping, this has been expressed internationally as “green shipping”, i.e. environmental protection in maritime transportation. The goal of green shipping is to bring about a change in attitude in order to advance the sustainable use of seas and oceans as part of a responsible approach to nature despite similarly growing demands for greater economy, greater safety and adaptation to new tasks for transportation.

**Keywords** History of shipping • History of ocean uses and exploitation • Changing perceptions of the sea

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## 26.1 Introduction

We live in a connected world. In the wake of globalization and digital communication, geographical distances have been reduced and in some cases, eliminated altogether (Osterhammel and Petersson 2007). The world seems to have “moved closer together.” The seven continents have digital links via the Internet and analogue ones via undersea cables (Holtorf 2013). Today, airplanes represent the fastest mode of conveyance between continents; at one time, however, ships were the only way to cross the world’s seas.

The size and appearance of all watercraft depend on their purpose, their place of action, and not least the state of technology of their time. Navigation has always been part of the interaction with human benefits, environment, and technology. The history of the use and perception of the seas and oceans by human beings can thus be expressed in the history of ships and shipping.

The goal of the present essay is to use the example of ships to reveal in retrospect the paradigm shift in terms of sustainable management of seas and oceans—a relatively recent one within the Anthropocene epoch (see Ehlers 2008). Examples and aspects are highlighted without any claim to completeness. Human motives and behavior in relation to the environment and technology and the resulting consequences will be examined in the first section, while the second section will deal with some different forms of use as well as the intensification of sea and ocean use.

## 26.2 Human Beings

The human motives for using the seas and oceans are changing, diverse, and most of all dependent upon time and space. Though there are many practical motivations to make use of seas and oceans, many almost always seem linked with either adventure and the desire to travel or the drive to compete, and discover. In times when transoceanic voyages were still novel and infrequent, the foreign objects arriving in Europe by ship were considered significant purely by the fact that they had survived the difficult conditions of the crossing. This was especially so in regard to the “voyages of discovery,” initially by the Portuguese and Spaniards in the early modern era, beginning in the fifteenth century, when these objects enduringly altered the image of the earth and knowledge about the world (Kollert 1997). The longer they had traveled and the fewer in number, the greater the value Europeans placed on the objects. Against that backdrop, it is hardly surprising that the rulers of Europe of the time surrounded themselves with exclusive and exotic objects that helped underscore their own special status and emphasized their power. In many cases, these objects formed the basis for the European museums of cultural and natural history (Minges 1998).

In addition to infusing objects with meaning, the act of seafaring itself, especially when people have successfully survived risky situations, often takes on a

mythological quality. This applies of course to the famous “discoverers” of the early modern era (Henze 2011), but perhaps most of all to the nineteenth-century seamen on the freight ships sailing around the legendary Cape Horn—one of the most dangerous shipping routes in the world. The “Cape Horners”, as they were called, were depicted with a mélange of adventure, masculinity, and danger—a portrayal which continues to this day (Feldkamp 2003) despite the fact that the last freight sailboat with no engine to pass Cape Horn was the *Pamir* in 1949 (Stark 2003). The same heroic romanticism can be observed, for example, in the perpetual appeal of the Blue Riband, or with the continued desire of some to sail solo around the world, where after risky and often sorrowful experiences at sea, the sailors are celebrated after a successful return. This feeling peaked in an undertaking that was not related to the true purpose of transportation but rather for the prospect of the “Blue Riband of the Ocean,” an “imaginary trophy” and “purely symbolic award without material compensation” (Rook 1994: 17). It was merely bragging rights for the passenger ship that could travel the route between Europe and North America the fastest.

The Romantic artists recognized the sea as a source of inspiration and a place of yearning, as a site of self-reflection and finding oneself (Brenken and Spielmann 1997).

Finally, in much more recent years the sea has become associated with recreation. Popular recreational use started out with group travels in the form of cruises (König and Schabbing 2014) in which only an exclusive section of society participated, but today recreational activities are more individual and much more widespread. Such activities include sailing, surfing, diving, and even mini-submarines used in coastal areas for tourists to explore the underwater coast. This growth has led to a very high overall frequency of use, with many negative consequences for sea sustainability.

