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From Reluctance to Greater Alignment

Russia-PRC Scientific Cooperation in the Arctic Supports Strategic Goals

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Introduction

In line with Russia's and the People Republic of China's (PRC) broader partnership, scientific cooperation between the two powers has evolved significantly within the last decade. Moscow has long prioritized Arctic sovereignty, but its increased international isolation since 2014 has made Arctic collaboration with the PRC more attractive. Growing dual-use economic and strategic opportunities for cooperation, against the backdrop of plummeting relations with other Arctic powers, have fueled this dynamic.

Recent US intelligence reports highlight the extent of PRC support for Russia's war effort in Ukraine, demonstrating that the partnership directly supports the Kremlin's weapons industry and strategic objectives.[1] This is just one of many indicators suggesting that the relationship is maturing. The PRC and Russia have significantly advanced their broader cooperation in the field of science and technology, including in sensitive areas of 5G and quantum. Their collaboration on space-based technologies and research on undersea acoustics in the Arctic supports both powers' defense industry and military ambitions. Given Moscow's historical reluctance to partner with Beijing in such strategic areas, recent changes call for Western policies to mitigate the security implications of this growing alignment.

This paper is the second in a series investigating the PRC's and Russia's growing alignment in areas that have potential military and dual-use applications in the Arctic. The analysis relies on open-source government documents and expert views, including anonymized interviews with leading experts and officials from the United States and Northern Europe.

The PRC's Focus on Shaping Arctic Governance and Scientific Exploration

Scientific research in the Arctic has been key to supporting Beijing's broader polar strategy and interest in "shipping, air links, resource extraction, missile positioning and timing, and weather forecasting".[2] Such research has also served as a benign means to establish a regional presence, foster diplomatic ties, and facilitate a greater role in polar governance and policymaking in multilateral forums and international organizations.

To maximize its influence, the PRC participates in all multilateral forums on Arctic governance that it can access[3] and takes a selective approach within these overlapping frameworks to strengthen rules, principles, and initiatives that align with its interests and deprioritize others.[4] Beijing is particularly focused on advancing international legal regimes, such as the International Maritime Organization's International Code for Ships Operating in Polar Waters (Polar Code) and the International Seabed Authority (ISA) within the UN Convention on the Law of the Sea (UNCLOS), that strengthen the rights and access of non-Arctic states in the region. At the same time, the PRC promotes arguments that support its framing of the Arctic as a "global commons"[5] whose governance status is "unresolved"[6] and, as Marc Lanteigne argues, positions itself as a "norm entrepreneur" to develop new guidelines and regimes.[7] This strategy also applies to Beijing's approach to the ISA (of which it is the "largest financial contributor"[8]), where it is uses its role to advance its access to seabed minerals.

Contrary to Chinese Communist Party (CCP) talking points geared toward Western audiences, efforts to combat global warming are not the primary driver for the PRC's Arctic scientific research. The country has a legitimate, if secondary, interest in understanding climate change effects on mid-latitude countries, which it views as a challenge to national stability (related, for example, to water scarcity and food insecurity issues) and an opportunity for increased Arctic access and resource extraction.[9] Since 2005, Chinese officials have emphasized the polar region's mineral resources and downplayed environmental concerns. [10] Beijing fears that stronger environmental regulation could impede commercial interests.

Military-Civil Fusion and Dual-Use Applications of Scientific Activity in the Arctic

Given the PRC's strategy of military-civil fusion (MCF), it is impossible to classify any Chinese activity in the Arctic as purely scientific. National security interests underpin all efforts. This paper covers select scientific interests and activities to assess how the PRC is using science collaboration in the Arctic to support diplomatic, commercial, and military ends, and the influence of these strategies and tactics on Beijing's engagement with Moscow.

Science Diplomacy

Science diplomacy has played an important role in the PRC's strategy to facilitate exchange and trust with other Arctic powers' scientific, political, and indigenous communities. As Chinese scholars point out, strategies to strengthen Beijing's "discourse power" enhance its "ability to control the narratives and agendas of international politics, which, if successful, should lead to influence over normative and legal processes".[11]

"People-to-people" diplomacy is part of Beijing's effort to legitimize and deepen its Arctic presence and enhance its influence in regional priority-setting and decision-making.[12] Scientists are part of the PRC apparatus that helps inform its polar strategy and drive national narratives about the Arctic.[13] As Matti Puranen and Sanna Kopra, building on research by Frank Jüris, argue, "China emphasizes unofficial connections between elites and institutions such as universities and research institutions in order to cultivate a 'circle of friends' … supportive [of], or at least neutral towards, Chinese Arctic ambitions." The scholars point to conferences such as the Arctic Circle Assembly in Reykjavik, the 2019 Arctic Circle China Forum in Shanghai, and Arctic Frontiers in Tromsø as venues used by Chinese stakeholders to promote PRC positions.

