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Arctic Minerals and Sea Routes

An Overview of Resources, Access and Politics

Arild Moe

Abundant Arctic mineral resources – hydrocarbons and hard minerals – are attracting attention. But what are the drivers and brakes of industrial development? Are the jurisdictional aspects clear, or is control of the resources subject to dispute? Likewise, Arctic sea lanes are opening up. Could access to them become a source of conflict?

The rapidly changing Arctic, with receding ice and discoveries of rich mineral resources, is attracting attention from many quarters. But what do we know about these resources and what is the status of development? Is there a race for them that could lead to conflict? Is development of shipping routes in the Arctic going to be important for world trade and could competition for access to them cause tension? These are the issues discussed in this article.

Arctic Hydrocarbon Resources

International interest in Arctic resource development really took off from about 2008, spurred by estimates from the United States Geological Survey (USGS) indicating considerable potential, at the same time as the receding ice cover in the Arctic Ocean was being widely discussed. Whereas less ice was primarily interpreted as an ominous sign of impending climate change, it also opened up prospects for better access to the riches of the Arctic as well as for shipping through the region. The image of abundant resources and an almost ice-free Arctic Ocean currently continues to dominate much of the media coverage of the region.

The USGS reports were staggering, estimating that the Arctic contained 12.3 per cent of the world's undiscovered oil resources and 32.1 per cent of its undiscovered gas resources.[1] But the general public – and also many observers and politicians – understood these figures to refer to proven reserves, which is something different. Undiscovered resources refer to estimates of the probability of discoveries, based on geological indications or similarities with other known regions. In the case of the Arctic, the estimates were made for large sub-regions. They said nothing about where exactly hydrocarbons could be found. To discover oil and gas offshore, extensive and costly exploration would have to take place. Moreover, the numbers were misunderstood as reflecting estimates for the Arctic Ocean alone. In fact, they also included vast land areas north of the Arctic Circle, much of it in Russia, where reserves had already been proven. Thus, altogether, the impression of new oil and gas resources available for exploitation was highly exaggerated.

It was also clear that if reserves were discovered offshore, they would be costly to produce. Nevertheless, development could be viable if global market prices were high enough. The fear of an imminent energy supply crisis and talk of "peak oil" – i.e. that global oil supplies are limited and that production would start to fall – soon waned with the unconventional oil and gas revolution, however, when production of shale oil and shale gas made the United States the world's number one petroleum producer. With an increasing concern for climate developments and efforts to decarbonise, attention has turned to "peak demand", since the global energy transition implies less use of fossil fuels. The uncertainty about future demand – and prices – for oil and gas has major consequences for offshore Arctic resource extraction because of the long lead times for development. It can easily take 15 years from the time exploration starts until production commences – if resources are discovered – and then the field has to be productive for up to 20 years to recoup the enormous investments. No one knows how prices

will develop over such a long period. For this reason, several big oil companies seem reluctant to engage in large new greenfield offshore projects in the Arctic. In cases where discoveries are made close to shore or near producing fields where existing infrastructure can be used, the calculations will be different.

Is There a Conflict Potential?

Another common impression is that Arctic offshore resources are to be found in contested areas or in areas outside national jurisdiction and that conflict could therefore arise in the search for and development of such resources. However, there are at present no large contested areas in the Arctic that are attractive for petroleum exploration. The last big dispute concerned the delimitation between Norway and Russia of a sizeable part of the Barents Sea where petroleum was expected to be discovered.[2] The parties negotiated for more than 40 years before drawing a boundary in 2010. In the meantime, they largely refrained from exploration in the area, although it was reported that at some point the Soviet Union tried to entice Western oil companies to drill there, presumably to put pressure on Norway, but to no avail. This underscores a general point, namely that oil companies are loath to work in areas with unclear or contested jurisdiction. One exploration may well cost upwards from 100 million US dollars.

There is no commercial pressure to gain national control over the seafloor in the Central Arctic Ocean.