### 26.3 Environment

Since the Neolithic age human beings have always attempted to manipulate the world around them to the extent that their technology has allowed (Moetz 2014), first on land and then at sea. Initially, this meant the focused use of specific areas: for example, fishing by those who lived in coastal regions to meet dietary needs (Goldhammer and Hartz 2012). From the eleventh century at the latest, however, with the construction of dikes, humans were able to take power away from the erosive property of the sea and preserve a more permanent coastline (Peters 2015). With the flourishing of hydro-engineering in the eighteenth and nineteenth centuries, additional technical structures in the form of locks and dams were created with the intention to regulate tide-related environmental conditions. The installation of infrastructure for navigation, especially in the form of coastal facilities and canals, represented no small enduring intervention in the environment. Human beings thus expressed their desire to not simply use the conditions established by the environment but also to design the environment to suit their ideas. This was based primarily

on economic considerations, although in many cases a potential for prestige was associated with it as well.

In addition to these deliberate interventions, however, humans indirectly affect the environment in negative ways. For a long time, people were not conscious of or simply did not care about the way they were affecting the world's seas. Garbage and things that had become useless onboard were thoughtlessly dumped on the high seas (Deutsches Umweltbundesamt 2010). The same was also done with unused munition after the Second World War, which was sunk at selected dump sites in the ocean (Böttcher 2014).

The use of ships, with its often far-ranging consequences for the environment, accounts for a large share of the pollution of the world's seas. Effects on the surface of the water that frighten sea creatures, the noise of engines under water, noxious emissions, and introduction of non-native species lead over the long term to infertility and resistance reduction of some sea animals. Dangers at sea from shallows, reefs and rocks, storm floods, and tsunamis can in unfortunate cases lead to shipwrecks with detrimental effects on the environment. Heavy oil (Diesel) and other fuels cause bird feathers and fish gills to stick together, causing agonizing deaths. The Russian nuclear submarine *Kursk*, which sank in the Barents Sea in 2000, impressively demonstrated the risks to the sea that nuclear-powered vessels can pose. (Mikes and Migdal 2014).

## 26.4 Technology

Engine technology and the associated range of ships have been crucial to how the sea is used. Whereas originally muscle power was the only way to move watercraft, wind power has been harnessed in northern Europe with the use of sails at least since the early Middle Ages. In the mid-nineteenth century, two innovations prevailed that still have effects today: the steam engine was used instead of sails, and steel replaced wood, which until then had been the sole as long-lasting material for constructing ships. These two crucial developments opened the way to modern developments in shipping. Steamships were less dependent on the wind and weather, and thus able to travel along canals which appeared soon thereafter. Most importantly, steam power led to greater reliability in terms of the duration of voyages.

With the introduction of steamships in the second half of the nineteenth century, the use of sails became less frequent in professional shipping. The Flettner rotors introduced in the 1920s, which provided aerodynamic propulsion by subjecting a rotating cylinder to airflow (Flettner 1926), remained a marginal phenomenon, just like the fully automated towing kites of the SkySails company, in which wind energy would supplement the engine power of large freight ships and fish trawlers (Elsner 2009). In the name of green shipping, electricity and liquefied natural gas are now occasionally used as alternatives to heavy oil (Diesel), making shipping cleaner and lowering emissions.

More broadly, the technological innovation of the ship opened up the use first of the surface of the water and then, with submarines, the area below the surface. Already in antiquity, people were thinking about how to spend extended periods under water despite their limited lung volume. The oldest drawings for diving boats and diving suits date from the fifteenth centuries, but it was not until the early seventeenth century that the first diving boat with a rudder was built. In the nineteenth century, the invention of the electric motor made it possible for the first time to build mechanised submarines, i.e., submarines that did not require muscle power. Their first practical use was in 1864 during the American Civil War. The *Sub Marine Explorer* was built a year later; it is regarded as the first functional submarine in the world, because it was the first that could surface again on its own. At the end of the nineteenth century, the world's navies recognized submarines as suitable to their ends, and they were first deployed in large numbers in the First World War, culminating in the very effective use of unrestricted submarine warfare. After being deployed with heavy losses in the Second World War due to the development of effective surface to underwater countermeasures, submarines once again resurfaced in the Cold War due to newfound strategic significance.