Advancing Situational Awareness

Technology and air, sea, and space assets to monitor and survey the environment enhance the PRC's capacity to study the operating environment in the Arctic. They also strengthen its situational awareness, including, for example, through unmanned aerial vehicles (UAV), satellites, and ground stations that support remote sensing, navigation, and communication. Icebreakers, submarines, autonomous underwater vehicles (AUV), monitoring buoys,[14] and hydrophones add to maritime domain awareness.

Research Stations

The PRC has two active research stations in the Arctic region. Yellow River Station, established in 2004 within Norway's science community in Ny-Ålesund, Svalbard, supports "scientific monitoring and research in … marine [and] terrestrial ecology, space physics, glacier mass-balance and motion, atmospheric physics and chemistry, and geographic information".[15] In 2018, the China Iceland Arctic Research Observatory, financed by the PRC, was launched in northern Iceland by the Polar Research Institute of China and the Icelandic Centre for Research.[16] Originally conceived to support aurora and upper atmosphere research, the observatory's research focus was expanded "to climate change, satellite remote sensing, geosciences, oceanography, fisheries and more,"[17] potentially offering pathways for dual-use intelligence collection.

PRC efforts to maintain or open additional science stations in other Arctic countries have failed or been suspended given greater awareness of Chinese ambitions and coercive economic tactics.[18] Failed projects include the Esrange Space Center in Kiruna, Sweden (suspended in 2020 due to suspected ties to the PLA)[19], a planned Joint Research Center for Arctic Space Observations and Data Sharing in Sodankylä, Finland (not realized due to security concerns),[20] and a proposal for a Chinese-operated research facility and satellite ground station in Nuuk, Greenland (denied by Danish authorities in 2017).[21] PRC hopes to establish a research station in Canada, voiced in 2015,[22] have been foiled, too, along with other proposed infrastructure projects that would have enabled the PRC to expand its Polar Silk Road.

The PRC also relies on expeditions to support Arctic research and gain operational experience. As of August 2023, the country completed 13 Arctic Ocean expeditions, including four with the Xuelong-2, Beijing's second icebreaker and its first domestically built (although it was developed by Finnish engineering company Aker Arctic). The Xuelong-2 can support deep sea exploration and seabed mapping.[23] Beijing is in the process of building a third polar-capable vessel that will carry three deep sea submersibles.[24] Despite previous Russia-PRC plans to jointly develop a nuclear icebreaker, it will be conventionally powered.[25]

Hydrographic Mapping

The PRC views the deep seabed as one of three "strategic new frontiers", with the polar regions and space, that offer economic, political, and military opportunities.[26] As part of the PLA's efforts to field a world-class force and blue-water navy, Beijing "has developed the world's largest fleet of civilian research vessels [that] support scientific and commercial objectives [and] advance Beijing's strategic ambitions",[27] a 2024 CSIS report finds. The PRC's 14th Five Year Plan (2021-2025) highlights deep sea exploration as one of seven scientific research priorities, and, in 2021, the Ministry of Natural Resources linked "ocean surveying to military objectives". [28]

While operations supporting hydrographic surveys have primarily focused on the South China Sea and western Pacific Ocean,[29] they also play an important role in the Arctic, as emphasized in the PRC's 2018 Arctic policy white paper.[30] Hydrographic mapping and deep seabed surveys have "two purposes", according to retired US Navy Captain James Fanell, formerly the director of intelligence for the US Pacific Fleet: to exploit resources and to

expand the "geographic area and lethality of the PLA Navy's [People's Liberation Army Navy, or PLAN] blue-water submarine force." [31] Surveying missions also help gather data on NATO allies' critical infrastructure, such as undersea cables, and military capabilities.

