Chinese Mining in Greenland: Arctic Access or Access to Minerals?

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This article contributes to the academic debate on China's growing interests in the Arctic and enriches our understanding of the various economic and political factors influencing Chinese investment decisions in the mineral sector. The article studies Chinese interests in two Arctic advanced mineral exploration projects – the Citronen Fjord zinc project in Northern Greenland and the Kvanefjeld (Kuannersuit) Rare Earth Element (REE)-uranium project in Southern Greenland. It analyses China's different policies for REE and zinc and their different roles in China's foreign policy strategy – the Belt and Road initiative (BRI), which also includes plans for establishing an "Ice Silk Road". Based on a study of Chinese-language policy documents and academic articles from the mining sector, we argue that Chinese involvement in the two projects is driven by different strategic considerations. Chinese involvement in REE projects overseas is primarily driven by China's interest in the strategic resource itself, whereas decisions of where to engage in zinc projects are to a higher degree determined by China's foreign policy priorities. China has a well-developed and clearly defined national strategy for REE, a resource it considers "strategic," of which the Kvanefjeld project is likely to be part. Zinc, on the other hand, is not a strategic resource to China, but still essential for its industry. Hence, we argue that the Citronen Fjord project is less tied to national resource strategy; instead, it offers China access to the Arctic region and to zinc as an added bonus. By focusing on the mineral sector, the article explores the extent to which mineral interests drive Chinese foreign policy and to what extent other foreign policy interests influence the Chinese mineral sector overseas.

Chinese Interests in Greenland: Mineral Resources and Power Balance

China's growing interests in the Arctic and emerging Arctic strategy have been the subject of several publications in recent years (e.g., Jacobson & Peng, 2012; Lanteigne, 2014; Brady, 2017; Lackenbauer et al., 2018; Sørensen, 2018). As Anne-Marie Brady (2017: 116) has shown in her book *China as a Polar Great Power*, China's Arctic policies are formally managed within China's maritime supra-bureaucracy. The maritime bureaucracy hosts at least seventeen different government agencies and departments with polar interests. In addition, external actors, including

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polar scholars, state-owned enterprises and other commercial forces may also influence China's polar policies. In Greenland, a country many scholars of Chinese-Arctic relations regard as being of strategic importance for China's Arctic activities, mineral resources have been the focus of China's interests (Brady, 2017; Sørensen, 2018). This makes Greenland an interesting and well-suited case for further exploring the extent to which mineral interests drive Chinese foreign policy and to what extent other foreign policy interests influence the Chinese mineral sector overseas.

Chinese state involvement in Greenland's mineral sector has generated political controversy in Denmark and Greenland. In Denmark, apart from concerns that state-supported Chinese companies will seize control over Greenland's vast mineral riches, there are fears that Chinese investments come with hidden political and military agendas. In 2016, the Danish government stepped in to prevent the Hong Kong-based mining company General Nice from taking over the abandoned naval base Grønnedal (Breum, 2016; Matzen, 2017). Recently, a bid by China Communications Construction Company, a Chinese state firm previously blacklisted by the World Bank, to build airports in Greenland prompted the Danish government to secure half of the financing of the airports. The interpretation in Greenland and Denmark was that this was done to keep China out. It resulted in the party Partii Naleraq, strongly in favor fast Greenlandic independence, leaving the government in protest against accepting support from Denmark (Bennett, 2018). In Nuuk, parts of the political elite regard a vibrant mining sector largely fueled by Chinese capital as one of the few feasible ways of achieving economic self-sufficiency (Gad et al., 2018).[1]

While there have been plans for very large Chinese investments in Greenland for a while now, actual investments are so far extremely limited. This suggests that that "speculation and political rhetoric far exceeds actual developments" (Foley, 2017: 100). However, the establishment of the "Ice Silk Road" (冰上丝绸之路) as an official policy and the above-mentioned fact that Chinese state firms have made bids for building airports in Greenland – a country with inadequate and badly connected infrastructure – seem to indicate that Greenland has at least some priority in parts of the Chinese state system.

Since Lieberthal and Oksenberg (1988) first coined the concept "fragmented authoritarianism," the view of large parts of the Chinese bureaucracy as being able to select between policy agendas set by competing sectors of the central leadership in Beijing became a common assumption in many studies of Chinese politics (Mertha, 2009). Under current president Xi Jinping, this view has become increasingly challenged, with one of the important elements of fragmented authoritarianism, policy experimentation, also questioned (Stepan & Ahlers, 2016). Recent studies of Chinese state-controlled enterprises, however, reveal that the fragmented authoritarianism approach may still have some relevance in the study of this sector. Based on telephone interviews with Chinese mining companies, Têtu and Lasserre (2017) argue that Chinese companies' decisions to invest in Greenland are based on a combination of economic and political considerations. Increased Chinese control over capital outflows means that both political support and commercial viability are increasingly required. We aim at exploring the incentives from the Chinese bureaucracy towards the mining sector and how these might be changing as a result of the "Ice Silk Road".