Beginning in the 1960s, submarines were increasingly used for research. Along with unmanned diving vessels equipped with cameras and grip arms, submarines were used for the systematic study of sea floors or sea currents to answer geological, biological, oceanographic, and archaeological questions. The use of the sea for oil extraction has led to the development of special submarines or diving robots with suitable grip arms and equipment to carry out repairs of drilling rigs, pipelines, and underwater cables.

As technology allowed ships to be increasingly less reliant on natural forces, their use has become an expression of the superiority of human beings over nature. The *Titanic* is the most prominent counterexample of the superiority of humanity over the environment and nature. The common view in the late nineteenth century that this ship could not be sunk was reflected in the limited number of lifeboats added to the ship, which turned out to be a fatal omission. That the ship was declared "unsinkable" has no doubt caused the sinking of the *Titanic* to linger in the popular consciousness to this day.

## 26.5 Seas and Oceans as a Place to Transport People, Goods, and Information

Ever since the invention of watercraft to transport human beings, coastal seas have also been used to transfer goods and information. In northern Europe during the Viking era (eighth to eleventh centuries), the intensity of trading along the coasts steadily increased and eventually resulted in the crossing of the Atlantic Ocean for the first time from the North Atlantic islands of Greenland to Newfoundland. This was made possible by narrow sailboats. Archaeological finds testify to an intense exchange of goods, technologies, fashions, and presumably information as well (Delgado 2015). By contrast, at the time of the medieval Hansa (twelfth to

seventeenth centuries), a new type of bulbous ship with a much larger capacity was found to be practicable for a network of trading in the region of the North and Baltic Seas and as far as Iceland (Hammel-Kiesow 2004). Even though there were contacts in this period to the Italian maritime republics and to the Near East as a result of the Crusades, it was only the founding of the trading alliance of the *Vereenigde Oostindische Compagnie* (VOC; Dutch East India Company) in 1599 that began to regularly conduct long-distance trading and influence the Far East in particular. This historical trading company was founded through the merger of smaller trading companies that no longer wished to compete with one another, and it became one of the most important business enterprises in the world (Nagel 2007). The prerequisites for this long-distance trading, which went hand in hand with colonialism, were the overseas voyages of discovery in the fifteenth and sixteenth centuries, advances in monetary and credit systems and the resulting simplified procurement of capital, and especially the development of the caravel, a new type of ship that was characterized by improved maneuverability.

The preferred ships for the “trading goods” of the seventeenth and eighteenth centuries—ivory, gold, and slaves for the Americas—were older brigs and schooners, i.e. sailing ships with two or more masts. In keeping with their focus on profits in the slave trade, intermediate decks were added so that slaves could be “stored” below the waterline where the cargo was normally held. Unhygienic conditions onboard led to comparatively high mortality rates. The ships were also subjected to heavy cargo and the risk of shipwreck (Harms 2007).

Many people were shipped across the Atlantic as a result of the nineteenth-century immigration waves from Europe to the Americas, first on sailing ships and later on paddle steamers and other steamboats (Guillet 1963). As mentioned above, one consequence of the introduction of steam power was regular shipping times. This increased reliability benefited the postal service in particular, which therefore had an interest in subsidizing passenger ship travel. And this in turn made passenger transportation less expensive and hence attractive for large numbers of people. The mass of immigrants traveling by ship ensured a regular income for ships. In the case of slaves, immigrants, and refugees, the sea journeys that people have been forced to make for various reasons are often their first and only ones.

With the introduction of regularly scheduled intercontinental flights, however, passenger travel by ship has declined. The shipping of raw materials and goods has, by contrast, increased. Mass transportation of goods by water began in the 1860s. Initially, petroleum was transported in barrels on sailing ships. Twenty years later, true tankers were developed. It is interesting to note that steam-powered tankers built according to the same principle as the oldest ones from 1886—in which the oil is stored in the ship’s hull itself—are still being used!