The PRC is intent on maintaining its grasp over critical mineral supply chains (it already controls 95% of the global rare-earth metal supply)[32], which are essential for civilian and military industry. While Arctic littoral states have the exclusive right to exploit resources within their own exclusive economic zones (EEZ)—with pending expanded Outer Continental Shelf (OSC) claims covering most of the Arctic seabed—Beijing is using its influence within the ISA to be first in line if the organization permits seabed mining on the high seas.[33]

Chinese submarines in the Arctic could play an important role in advancing the PRC's nuclear deterrence vis-à-vis the United States. Submarine and AUV operations are particularly hard to detect and deny in the Arctic due to the scarcity and high-latitude limits of intelligence, surveillance, and reconnaissance (ISR) capabilities in the region. In 2019, the US Department of Defense warned about this, especially given the country's modernization of its submarine fleet. According to the Pentagon's China Military Power report, "[c]ivilian research could support a strengthened Chinese military presence in the Arctic Ocean, which could include deploying submarines to the region as a deterrent against nuclear attacks."[34]

Russia's Science Interests in the Arctic and Its Perception of PRC Ambitions

Beyond security considerations, economic interests drive Russia's scientific priorities in the Arctic. Decades of geographical and geological research has been used to support Moscow's claims to large parts of the central Arctic Ocean (and its minerals) based on an extended OCS delineation,[35] most of which the UN Commission on the Limits of the Continental Shelf (CLCS) declared valid in February 2023. According to Russian estimates, "up to 5 billion metric tons of hydrocarbon resources fall within Moscow's claimed extended continental shelf."[36]

Although climate change affects Russia disproportionally due to permafrost thaw and coastal erosion, the Kremlin has devoted little to climate mitigation efforts, with dire consequences for the planet.[37] Russian national and elites' economic interests remain focused on hydrocarbon extraction and development of the Northern Sea Route (NSR). While Russia's war economy and resulting emissions have exacerbated environmental pollution,[38] data flows from Russia's 21 research stations, many of which are located in the boreal forest in Siberia, have stopped, "cutting access to data from half of the landmass in the Arctic region".[39] According to climate scientists, this severely impacts climate research and skews models analyzing environmental changes.[40] Moreover, Russia's repressive domestic environment has chilled international scientific exchange and collaboration.[41] Russia calculates that other Arctic powers' desire to mitigate climate change will eventually lead to a resumption in collaboration.[42] The Arctic Council, which Norway currently chairs, recently resumed virtual working group meetings.[43]

Simultaneously, isolation from the West has increased Moscow's interest in cooperating with other powers. In 2023, Russia announced the development of an international Arctic science center in Pyramiden, Svalbard (a former Soviet coalmining community) in collaboration with the BRICS and other "friendly countries".[44] The Kremlin

claimed that Brazil, India, the PRC, Thailand, and Türkiye had expressed interest in the project,[45] which will require significant resources and infrastructure investment. India and the PRC already have a research presence in Ny-Ålesund, which may limit the appeal of joining Russia's development efforts in Pyramiden.

Russia-PRC Science Cooperation

The PRC was Russia's top partner for joint research papers in 2023 (overtaking Germany and the United States).[46] Although it may take years to assess the full impact of this trend, it reflects Moscow's growing pivot toward Beijing. A "budget squeeze in Russian science" is further impacting scientific efforts.[47] For this reason, the Kremlin is prioritizing high-profile technological cooperative efforts, including those in sensitive areas such as quantum communication.[48] This suggests that mutual distrust may be dissipating, especially at the top levels of government. The PRC and Russia are also finding common ground in their opposition to US OCS claims.[49]

Areas of Russia-PRC Science Cooperation in the Arctic

Russia-PRC scientific research projects in the Arctic build on initiatives launched before 2022. But continued collaboration and the evolution of collaborative research activities since their first joint Arctic expedition in 2016 is noteworthy. Both countries have previously emphasized the civil focus of joint research, arguing it supports commercial development and navigation along the NSR. They have played down the potential for military collaboration. A Russian professor referencing a joint project in 2019 stressed that "military cooperation with China in the Arctic is not considered a relevant option by Moscow so far."[50] Similarly, a 2021 article by Chinese and Russian researchers at Harbin Engineering University's (HEU) Arctic Blue Economy Research Center discusses bilateral cooperation and argues that "many spheres of knowledge related to the Russian Arctic remain closed for admission of foreign [implying Chinese] specialists for security reasons. The transfer of the Russian research findings in 'security-sensitive' areas to a foreign party is also significantly limited."[51]

However, Frank Jüris suggests that projects led by PRC and Russian institutions, including the Arctic Blue Economy Research Center, may have military applications, given their home institutions' ties to the Chinese defense sector and their research on undersea acoustics and communication, an important field for anti-submarine operations. The table below lists relevant research initiatives between 2016 and 2019 pursuing potential dual-use projects.