There is, however, an area in the Central Arctic Ocean outside coastal state jurisdiction. The size of this area is yet to be determined because it depends on the outcome of a long and slow process in the Commission on the Limits of the Continental Shelf, a technical body established by the UN Convention on the Law of the Sea (UNCLOS) to make recommendations to coastal states on the outer delimitation of their continental shelves.[3] If a state claims an extended shelf beyond 200 nautical miles from shore, it must provide geological evidence that its shelf reaches out that far. Russia, which already has the largest continental shelf within 200 nautical miles, has submitted documentation for a significant extension. In a decision in early 2023, the Commission did not recommend a substantial part of the most recent claim – the Gakkel Ridge.[4]

Russia, Canada and Denmark/Greenland have claims that overlap. This situation has led some observers to conclude that there is a risk of conflict. The Commission was set up to assess scientific evidence only, and it will not give recommendations if there is a dispute between states over the delimitation between them. Resolving disputes is left to the parties themselves, which is what the Arctic coastal states Russia, Norway, Denmark/Greenland, Canada and the United States agreed to do, peacefully, when they signed the Ilulissat Declaration in 2008.[5] Some may question whether this commitment is still valid in today's tense international situation, but there are two good reasons why the risk of conflict still remains small.

Firstly, the areas in question are very far from land and the waters are very deep. There are, so far, no strong geological indications of interesting minerals there. This may change, but there are enormous uncontested continental shelf areas that are likely to be explored first. There is therefore no commercial pressure to gain national control over the seafloor in the Central Arctic Ocean.[6] Secondly, the right to claim an extended continental shelf, and the exclusive right of the coastal state to resources on the shelf, is derived from the law of the sea, codified in UNCLOS in 1982. A conflict over delimitation in the Central Arctic Ocean would undermine confidence in UNCLOS as a sufficient legal instrument for management of the Arctic. The United States has not ratified the convention but adheres to it as customary law. Proposals to establish an "Arctic Treaty" were on the table in 2008 – and were one of the

reasons why the Arctic Five (the Arctic littoral states) joined forces – and challenges to the exclusive rights of coastal states may come up again, for example from the rising superpower China. All Arctic states would have much to lose from developments of this kind. In the Central Arctic Ocean, the coastal states can agree to disagree, and this situation might continue for decades.

Status of Offshore Petroleum Activities

Most of the offshore hydrocarbon resources are expected to be found in relatively shallow waters, in other words less than 500 metres, on uncontested continental shelves of the Arctic states. But the outlook for development depends not only on the resource base. The framework conditions and regulations

Top diplomats of the Arctic coastal states in Ilulissat, Greenland, in 2008: At that time, the states reaffirmed their intention to settle overlapping territorial claims peacefully. Although it is questionable if this commitment is still valid today, the majority of the relevant raw material deposits in the Arctic are likely to lie in undisputed areas anyway. Photo: © Bent Petersen, epa, dpa, picture-alliance.