The relatively late introduction of container shipping in Europe, compared to the Americas, was associated with consequential changes on land as well (Levinson 2008). The standardization of containers went hand in hand with automated processes for loading and unloading. Today’s harbor facilities, most of which are impressively large, are huge logistics centers. After the Second World War, shipping was the largest force behind globalization. Even today it is the largest mode of transportation in the world economy.

## 26.6 Seas and Oceans as Places for Resources

It is reasonable to assume that one of the oldest motives for using seas and oceans was the exploitation of marine resources for food and to obtain economic goods. Fishing implements found in northern Europe dating as far back as the Mesolithic era testify to this (Goldhammer and Hartz 2012). This sort of exploitation of marine resources is inconceivable without ships; it can be assumed that dugout canoes were already in use near coasts during the Stone Age.

Ships had to be equipped appropriately to exploit the materials of the sea. In many cases, special types of ships were developed over the course of time. For example, in the early days of whaling, small, powerful rudder boats, handheld harpoons, and lances were used. By the nineteenth century, however, whaling ships had harpoons mounted on deck. The driving force behind whaling in the seventeenth century was the pursuit of train oil as a fuel and industrial raw material. In the twentieth century, the driving force switched to the pursuit of raw materials for margarine and nitroglycerin (Ellis 1993). Encouraged by the self-sufficiency policy of the Third Reich to reduce the “fat gap,” specialized factory ships for whaling were placed in service between 1936 and 1939. Factory ships, the first of which were produced in Germany in 1940–1941, were equipped to filet and freeze large quantities of fish to obtain a market-ready product directly on board. Whaling factory ships, too, followed this principle, with a tow for the whales on the stern and the deck used for slaughtering. The only whaling ships that can be inspected today, in Germany for example, are museum ships such as the *Rau IX* in the museum harbor of the *Deutsches Schiffahrtsmuseum* (DSM; German Maritime Museum) in Bremerhaven. Whaling, which is controversial internationally, is no longer permitted under EU law.

The enormous size of the ships and fishing fleets used for fishing today has made it necessary to regulate the use and construction of fishing equipment and to place specific quotas on catches. This is true of trawling ships as well as factory ships. In order to meet the world’s needs for seafood in view of depleted fish populations and quotas on catches, aquaculture is becoming increasingly important (Nash 2011).

Extracting inorganic resources also requires special vehicles. Offshore oil rigs are often transported using semisubmersible ships, which carry cargo underwater (Spethmann et al. 2012). Installation vessels with heavy cranes, special motors, and jacking equipment are used to construct offshore wind turbines, though in many cases it is no longer necessary to anchor the turbines in the ground, since floating facilities are increasingly being employed (Hautmann 2012: 29).

The sand and gravel used as construction materials are extracted in coastal areas using dredging vessels. In addition, ships are constructed specifically to extract large quantities of raw materials (ores) for metals at deep sea, with all the consequences one would expect for the mechanical destruction of the ocean floor and the eco system therein (Halbach and Jahn 2015). Internationally binding, sustainable rules for such extraction are currently being established.

Ships themselves are considered resources of the sea in the broadest sense when they are removed from their original functional context—whether as the result of an

accident or deliberately grounding. For example, ships that have sunk off the coast are scrapped to obtain the valuable wood or high-quality steel used in ship building. The right of salvage laws that applies in many countries enables people to use objects removed from the sea like newly extracted resources (Hansen 2001). Germany rescinded this right with a new law in 1990. According to this law of lost property, flotsam and jetsam can only be claimed when its legal owner cannot be determined.

Last but not least, there are recovery companies that search for sunken ships, such as Odyssey Marine Exploration (<http://www.odysseymarine.com/>), which are motivated in part by economic objectives. The expedition to find the *Titanic*, by contrast, was organized on the initiative of the Woods Hole Oceanographic Institution in Massachusetts and the *Institut français de recherche pour l'exploitation de la mer* (IFREMER; French Research Institute for Exploitation of the Sea) ([http://www.huffingtonpost.de/norbert-zimmermann/vor-30-jahren-wurde-das-w\\_b\\_8059414.html](http://www.huffingtonpost.de/norbert-zimmermann/vor-30-jahren-wurde-das-w_b_8059414.html)).