Table 1: Joint Russia-PRC Research Initiatives in the Arctic

Year	*Joint Center/Project*	*Russian Institution*	*PRC Institution*	*Research Focus*
2016	Russian-Chinese Polar Engineering and Research Center	Far Eastern Federal University (FEFU)	Harbin Polytechnic University/ Harbin Institute of Technology (HIT)	industrial development of Arctic (including assessing geocryological conditions in support of Rosneft)[52]
2018	Arctic Blue Economic Research Center	Russia's Northern (Arctic) Federal University	Harbin Engineering University (HEU)	marine engineering and navigation along the NSR and development of the Russian and European Arctic through joint investment projects (incl. with Nordic partners) [53]
2018	Not affiliated with a center	FEFU's School of Engineering	HEU's College of Underwater Acoustic Engineering	"the polar shallow water under-ice acoustic environment and under-ice underwater communication" [54]
2019	Russian-Chinese Arctic Research Center	Institute of Oceanology at the Russian Academy of Sciences	Qingdao National Laboratory for Marine Science and Technology	evaluation of "climate, geological and bio-geo-chemical processes"; research, including on ice conditions on Northeast Passage [55]

The **Arctic Blue Economic Research Center** (launched in 2018) is a joint initiative between HEU and Russia's Northern (Arctic) Federal University in Arkhangelsk with a focus on marine engineering and navigation along the NSR and an expressed interest in supporting development of the Russian and European Arctic through joint investment projects (including with Nordic partners).[56] HEU is part of the "Seven Sons of National Defense" grouping of public universities affiliated with the PRC's Ministry of Industry and Information Technology and the PLA. According to the Australian Strategic Policy Institute's (ASPI) defense university tracker, it is subordinate to the PLAN and requires "top secret" security credentials.[57] The Harbin Institute of Technology (HIT), a partner in the Polar Engineering and Research Center that was launched in 2016 with Russia's Far Eastern Federal University (FEFU), is also part of this defense university cluster and requires the same "top secret" clearance level.

As Jüris points out, HEU has an advantage in undersea communications technology[58] and partnered with FEFU in 2018 to conduct joint "research on the polar shallow water under-ice acoustic environment and under-ice underwater communication."[59] One year later, the PRC's Qingdao National Laboratory for Marine Science and Technology and the Russian Academy of Science launched the Russian-Chinese Arctic Research Center. The Chinese laboratory focuses on fiber-optic hydrophones (FOH), which, it points out on its website, "can be used to construct sonar detection systems for various surface and underwater mobile platforms … in important areas such as ports, islands, straits, [and] seabeds."[60] Jüris highlights concerns about this capability given PRC and Russian stakes in the Finnish-led Arctic Connect data cable project and notes that it could be put to use "for the detection of adversaries' submarines in the strategically important Artic region." [61] The Arctic Connect project was suspended in 2021, but the continued collaboration between the PRC and Russia on underwater technologies and capabilities used in missions as late as 2023 is concerning.[62]

The COVID-19 pandemic temporarily impacted Arctic scientific missions although the Xuelong-2 conducted an Arctic mission in 2021 (it did not in 2022). Beijing completed its 13th scientific mission to the Arctic in September 2023 to explore the "central section of the Pacific Arctic and the Gakkel Ridge."[63] Russian and Thai scientists were on board this mission,[64] which included "exploration of the seabed using trawls".[65] The Xuelong-2 carried an AUV developed by HEU that was "equipped with a multi-beam ice shape detection sonar independently developed by the School of Hydroacoustics". According to an HEU report, the ship facilitated the PRC's "first Arctic sea ice bottom morphology observation test [and] verified key technologies such as high-latitude underwater navigation in the polar regions, hydroacoustic communications, and precise control of under-ice navigation."[66] It should be noted that Canada, Denmark, and Russia all have pending, overlapping OCS claims on the Gakkel ridge.

The military affiliation of the joint research centers and scientists involved in the Xuelong-2's missions, and the PRC's explicit interest in furthering military objectives via ocean surveying, suggest that, despite assertions to the contrary, joint Russia-PRC Arctic research in the last six to eight years supports dual-use capability development and furthers strategic PRC interest in submarine and antisubmarine capabilities.