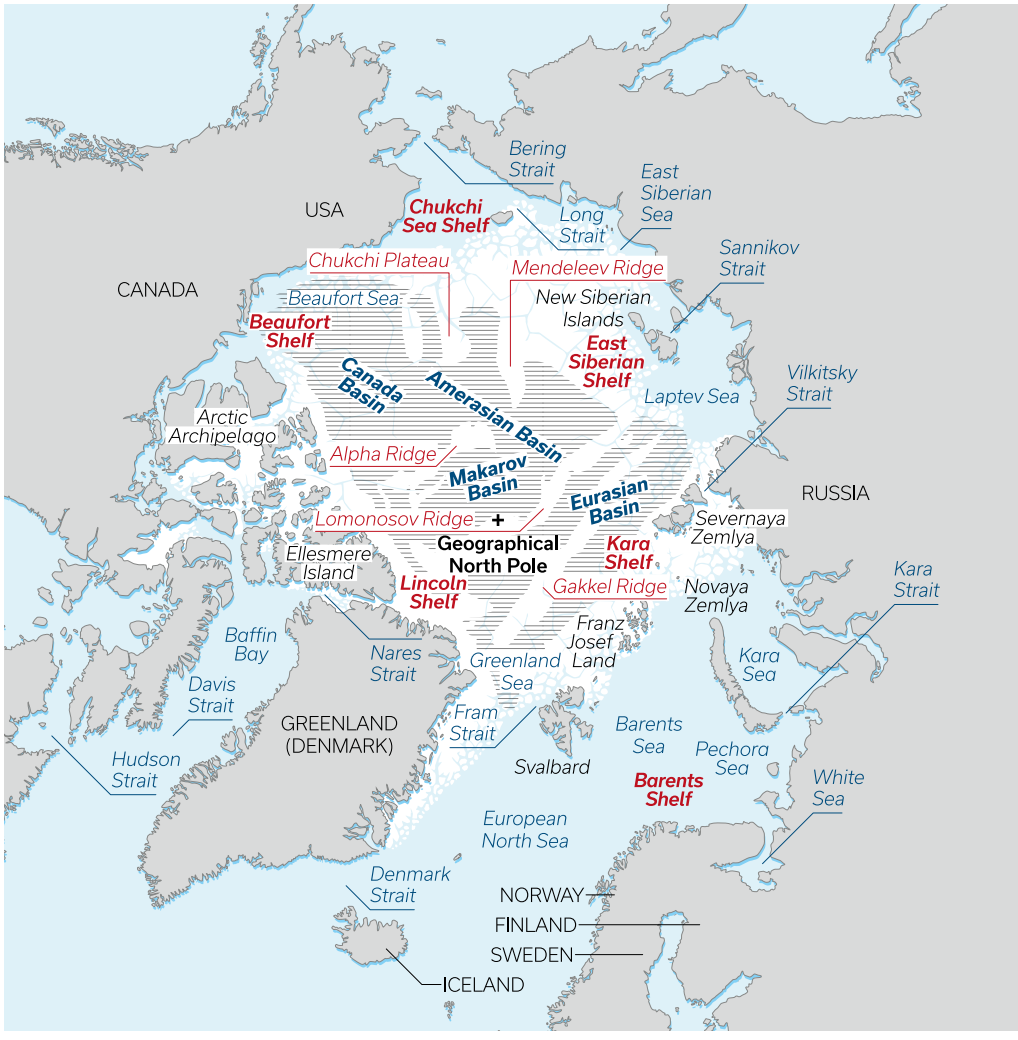
differ depending on national priorities.[7] And of course, the costs differ too.

The most promising areas for oil discoveries are on the outer continental shelf of Alaska. In 2021, American authorities estimated that there were 21 billion barrels (2.8 billion tons) of undiscovered technically recoverable oil resources in the Beaufort and Chukchi Seas, and huge gas resources.[8] Nevertheless, there is no activity there today, beyond a few wells relatively close to shore in the Beaufort Sea. Shell spent seven billion US dollars on an unsuccessful exploration programme, which it abandoned in 2015. A ban on offshore energy development on most of the outer continental shelf, which is under federal jurisdiction, was imposed by the Obama administration in 2016 on environmental and to some extent climate grounds. The ban was revoked by President Trump, but it was reinstated by his successor, Joe Biden.[9] The regulatory uncertainty remains. Onshore production continues in Alaska, but it is in decline due to depletion of the resource base. In a controversial decision, President Biden decided in March 2023 to open large sections of federal land for oil development.[10] However, vast natural gas resources both onshore and offshore are not considered attractive to exploit due to cost versus price calculations.

After a brief wave of enthusiasm among major companies, negative results from exploration drilling caused them to leave Greenland.

The offshore areas of the Canadian Arctic are also expected to contain very significant petroleum resources. Drilling took place in the 1970s and 1980s. In 2002 and 2004, new leases were sold when interest picked up. The most recent licences were issued in 2012. However, a joint moratorium on offshore activity was introduced with the United States in 2016. It is reviewed every five years. The eleven exploration licenses that had been granted have now been frozen. The Canadian government has announced that it wants to continue to suspend all oil and gas activities in Canada's Arctic waters.[11] There is no strong pressure politically or from industry to change this position.