## 26.7 Seas and Oceans as Territories

The uses of seas and oceans are to a large degree dependent on the political situation on land. In the seventeenth century, Hugo Grotius, who is regarded as one of the founding fathers of modern international law, formulated the principle of freedom of the seas (Mühlegger 2007). It states that the exercise of state power on the high seas is limited to ships flying that state's own flag, though piracy and other similar behaviours limit the full implementation of this principle. This was already the case with the so-called *Likedeelers* ("Equal Sharers"), buccaneers and pirates from the Hanseatic era, whose views probably became known historically as a result of their most prominent advocate of the time, Klaus Störtebeker (Zimmermann 2000). Similarly, there were other ship commanders who operated on their own initiative without authorisation from any state as well as those who had a letter of marque from a state or ruler and thus conducted a trade war for third parties.

With the United Nations Convention on the Law of the Sea (UNCLOS) of 1982, the signatory states agreed to work together to combat piracy. This has become all the more relevant as globalization and political revolutions have created new behavior in piracy that has been manifested repeatedly since the 1990s. From Southeast Asia, South America, and South Africa, ambushes with bazookas, grenades, machine guns, and other automatic weapons have been reported on ships involved in professional shipping, from small vessels like yachts all the way to huge freighters and supertankers. The first judicial inquiry into piracy by German prosecutors took place in Hamburg in 2008 and was related to the case of the tanker *Longchamp*, which was operated by a German shipping company prior to being seized off the coast of Somalia.

Additionally, there have been repeated attempts to establish physical boundaries at sea or to demonstrate maritime power by militarizing ships and positioning them in strategic places. For example, there is evidence of underwater barriers for ships since the Viking era, and blockades by warships or underwater mines have tried to



control shipping or otherwise place strict limits on navigation. Whereas ship barriers and blockades have always occurred in relatively shallow waters, sea battles and skirmishes have often taken place on the open seas. Victory and defeat are usually decided by new technologies of shipbuilding or new tactics for naval warfare. During the Cold War skirmishes were avoided by equipping ships with sophisticated weapons systems and medium- to long-range missiles with nuclear warheads, as well as by the creation of nuclear-powered aircraft carriers (Duppler 1999). Today such arms are intended to deter by instilling fear and establishing distance.

## 26.8 Seas and Oceans as a Subject of Research

Seas and oceans play an important role in the research regarding worldwide climate change. Marine research is conducted with the goal of understanding the system of the ocean better in order to make life on land sustainable (Wefer et al. 2012). As a rule, such research is ship-based, that is to say, it is conducted on water using research ships as laboratories.

Modern oceanography began with the British HMS *Challenger* at the end of the nineteenth century. Surveys of the world's seas and oceans were conducted over several years and the first fundamental findings on their topographical, physical, chemical, and biological conditions were obtained (Thomas and Murray 1880).

Whereas modern research ships are tailored for specific applications and are distinguished by remote-controlled and autonomous watercraft and highly specialized measuring systems to collect data and probes, research ships in the nineteenth century instead were repurposed and adapted from previous uses prior to being used for research. For example, the yacht used by the geographer Dr. Petermann of Gotha for the first German polar expedition in April 1868 originally was a ship for seal hunting. The *Grönland* was converted for research by Captain Koldewey on behalf of the *Komitee für die Deutsche Nordpolarforschung* (Research Committee for the German Arctic) in Bremen, and is maintained today by a volunteer crew at the *Deutsches Schifffahrtsmuseum* in Bremerhaven.

Oceanography has thus always had a pioneering character, due to its extreme destinations. While that once meant journeys to the ice-covered regions of the Arctic and Antarctica, today it is the deep sea being explored, often with unmanned vehicles with suitable diving and imaging techniques. Germany now has more than 30 research ships used by geologists, oceanographers, and biologists for both observational and experimental oceanography (Wissenschaftsrat 2010).