Conclusion

Scientific and technological cooperation between Beijing and Moscow in the Arctic—and beyond—has significantly evolved in the last decade, as both countries' relationships with the United States and other NATO members have become increasingly tense. Russia's initial economic and political isolation in the aftermath of its 2014 annexation of Crimea and the acceleration of that isolation following the full-scale invasion of eastern Ukraine in 2022 has made cooperation with the PRC more attractive. At the same time, a growing wariness of Chinese strategic ambitions, coercive economic tactics, and focus on dual-use technologies, has slowed Beijing's efforts to advance economic and scientific collaboration with NATO Arctic powers. With other avenues of Arctic engagement restricted, Moscow now offers Beijing the best pathway to further its Arctic interests.

Greater strategic and economic alignment between the two powers, driven by Russian President Vladimir Putin and his Chinese counterpart, Xi Jinping, is fueled by scientific collaboration. While efforts to better understand and mitigate climate effects have served as important justifications for Beijing's inclusion in Arctic scientific and multilateral forums, and are cited as evidence for the need to resume international collaboration with Moscow, climate mitigation actually holds little interest for Putin and Xi who view the Arctic primarily through the strategic lens of national and economic security. Academic institutions from both countries have launched joint research initiatives on climate-relevant topics such as water ecology and permafrost (two issues that have direct implications on Chinese and Russian societies), but these efforts largely serve to preserve regime stability.

Arctic scientific cooperation between the PRC and Russia has evolved from commercial applications to facilitate shipping and navigation along the NSR to a more geological focus with relevance for dual-use capabilities in space and in the deep sea. The PRC's MCF strategy and the involvement of institutions associated with the PLA make it likely that scientific data collected during Arctic missions helps inform Chinese military interests in that region and research and development efforts in Beijing's and Moscow's broader defense sectors.

Nonetheless, as outlined in GMF's previous paper in this series, some limits on this evolving partnership continue. Beijing's third polar-capable vessel, for example, will be conventionally powered, despite previous plans by the PRC and Russia to collaborate on a nuclear-powered icebreaker, which would have relied on existing Russian technology. Beijing's long-standing skepticism of relying on Russian technology, and Moscow's long-standing skepticism of sharing it, may persist.[67] But the limits may be beginning to erode, which suggests a growing level of trust and pragmatic scientific engagement that could deepen over time.

As in other domains, Beijing and Moscow continue to seek to diversify their partnerships and balance their growing bilateral cooperation and trade relationships through engagement with others. Russia has recently increased its courtship of other "friendly powers", including other BRICS+ countries. The PRC, to facilitate broader engagement in the Arctic and develop its Polar Silk Road—which relies on access to ports, airfields, and communication and data centers along the route—is eager to continue its political and economic engagement with other Arctic powers. Beijing also seeks to portray itself as a responsible power, but its increased rhetorical support[68] of Moscow and its tangible support for Russia's war economy has begun to cross a threshold that may force the United States and its NATO partners to respond to PRC actions more forcefully.

Collaboration in the field of international scientific research and science diplomacy in and around the Arctic Council and other international forums remains one of Beijing's and Moscow's last avenues to advance cooperation with other Arctic powers and reduce Russia's international isolation. This is consistent with Western countries' desire to keep open channels with both capitals. But caution and awareness are necessary as both use these avenues to support their interests, not international collaboration.

Endnotes

[1] Aamer Madhani, "US intelligence finding shows China surging equipment sales to Russia to help war effort in Ukraine", Associated Press, April 12, 2024, https://apnews.com/article/united-states-china-russia-ukraine-war-265df843be030b7183c95b6f3afca8ec.

[2] Anne-Marie Brady, China as a Polar Great Power, Cambridge University Press, 2017, p. 105.

[3] Matti Puranen and Sanna Kopra, China's Arctic Strategy – a Comprehensive Approach in Times of Great Power Rivalry, Scandinavian Journal of Military Studies, 6(1), p. 244, https://sjms.nu/articles/10.31374/sjms.196

[4] For more on this (specifically related to the Polar Code), see: Trym Eiterjord, Arctic Technopolitics and China's Reception of the Polar Code, The Arctic Institute, May 26, 2020. https://www.thearcticinstitute.org/arctic-technopolitics-china-reception-polar-code/

[5] For an in-depth discussion, see Anne-Marie Brady, p. 76.