Fig. 1: The Arctic Ocean, Marginal Seas and Subareas



Undersea basins. Sources: own illustration based on Macnab, Ron / Neto, Paul / van de Poll, Rob 2001: Cooperative Preparations for Determining the Outer Limit of the Juridical Continental Shelf in the Arctic Ocean: A Model for Regional Collaboration in Other Parts of the World?, IBRU Boundary and Security Bulletin, IBRU Centre for Borders Research, Durham University, pp. 86–96, in: https://bit.ly/3YTRCDD [18 Mar 2023]; Weber, J. R. 1983: Maps of the Arctic Basin Sea Floor: A History of Bathymetry and its Interpretation, Arctic 36: 2, Jun 1983, pp. 121–143, in: https://bit.ly/40iBuwM [18 Mar 2023]. Map: © Peter Hermes Furian, AdobeStock.

The USGS estimates indicated considerable offshore potential off Greenland, and the authorities and a large part of the population welcomed petroleum activity as a source of income that could make the country fully independent of Denmark.[12] However, after a brief wave of enthusiasm among major companies, negative results from exploration drilling caused them to leave Greenland. In 2021, the Greenlandic government declared an end to oil and gas exploration, citing environmental and climate concerns in addition to economic calculations.[13]

The Norwegian part of the Barents Sea is still considered a promising area in official Norwegian resource estimates. Petroleum resources are estimated to about 2,400 million tons of oil equivalent, divided between oil and natural gas. The lion's share of the resources is undiscovered, and large areas have not been explored.[14] The

northern part of the Barents Sea – the continental shelf around the Svalbard archipelago – has not been opened up for exploration at all. Exploration in the southern part started in 1980, but interest from industry has fluctuated and the response to recent licensing rounds has been modest. Two major projects are in production, the Snow White natural gas project and the Goliat oil project. A second oil project – Johan Castberg – is under development, and plans for a third oil project – Wisting – are well advanced. There is intense domestic debate about Norwegian petroleum activity with demands for exploration in new areas to be avoided and industry scaled back to pave the way for a decarbonised future. The government's policy so far is to sustain activity.

Russia has the largest continental shelf among the Arctic states. Exploration has taken place since the 1980s, starting with the Barents Sea. For a long time, however, offshore development was not a high priority because of the abundance of onshore resources. Political priorities changed in the early 2000s as the onshore reserve base had become more challenging and costly to develop. Geological surveys and drilling results indicated an enormous offshore potential, particularly in the Barents, Pechora and Kara Seas: some 100 billion tons of oil equivalent, surpassing USGS estimates by far.[15] Such figures have been taken at face value by many, despite their very uncertain basis.

The Russian petroleum industry lacked experience and technology for deep offshore operations, but a framework for cooperation with foreign companies was established, and large-scale projects were envisaged. Preparations for development of the huge Shtokman gas field in the Barents Sea were carried out by Russia's Gazprom together with Total of France and Norway's Statoil. The project was effectively cancelled in 2012, however, due to cost concerns and a negative market outlook caused by the rapid growth of unconventional gas in the United States. At the same time, large-scale oil projects were negotiated between the state-dominated Russian oil company Rosneft, Italy's Eni and Statoil in the Barents Sea, and between Rosneft and ExxonMobil in the Kara Sea and further east. By early 2014, it looked like a major offshore development in the Russian Arctic would soon be under way. The economic sanctions against Russia, and Arctic offshore oil in particular, imposed after the annexation of Crimea and the support of separatists in Donbas, put an end to this expansion. ExxonMobil withdrew just as one well had been drilled. And all cooperation agreements were frozen and later cancelled.

The successful start of Yamal LNG in 2017 opened a new chapter in Arctic navigation.

The official Russian position was first that Western majors could be replaced by Asian companies, i.e. Chinese ones. This has not happened though, partly because they lack the necessary experience but also because the significant fall in the oil price made expensive Arctic offshore projects look less attractive. Since then, official Russian reports have also modified their outlook. Newer estimates of economically recoverable oil and gas indicate a potential of about one billion tons of oil equivalent in the Russian western Arctic.[16] This is still a very significant volume, most of it natural gas. In a comprehensive oil policy paper from 2021, the Ministry of Energy declared that large-scale Arctic offshore development would hardly take place before 2035 because of a lack of technology and due to expectations that the oil price would remain too low.[17] Some exploration close to shore will continue, however, as will Russia's only producing Arctic offshore field Prirazlomnoe, which is located in shallow waters in the Pechora Sea and came on stream in 2013.