## 26.9 Seas and Oceans as Places of Perception and Memory

Human beings attribute meaning to seas and oceans in a variety of ways. Survivors of shipwrecks usually have especially vivid memories of the scenes experienced at sea. In addition to collective forms of memory, there are also individual ones,

often expressed in diaries and letters. A sea journey from one cultural circle to another can be seen as a “rite of passage” into a new world and hence be perceived as very memorable, especially if it is the only journey by ship in a lifetime, and is associated with strong emotions such as bidding farewell, uncertainty, or the joy of anticipation.

Initially, and for a long time, life onboard was difficult and sea journeys were often dangerous and even fatal. Skepticism about sea travel changed as advances in technology enabled navigators to better predict wind and weather, and to adapt accordingly. Visual and literary evidence from the late nineteenth century documents the discovery of nature, including the sea, as a place of inspiration and beauty. The memories retained via images also include sea battles perceived as successful or traumatic (or sometimes both). Marine art especially keeps the memory of specific battles and warships alive.

As the hundredth anniversary of the outbreak of the First World War, 2014 was a good occasion to reflect on those who died in naval wars. Several European countries seized that historical moment of reflection to ratify the Convention on the Protection of the Underwater Cultural Heritage, which had been passed in 2001 but only signed by a few European countries. In the coalition agreement concluded in 2014, the German government defined the ratification of the convention as a goal to be achieved within that legislative term. Currently, all of the measures necessary for the law—in particular the legal ones—have been met. Ships thus become places of memory. This means a shift consciousness from perceiving submarines as weapons to memorials.

Another way to create sites of collective memory is to build museums. They too help to offer places to reflect on history. Against the backdrop of the structural change in professional shipping since the 1970s, museums are an important way to help reflect on this process of change that affects the whole of society. Processes that have changed as a result of automation, digitalization, increases in the quantities transported, and the associated growth of ships and ports have led to structural innovations which in turn have led to the rezoning of neighborhoods. Ports and transshipment areas for fish and goods have been converted into modern residential neighborhoods and tourist attractions with a maritime flair. The task of museums is to document, evaluate, and moderate knowledge about the past and its reflection as part of positioning within society.

The *Deutsches Schiffahrtsmuseum*, for example, uses research and communication to lend value and social significance to the subject of “human beings and the sea.” Topical and socially relevant themes are addressed by scholars and research cooperatives. As an independent “third party,” the *Deutsches Schiffahrtsmuseum* looks at current topics from a scientific perspective. It increases awareness of the historical dimensions of current and future problems, helps individuals position themselves within the society, and lends scientific, political, and emotional value to maritime themes.

## 26.10 Looking Forward

By using the seas and oceans for different purposes, human beings have shaped and influenced their space. The development of ships has resulted in a tension in the relationship between human beings, the environment, and the technology we use to interact with it. This tension is dynamic insofar that it varies with different uses and the intensity of the use of seas and oceans.

In order to maximize the use of seas and oceans, people observed nature, beginning locally and on the basis of knowledge acquired through experience. The increasing “surveying of the world” in the nineteenth century produced the foundations for an intervention in the environment that not only enabled humans to shape it but also to improve their use of it. Data recorded regularly now forms the basis for prognoses that can be used to guide modern strategies for use. The opportunities that result from digitalization make it possible to see and measure not only complex local conditions and connections but especially global ones.

Future-oriented calculations and assumptions have prompted a discussion of the finiteness of natural resources. The Club of Rome’s report *The Limits to Growth* of 1972 led to international awareness of these themes (Meadows et al. 1972). Environmental organizations that helped make the negative consequences of tanker accidents known internationally by circulating photographs of birds that perished in oil spills have also contributed to increasing public awareness.

Very recently, seas and oceans have again become the focus of political and public interest as well. The flagship report “*World in Transition: Governing the Marine Heritage*” published by the *Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen* (WBGU; German Advisory Council on Global Change) in 2013, revealed the scale of global changes in living conditions (WBGU 2013). Renewing political and public interest was also the objective of the *Bundesministerium für Bildung und Forschung* (BMBF; Federal Ministry of Education and Research) when they selected “Meere und Ozeane” (“Seas and Oceans”) as the theme of the *Wissenschaftsjahr* (“Science Year”) 2016–2017. By making funds available through competitions, governments can provide stimuli for research and educational institutions to use participatory events to sensitize the public to the precautionary principle when dealing with seas and oceans. The goal of higher public awareness and engagement is also demonstrated by UNESCO’s efforts to protect water across international boundaries.