[6] Ibid.

[7] Marc Lanteigne, 'Have you entered the storehouses of the snow?' China as a norm entrepreneur in the Arctic, Norwegian Institute of International Affairs, January 9, 2017, p. 117. 2017, https://www.cambridge.org/core/services/aop-cambridge-core/content/view/400E24FB4EB6B68ADC5D72032AD65AFA/S0032247416000759a.pdf/have-you-entered-the-storehouses-of-the-snow-china-as-a-norm-entrepreneur-in-the-arctic.pdf

[8] John Grady, "China Could Play Major Role in Drafting New Regulations for Seabed Mining, Says U.N. Official", USNI News, November 29, 2023. https://news.usni.org/2023/11/29/china-could-play-major-role-in-drafting-new-regulations-for-seabed-mining-says-u-n-official

[9] Ibid, p. 217.

[10] Ibid.

[11] Ibid.

[12] For more on "People-to-people diplomacy", see Matti Puranen and Sanna Kopra, pp. 244-246; Anne-Marie Brady, p. 249; and Frank Jüris, "Sino-Russian Scientific Cooperation in the Arctic: From Deep Sea to Deep Space", Russia-China Relations, Emerging Alliance or Eternal Rivals?, Sarah Kirchberger, Svenja Sinjen, Nils Wörmer (eds), pp 185-189. https://www.researchgate.net/publication/361335811_Sino-Russian_Scientific_Cooperation_in_the_Arctic_From_Deep_Sea_to_Deep_Space

[13] For a more detailed analysis, see Anne-Marie Brady, p. 249.

[14] In the fall of 2022, the Canadian military discovered Chinese monitoring buoys in the Arctic, leading to a statement by the Department of National Defence that it is "fully aware of recent efforts by China to conduct surveillance operations in Canadian airspace and maritime approaches utilizing dual-purpose technologies". For reporting on this, see "Canadian military found Chinese monitoring buoys in the Arctic", The Globe and Mail, February 21, 2023. https://www.theglobeandmail.com/politics/article-canadian-military-found-chinese-monitoring-buoys-in-the-arctic/

[15] "Arctic Yellow River Station", Polar Research Institute of China. https://en.pric.org.cn/index.php?c=category&id=98

[16] Michael Lipin, "China Begins to Revive Arctic Scientific Ground Projects After Setbacks", VOA, December 5, 2022. https://www.voanews.com/a/china-begins-to-revive-arctic-scientific-ground-projects-after-setbacks-/6860756.html

[17] Melody Schreiber, "A new China-Iceland Arctic science observatory is already expanding its focus", Arctic Business Journal, Arctic Today, October 31, 2018. https://www.arctictoday.com/new-china-iceland-arctic-science-observatory-already-expanding-focus/

[18] As Puranen and Kopra point out, the US Department of Defense and many Nordic governments have warned about the security risks of Chinese research and infrastructure projects in the region. Matti Puranen and Sanna Kopra, p. 247; see, e.g., US Department of Defense, Military and Security Developments Involving the People's Republic of China 2019: Annual Report to Congress, p. i. https://media.defense.gov/2019/May/02/2002127082/-1/-1/1/2019_CHINA_MILITARY_POWER_REPORT.pdf

[19] Nadya Yeh, China's Arctic ambitions and Russian ties stoke NATO fears, The China Project, April 25, 2023. https://thechinaproject.com/2023/04/25/chinas-arctic-ambitions-and-russian-ties-stoke-nato-fears/

[20] Matti Puranen and Sanna Kopra, p. 247.

[21] Nadya Yeh, China's Arctic ambitions and Russian ties stoke NATO fears.

[22] Anne-Marie Brady, p. 152.
[23] Ibid, pp. 154-55.

[24] Thomas Nilsen, "Third Chinese polar icebreaker will carry deep-sea submersibles", The Independent Barents Observer, June 28, 2023. https://thebarentsobserver.com/en/arctic/2023/06/third-chinese-polar-icebreaker-will-carry-deep-sea-submersibles

[25] Erdem Lamazhapov, Iselin Stensdal, and Gørild Heggelund, China's Polar Silk Road: Long Game or Failed Strategy?, The Arctic Institute, November 14, 2023. https://www.thearcticinstitute.org/china-polar-silk-road-long-game-failed-strategy/

[26] Patrik Andersson, The Arctic as a 'Strategic' and 'Important' Chinese Foreign Policy Interest: Exploring the Role of Labels and Hierarchies of China's Arctic Discourses, p. 20.