Resources and the Northern Sea Route

Extensive energy developments have been taking place for decades onshore in the Russian Arctic. In the 1990s, oil production began

from fields in the Nenets autonomous district in the northern part of European Russia, west of the Ural Mountains. Oil is transported out by sea from a terminal in the shallow Pechora Sea. But the most noteworthy development is exploitation of the enormous gas resources in the Yamal-Nenets autonomous district in North-West Siberia, east of the Urals. Development of

Between hope and scepticism: The official Russian expectation has been that international transit traffic on the Northern Sea Route will flourish once year-round use is secured. However, outside observers remain cautious about the potential. Photo: © Oksana Sotnik, TASS, dpa, picture alliance.

giant gas fields operated by Gazprom started in the 1980s, all connected to western Russia and Europe via pipelines. The region accounts for some 90 per cent of Russia's gas production. However, in recent years it is the production of liquefied natural gas (LNG) that has caught most international attention. The Yamal LNG plant on the east side of the Yamal Peninsula

processes some 19.5 million tons of LNG annually. The plant is majority-owned and operated by Novatek, which is a private company but has close ties to the Kremlin. TotalEnergies has a 20 per cent stake, and Chinese interests control 29.9 per cent. The project required sea-based transportation and included the construction of 15 icebreaking LNG carriers, owned and operated mostly by consortia of international shipping companies and one of them Russian owned.[18]

The successful start of Yamal LNG in 2017 opened a new chapter in Arctic navigation. About every 50 hours a carrier takes 170,000 cubic metres of gas to the market. Most of the gas has been sent to Europe, or reloaded there for further transport to Asia, but increasingly cargos are sent eastwards directly to Asia. The vision was, and is, further build-up of LNG production from several fields in the Ob Bay area to serve Asian markets. In addition, plans for a huge oil project in East Siberia – Vostok Oil – have been under way for the last few years, entailing transportation by sea. To facilitate this development, Russia has embarked on an ambitious renewal and expansion programme for its nuclear icebreaker fleet that would make year-round use of the whole Northern Sea Route possible. Even if the ice is decreasing and ice-free summers are realistic within a few decades, there will still be ice for parts of the year.

In the current situation and the near future, the Central Route is not a realistic option.

The expansion of shipments of hydrocarbons out of the Arctic changed the focus for development of the Northern Sea Route. Ten to twelve years ago, it was expected that international transit shipping between the Pacific and the Atlantic would soar, but it did not take off – for several reasons.[19] International shipping companies have not invested in special tonnage for Arctic shipping and the bulk cargo potential is limited. The big container shipping companies show scant interest in the Arctic route. Even though it is shorter than southern routes, it has limitations in terms of predictability (unexpected ice makes just-in-time delivery impossible), size due to shallow straits, and the lack of markets underway. The official Russian position has been that international transits will flourish once year-round use is secure, but outside observers remain doubtful about the potential, although some growth is expected. Some big liner companies have shown interest in establishing a cargo route together with Russian companies, but the sole company so far carrying out a regular cargo service on the whole route is China's COSCO, with four to five sailings per year in each direction.

There is no rush from international shipping companies to explore the route for transit, and Russian policies governing the growing destination shipping traffic have become more protectionist and do not encourage foreign participation.[20] The Russian war against Ukraine and sanctions have created new uncertainties which are bound to reduce outside interest further and which will also probably impact the development of hydrocarbon projects in Arctic Russia, due to reduced access to key technologies as well as markets.