Especially given the background of anthropogenic interventions with worldwide effects, connections and dependencies that are by nature global must be solved with international strategies. Moreover, the example of carbon dioxide emissions shows that maritime and terrestrial factors have to be observed together, and the plastic trash that has been fished from the world’s seas as part of research projects confronts us with a visible consequence of a globalized and networked world that is the hallmark of the Anthropocene epoch.

It is up to human beings to use centuries of experience and present knowledge about the relationship of human beings, nature, and technology to help guide decisions with regard to the intensity and frequency of human interventions in nature. Under the slogan “green shipping,” the first steps toward changes in shipping that are urgently necessary to minimize environmental pollution and improve environmental project have already been identified (Müller 2012). The next essential action is for them to be rigorously implemented.

## References

- Böttcher C (2014) Munitionsbelastung der deutschen Meeresgewässer: Entwicklungen und Fortschritt. Landesregierung Schleswig-Holstein, Kiel
- Brenken A, Spielmann A (1997) Maler am Meer: Auf den Spuren der Brücke in Schleswig-Holstein. Ellert und Richter, Hamburg
- Delgado JP (2015–2016) Maritime archaeology in the 21st century. In sea history: the art, literature, adventures, lore and learning of the sea. Official Journal of the World Ship Trust, 153, 16–22
- Duppler J (ed) (1999) Seemacht und Seestrategie im 19. und 20. Jahrhundert. Mittler, Hamburg
- Ehlers E (2008) Das Anthropozän. Die Erde im Zeitalter des Menschen. Wissenschaftliche Buchgesellschaft, Darmstadt
- Ellis R (1993) Mensch und Wal: Die Geschichte eines ungleichen Kampfes. Droemer Knauer, Munich
- Elsner R (2009) Testergebnisse des SkySails-Systems. Schiff & Hafen 1:36–43
- Feldkamp U (ed) (2003) Rund Kap Hoorn: Mit Frachtseglern zur Westküste Amerikas. Hauschildt, Bremen
- Flettner A (1926) Mein Weg zum Rotor. Köhler & Amelang, Leipzig
- Goldhammer J, Hartz S (2012) Steinzeitliche Siedlungsreste am Ostseegrund: Ein endmesolithischer Fundplatz in der Kieler Bucht. Archäologische Nachrichten aus Schleswig-Holstein 18:26–29
- Guillet EC (1963) The great migration: the atlantic crossing by sailingship since 1770. University of Toronto Press, Toronto
- Halbach PE, Jahn A (2015) Metalle aus der Tiefsee: Aussichtsreiche Quelle oder Illusion? Schiff und Hafen 2:36–41
- Hammel-Kiesow R (2004) Hanse. C. H. Beck, Munich
- Hansen N (2001) Strandrecht und Strandraub: Bemerkungen zu einem Gewohnheitsrecht an den schleswig-holsteinischen Küsten. Kieler Blätter zur Volkskunde 33:51–78
- Harms R (2007) Das Sklavenschiff: Eine Reise in die Welt des Sklavenhandels. Goldmann, Munich
- Hautmann D (2012) Die Windkraft schwimmt sich frei. Technol Rev 4:29
- Henze D (2011) Enzyklopädie der Entdecker und Erforscher der Erde. Wissenschaftliche Buchgesellschaft, Darmstadt
- Holtorf C (2013) Der erste Draht zur Neuen Welt: Die Verlegung des transatlantischen Telegrafenkabels. Wallenstein, Göttingen
- Kollert G (1997) Der Gesang des Meeres: Die portugiesischen Entdeckungsfahrten als Mythos der Neuzeit. Edition tertium, Ostfildern
- König N, Schabbing B (2014) Risikobetrachtung für Kreuzfahrten: Eine systematische Risikoanalyse und -bewertung der Urlaubsform Kreuzfahrt am Beispiel von Clubschiffen und Megalineren. ISM-Schriftenreihe 28. Monsenstein und Vannerdat, Münster
- Levinson M (2008) The box: how the shipping container made the world smaller and the economy bigger. Princeton University Press, Princeton