[27] Matthew P. Funaiole, Brian Hart, and Aidan Powers-Riggs, Surveying the Seas: China's Dual-Use Research Operations in the Indian Ocean, Center for Strategic and International Studies (CSIS), January 10, 2024. https://features.csis.org/hiddenreach/china-indian-ocean-research-vessels/

[28] Ibid.

[29] Ibid.

[30] The State Council Information Office of the People's Republic of China, China's Arctic Policy, First Edition, January 2018. https://english.www.gov.cn/archive/white_paper/2018/01/26/content_281476026660336.htm

[31] As quoted in Alexander B. Gray, The Deep Seabed Is China's Next Target, American Foreign Policy Council, July 15, 2021. https://www.afpc.org/publications/articles/the-deep-seabed-is-chinas-next-target

[32] Lily Kuo, "China is set to dominate the deep sea and its wealth of rare metals", The Washington Post, October 19, 2024. https://www.washingtonpost.com/world/interactive/2023/china-deep-sea-mining-military-renewable-energy/

[33] Ibid.

[34] US Department of Defense, Military and Security Developments Involving the People's Republic of China 2019: Annual Report to Congress, p. v. https://media.defense.gov/2019/May/02/2002127082/-1/-1/1/2019_CHINA_MILITARY_POWER_REPORT.pdf

[35] Elizabeth Buchanan, "Russia's Gains In The Great Arctic Race", War on the Rocks, May 4, 2023. https://warontherocks.com/2023/05/russias-gains-in-the-great-arctic-race/

[36] Ibid.

[37] Heather A. Conley and Cyrus Newlin, Climate Change Will Reshape Russia, CSIS, January 13, 2021. https://www.csis.org/analysis/climate-change-will-reshape-russia

[38] Ken Silverstein, "Russia Splatters the Environment, Leaving Its Own Country a Mess", Forbes, February 26, 2024. https://www.forbes.com/sites/kensilverstein/2024/02/26/russia-splatters-the-environment-leaving-its-own-country-a-mess/?sh=5fb4b8f2ccfe

[39] Ibid.

[40] For a more in-depth analysis of this, see Efrén López-Blanco, Elmer Topp-Jørgensen, Torben R. Christensen, et al., "Towards an increasingly biased view on Arctic change", Nature, January 22, 2024. https://www.nature.com/articles/s41558-023-01903-1

[41] For examples of Russia's domestic oppression of scientific voices, see, e.g., Thomas Nilsen, "Russia removes critical voices ahead of Arctic Council chairmanship, claims Indigenous peoples expert", The Barents Observer, November 27. 2019; or "Another Russian Researcher Charged with High Treason", RFE/RL Russian Service, June 15, 2020.

[42] A TASS article quotes a political science professor at St. Petersburg State University, Alexander Sergunin, saying that "arctic scientific diplomacy remains one of the few channels through which it is possible to maintain more or less normal relations and implement some interesting ideas" and that "the scientists themselves [in the Arctic] understand" that scientific institutes need to cooperate with Russia to get adequate data. The article suggests that Arctic scientific research cooperation with Russia is a necessary step for the future and that many Arctic Council members "want to cooperate with Russia" and will eventually pursue bilateral cooperation if Russia continues to be shut out. Ученый: арктическая научная дипломатия остается каналом сотрудничества с Западом [Scientist: Arctic scientific diplomacy remains a channel of cooperation with the West], TASS, October 20, 2022.

[43] Astri Edvardsen, "The Arctic Council with New Decisive Step Forward", High North News, February 29, 2024. https://www.highnorthnews.com/en/arctic-council-new-decisive-step-forward

[44] Astri Edvardsen, "Russia Wants to Cooperate with BRICS Countries on Research on Svalbard", High North News, April 14, 2023. https://www.highnorthnews.com/en/russia-wants-cooperate-brics-countries-research-svalbard

[45] Thomas Nilsen, "Isolated Russia invites faraway countries to upcoming Svalbard science center in Pyramiden", The Barents Observer, October 30, 2023. https://thebarentsobserver.com/en/arctic/2023/10/ghost-town-pyramiden-will-be-home-russias-planned-international-svalbard-science

[46] David Matthews, "China becomes Russia's biggest collaborator after war decimates science ties with the west", Science Business, February 22, 2024. https://sciencebusiness.net/news/international-news/china-becomes-russias-biggest-collaborator-after-war-decimates-science-ties

[47] Ibid.