The Northwest Passage and the Transpolar Route

The other Arctic shipping route, the Northwest Passage, which consists of several shipping lanes through the archipelagos in Arctic Canada, has not been developed as a commercial route at all. Canadian authorities have not encouraged the use of the route, partly for environmental safety reasons but also because of a dispute with the United States about the legal status of the route – as international straits or internal Canadian waters. There are also Inuit claims for control of parts of the route, as they rely on transportation over ice which would be broken up with the use of the route in winter. The ice situation is heavy for long periods of the year, and ice can be a hindrance even in the summer. As ice

breaks up in the Arctic Ocean, prevailing wind directions tend to bring ice floes into Canadian waters. Most vessels on the route are yachts, but in recent years large cruise vessels have been seen. The number of cargo ships is very small: only eight in 2022.[21] Nevertheless, as the ice situation is expected to get lighter, more commercial interest in transits is expected, particularly seasonal transportation of ore and metals with icebreaker support to processing plants in Asia.

There is also a third route through the Arctic – referred to as the Transpolar or Central Route – straight across the Arctic Ocean. This is not an existing seaway, but it is being discussed as a possibility as the ice continues to melt.[22] However, as argued above, ice will remain for at least parts of the year, making navigation unpredictable and risky. The safety risks of journeys in such waters so far away from any shore are substantial. In the current situation and the near future, the Central Route is not a realistic option.

Hard Minerals

The Arctic is expected to contain a vast array of hard minerals. Some reserves are proven, but generally a great deal of exploration will be required to assess and develop deposits. With the largest Arctic land territory, Russia stands out with expected deposits of several minerals and rare earth metals. However, exploring for and developing resources is costly and time consuming. It has long been considered necessary to bring in foreign investors to develop large-scale projects. This has met with political opposition, and the conditions for long-term investment in Russia have not been attractive, to say the least. With the tensions and uncertainty following the invasion of Ukraine, a willingness to invest in Russia seems even less likely. Only large state-owned Chinese companies may be interested, but even these kinds of companies have not undertaken much activity in the Russian mineral sector so far.

There is commercial interest in hard minerals in the other Arctic countries, just as there are domestic discussions involving indigenous rights and environmental concerns that may limit access for industry. Extraction of hard minerals and rare earth metals is at a very early stage, but several mineral projects in Alaska[23] and, to a lesser extent, in Arctic Canada[24] can be expected in the coming years. In any case, outside investors and industries have no exploration rights without permission from national – and sometimes regional and local – authorities.

The increasing need for rare earth minerals in green technologies has increased the focus on Greenland.

A case of special interest is Greenland, a nation in the Kingdom of Denmark with extensive autonomy, a huge territory, a very small population – and rich deposits of minerals and rare earth metals.[25] It has been speculated that the country would be vulnerable to pressure for access to its mineral resources due to limited state capacity and because mineral development could offer an important diversification of its economy, ultimately paving the way to full independence from Denmark.

More specifically, it has been argued that Chinese companies with strong state connections were ready to start large mining projects in Greenland. However, closer inspection showed that the Chinese interest was exaggerated and that announced investments never happened.[26] Nevertheless, Chinese investors are involved as part owners in a controversial uranium project. Permission to develop has not been given, however, and there is a heated internal debate about the benefits of opening mines versus the environmental impacts and threats to traditional livelihoods.[27] The increasing need for rare earth minerals in green technologies, and the dependence on China for these resources, has increased the focus on Greenland. Melting glaciers are making deposits more accessible. Over the last few years, several foreign companies

have evaluated or applied for exploration rights, and the political interest in Greenland and its resources, particularly from the United States, has soared.[28]

Deep Seabed Minerals

Exploitation of deep seabed minerals, which was on the agenda in the 1980s, has enjoyed a come-back in recent years connected with a growing need for specific metals. Arctic continental shelves are considered promising areas, but there are considerable technological and environmental challenges associated with mining on the seabed that need to be resolved.[29] Canada has imposed a moratorium on deep seabed activity in waters under its jurisdiction,[30] whereas Norway is actively mapping its resources and is preparing to open up for exploration in certain areas.[31] Exploration and exploitation will be under national control, but if resources on the continental shelf around Svalbard are considered interesting, a dispute about the conditions for exploitation may emerge.