- Meadows D, Meadows L, Randers J, Behrend WW (1972) *The limits to growth*. Universe Books, New York
- Mikes A, Migdal A (2014) *Learning from the Kursk Submarine Rescue Failure: the case for Pluralistic Risk Management*. HBS Working Paper Series, 15-003
- Minges K (1998) *Das Sammlungswesen der frühen Neuzeit. Kriterien der Ordnung und Spezialisierung. Reihe Museen—Geschichte und Gegenwart 3*. LIT, Münster
- Moetz FK (2014) *Sesshaftwerdung: Aspekte der Niederlassung im Neolithikum in Obermesopotamien*. In: *Universitätsforschungen zur prähistorischen Archäologie 244*. Habelt, Bonn
- Mühlegger F (2007) *Hugo Grotius: Ein christlicher Humanist in politischer Verantwortung—Arbeiten zur Kirchengeschichte 103*. De Gruyter, New York
- Müller S (2012) *Green Shipping als Konzept zur Bewältigung des Problems knapper Ressourcen—eine Ist-Aufnahme*. Schriftenreihe des Institut für Logistikmanagement 4. BA-Arbeit, Bremen
- Nagel JG (2007) *Abenteuer Fernhandel: Die Ostindienkompagnien*. Wissenschaftliche Buchgesellschaft, Darmstadt
- Nash C (2011) *The history of aquaculture*. Wiley-Blackwell, Ames, IA
- Osterhammel J, Petersson NP (2007) *Geschichte der Globalisierung: Dimensionen, Prozesse, Epochen*. C. H. Beck, Munich
- Peters K-H (2015) *1000 Jahre Deichbau und Sturmfluten*. In: *Oldenburger Landesverein für Geschichte, Natur- und Heimatkunde e.V (ed) Die Jade: Flusslandschaft am Jadebusen—landes- und naturkundliche Beiträge zu einem Fluss zwischen Moor, Marsch und Meer*. Oldenburg, Isensee, pp 374–87
- Rook H-J (1994) *Die Jagd ums Blaue Band: Reeder, Rennen und Rekorde*. Gondrom, Bindlach
- Spethmann K, Holbach G, Ritz S (2012) *Halbtaucher-Serviceschiffe für den Offshore-Einsatz: das SWA-Konzept*. *Jahrbuch der Schiffbautechnischen Gesellschaft 106*:169–179
- Stark WF (2003) *Das letzte Mal ums Horn: Das Ende einer Legende, erzählt von einem, der dabei war*. Piper, Munich
- Thomas CW, Murray J (1880) *Report on the scientific results of the Voyage of H.M.S. Challenger during the years 1873–76*. Eyre & Spottiswoode, London
- Umweltbundesamt (2010) *Abfälle im Meer: Ein gravierendes ökologisches, ökonomisches und ästhetisches Problem*. <http://www.umweltbundesamt.de/publikationen/abfaelle-im-meer>. Accessed 4 Juli 2016
- WBGU (2013) *World in transition: governing the marine heritage*. WBGU, Berlin. [http://www.wbgu.de/fileadmin/templates/dateien/veroeffentlichungen/hauptgutachten/hg2013/wbgu\\_hg2013\\_en.pdf](http://www.wbgu.de/fileadmin/templates/dateien/veroeffentlichungen/hauptgutachten/hg2013/wbgu_hg2013_en.pdf)
- Wefer G, Schmieder F, Freifrau von Neuhoff S (2012) *Tiefsee: Expeditionen zu den Quellen des Lebens. Begleitbuch zur Sonderausstellung im Ausstellungszentrum Lokschuppen Rosenheim 23. März bis 4. November 2012*. MARUM, Bremen
- Wissenschaftsrat (ed) (2010) *Empfehlungen zur zukünftigen Entwicklung der deutschen marinen Forschungsflotte*. Wissenschaftsrat, Lübeck. <http://www.wissenschaftsrat.de/download/archiv/10330-10.pdf>
- Zimmermann D (2000) *Die Hanse*. Störtebeker & Co. Verlag, Hamburg