[48] Matt Swayne, "Report: China and Russia Test Quantum Communication Link", The Quantum Insider, January 2, 2024. https://thequantuminsider.com/2024/01/02/report-china-and-russia-test-quantum-communication-link/

[49] Kenza Bryan, Josh Gabert-Doyon, and Demetri Sevastopulo, "China and Russia challenge US claim to mineral-rich stretches of seabed", Financial Times, March 25, 2024. https://www.ft.com/content/0e550c72-c6b1-42ac-876b-22aa49c2057b

[50] Pavel Devyatkin, "Russian and Chinese Scientists to Establish Arctic Research Center", High North News, April 15, 2019. https://www.highnorthnews.com/en/russian-and-chinese-scientists-establish-arctic-research-center

[51] Gao Tianming and Vasilii Erokhin, "China-Russia research and education collaboration in the Arctic: opportunities, challenges, and gaps," The Polar Journal 2021, Vol. 11, No. 1, p. 202., https://doi.org/10.1080/2154896X.2021.1889837

[52] "Far Eastern Federal University, Harbin Polytechnic University establish a Russian-Chinese polar engineering center", The Arctic, September 29, 2016. https://arctic.ru/international/20160929/446559.html

[53] "Arctic Blue Economy Research Center has been established at Harbin Engineering University", The University of the Arctic, November 26, 2018. https://www.uarctic.org/news/2018/11/arctic-blue-economy-research-center-has-been-established-at-harbin-engineering-university/

[54] Jüris, p. 189.

[55] "Russian Academy of Sciences, Chinese scientists to create Arctic research center", TASS, April 10, 2019. https://tass.com/science/1053084

[56] "Arctic Blue Economy Research Center has been established at Harbin Engineering University", The University of the Arctic, November 26, 2018. https://www.uarctic.org/news/2018/11/arctic-blue-economy-research-center-has-been-established-at-harbin-engineering-university/

[57] China Defence University Tracker, Australian Strategic Policy Institute, https://unitracker.aspi.org.au/universities/harbin-engineering-university/

[58] Jüris, p. 189.

[59] Ibid.

[60] "Fiber optic hydrophone technology", Pilot National Laboratory for Marine Science and Technology (Qingdao). https://archive.ph/MK0RN#selection-655.206-655.388

[61] Jüris, p. 190.

[62] For more on this and other infrastructure projects in Finland and the Nordic states, see Heather A. Conley and James A. Lewis, Chinese Technology Acquisitions in the Nordic Region, CSIS, September 2020, https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/200924_Chinese_Tech.pdf

[63] Heiner Kubny, "China on its 13th Arctic Expedition", Polar Journal, July 24, 2023. https://polarjournal.ch/en/2023/07/24/china-on-its-13th-arctic-expedition/

[64] "Scientists of the 13th Expedition of the People's Republic of China to the Arctic Ocean return to Shanghai", TASS, September 15, 2023. https://tass.ru/obschestvo/18757295.

[65] Ibid.

[66] Wang Qingchen and Zhu Zhongben, "Harbin Project's 'Xinghai 1000' polar AUV explores the North Pole", Gong Xue News, Harbin Engineering University, October 2, 2023 (accessed April 7, 2023). https://www-gongxue-cn.translate.goog/info/1141/78179.htm?_x_tr_sch=http&_x_tr_sl=zh-CN&_x_tr_tl=en&_x_tr_hl=en&_x_tr_pto=sc

[67] Erdem Lamazhapov, Iselin Stensdal, and Gørild Heggelund, "China's Polar Silk Road: Long Game or Failed Strategy?", The Arctic Institute, November 14, 2023, https://www.thearcticinstitute.org/china-polar-silk-road-long-game-failed-strategy/.

[68] Guy Faulconbridge, Lidia Kelly and Andrew Hayley, "Russia, China to talk about deeper security co-operation in Eurasia, Lavrov says", Reuters, April 9, 2024. https://www.reuters.com/world/russia-china-cooperate-fight-against-terrorism-russian-agencies-cite-lavrov-2024-04-09/