The Norwegian position is that Norway has exclusive resource rights there, whereas some states hold that the equal treatment provisions of the Svalbard Treaty apply. However, there is no disagreement that Norway has sovereignty and can decide whether to open the shelf for commercial exploitation of minerals or keep it closed. This is a parallel to petroleum activity. In the absence of general support for the Norwegian position, the shelf has not been opened. The possibility of mining on the seabed in the Central Arctic Ocean outside coastal state jurisdiction is very remote, but a framework exists as the International Seabed Authority was established under UNCLOS for that purpose.

Security Implications

There are no security implications arising from disputable ownership to Arctic mineral resources at sea or on land. The idea that there are attractive resources in contested areas is still widespread but it is misleading, and mineral resources outside national jurisdiction are not on the agenda for technological and economic reasons, although they may be in future. Security conflict over resources today would imply claims to resources belonging to another state, which does not look probable, even now. A more realistic scenario would be a combination of political and economic pressure to gain access to resources.

The idea that there are attractive resources in contested areas is still widespread but it is misleading.

The sea routes are a somewhat different matter. A basic principle in the law of the sea is freedom of navigation, which is balanced against the extensive coastal state rights to resources in the ocean and on the seabed. Outside internal waters, foreign ships enjoy right of passage through territorial waters (twelve nautical miles from shore), and further out the coastal state cannot in principle impose any restrictions. There is, however, an exception to these rules in UNCLOS Article 234, which states that "Coastal States have the right to adopt and enforce non-discriminatory laws and regulations for the prevention, reduction and control of marine pollution from vessels in ice-covered areas within the limits of the exclusive economic zone, where particularly severe climatic conditions and the presence of ice covering such areas for most of the year create obstructions or exceptional hazards to navigation, and pollution of the marine environment could cause major harm to or irreversible disturbance of the ecological balance."[32]

Russia refers to this article to justify its management system for the Northern Sea Route, which involves permits to sail through the route and mandatory use of Russian icebreakers when necessary. Objections have been raised, particularly by the United States, that the rules

concerning the Northern Sea Route are discriminatory, and the scope is also questioned. Can the whole sea route area really be considered ice-covered for most of the year?[33] The United States has also repeatedly protested against the lack of an exemption for state vessels (including military) as codified in UNCLOS Article 236. In 2022, Russia imposed even stronger restrictions on foreign warships, requiring notification through diplomatic channels three months in advance.[34]

The United States is particularly concerned about navigational rights in the straits of the Northern Sea Route. The Russian position is that these relatively narrow straits are internal waters; thus the scope for regulation would be very broad. The United States holds that the straits fall under the UNCLOS definition of "straits which are used for international navigation". Ships under foreign flag have transit rights in such straits. These transit rights are very similar to "innocent passage", which military vessels enjoy in the territorial seas, but they go further, as submarines do not have to navigate on the surface. The United States maintains that it has a right to send naval vessels through the Northern Sea Route without notification, as it has done in other sea areas with contested jurisdiction in what are known as FONOPs – freedom of navigation operations.[35] Such a move could bring with it the risk of military conflict, but there is no indication that the United States is considering it.[36]

Commercial users of the sea route have accepted the Russian regulations, however. More Russian restrictions will impact their economic interest in the sea route, but do not create security problems. There is no likelihood that foreign states will use military power to support passage of cargo vessels through the sea route.

Whereas military conflict associated with the search for and development of mineral resources is unlikely, Arctic resource policies and management may nevertheless become engulfed in conflict. That will be primarily between domestic actors who support or reject specific projects, however. Environmental impacts and effects on traditional livelihoods are already a concern in many places, and positions seem quite likely to become further entrenched. External activists may become involved in these kinds of conflicts. Pressure from other countries or international organisations is conceivable, as witnessed, for example, by declarations about conservation of the Arctic environment from the EU. Such developments may turn resource projects into foreign policy and diplomatic challenges. On the other hand, the war in Ukraine and uncertainty about developments in Russia will prompt a reassessment of critical raw material supplies, not only oil and gas, which is likely to increase the importance of non-Russian parts of the Arctic.[37]

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