Chinese companies interested in Greenland are at least partly driven by state interests (Sørensen, 2018; Zeuthen, 2017; Têtu and Lasserre, 2017). Few, however, have studied what the state wants to gain from its involvement. Moreover, with few exceptions (e.g., Brady, 2017; Zeuthen, 2017;

Martin 2018), most Western analysis relies exclusively on English-language sources to assess the interests and motivations behind Chinese state investments in Greenland. This article draws extensively on Chinese-language materials intended to inform and instruct Chinese stakeholders involved in mineral exploration projects overseas, some of which have never been analyzed in Western research. In addition, the article draws on data collected in interviews with stakeholders in some of the mining projects. It focuses on two advanced[2] mineral exploration projects in Greenland where Chinese companies are involved – the Citronen Fjord zinc project in Northern Greenland and the Kvanefjeld Rare Earth Elements (REE)[3] and uranium project in Southern Greenland.[4]

The article begins by discussing China's foreign policy interests in Greenland and the Arctic more broadly. It then moves on to present the global supply and demand outlook for zinc and REE based on data from geological surveys, providing an explanation for China's interests in the two commodities from a macro-perspective. It then compares China's policies for zinc and REE[5] based on the official five-year plans for the two commodities, showing how zinc and REE are differently prioritized and their different roles in China's Belt and Road initiative (BRI 一带一路),[6] the larger policy framework of which the "Ice Silk Road" is a part. The next section discusses China's interests in Greenland's mineral resources based on a content analysis of Chinese-language geology journals from the Chinese Academic Journals Database (CAJ), a Chinese full-text database containing more than 66 million articles. It shows how, following a series of diplomatic exchanges between China and Greenland from 2011 to 2013, Chinese geologists began to publish detailed assessments of Greenland's mineral resources. The article then briefly introduces the two mining projects and the Chinese investments in these projects that followed the diplomatic exchanges. Finally, it analyzes and compares the two Chinese companies involved in the projects, their relationship to the Chinese state, and how they operate within Chinese and global policy frameworks, before concluding that Chinese involvement in the two projects is driven by different strategic considerations. We argue that Chinese involvement in REE projects overseas is primarily driven by China's interest in the "strategic"

resource itself, whereas decisions of where to engage in zinc projects are to a higher degree determined by China's foreign policy priorities.

China's Foreign Policy Interests in the Arctic and Greenland

Until 2018, China operated under an unofficial Arctic policy. Moreover, in public statements targeting international audiences, Chinese polar officials tended to deemphasize or avoid discussing China's interests in what they perceived as potentially sensitive areas, such as mineral resources and national security.[7] As late as 2012, Yang Huigen, Director of the Polar Research Institute of China, denied that China had any interest in Arctic mineral resources (Brady, 2017: 87). This contrasted with China's domestic discourse on Arctic issues, which showed great interest in mineral resources (ibid). A 2015 Chinese-language report from the Shanghai Institutes for International Studies (SIIS), a government-affiliated think tank, stated: "with the rapid development of China's economy, China's demand for resources and energy continues to increase, and its dependence on imported energy sources is also rising. The Arctic region has abundant reserves of energy resources. There is great potential for China and Arctic countries to engage in energy cooperation and achieve joint economic development" (Zhang et al., 2015: 27).

With the publication of China's white paper on the Arctic in January 2018, the gap between China's domestic discourse and the message it transmits to foreign audiences appears to be shrinking. Although the white paper does not address China's military interests in the Arctic, it now makes clear that China intends to explore and exploit Arctic resources, including mineral resources, while stressing that it will be done in accordance with international law. It repeats China's intention to incorporate the Arctic into BRI by establishing an "Ice Silk Road", a term officially established in May 2017 when Chinese foreign minister Wang Yi referred to it in a discussion on China-Russia cooperation in developing the northern sea route (Xinhuanet.com).[8] In a Chinese-language analysis of the white paper, Yang Jian, Vice-President of SIIS, noted that "from an economic perspective, China is a major country of world trade and energy consumption. The development and utilization of Arctic navigation channels and resources may have a huge impact on China's energy strategy and economic development" (Yang, 2018: 4).

Given its geostrategic location between North America and Europe, its proximity to new potential shipping lanes, and its vast potential for mineral resource exploitation, Greenland is expected to play an increasingly important role in China's emerging Arctic strategy. Although Chinese officials are careful to avoid addressing China's foreign policy interests in Greenland, influential Chinese scholars have since 2016 begun to publicly discuss the issue of Greenlandic independence and its implications for the geopolitical balance. As first reported in Western research by Martin (2018), Guo Peiqing, a law professor at Ocean University of China and one of China's most prominent polar researchers, has discussed the topic in one of China's leading international relations journals. Guo and co-author Wang Junjie believe that Greenland is moving towards independence at an accelerating pace. According to them, the international community has a "responsibility" to help an independent Greenland deal with its developmental problems. Mineral resources will play an important role in Greenland's future, especially REE, which the authors regard as "the most important strategic resource of the 21st century" and "one of Greenland's most important strategic assets" (Guo & Wang, 2017: 64). Other scholars go even further, presenting views that could be regarded as highly controversial. Xiao Yang, director of the Arctic Research Center at Beijing

International Studies University, discusses the role of Greenland in China's foreign policy strategy. Greenland, which is "gradually gaining greater independence," is the key variable in the Arctic's future political and economic landscape. In Xiao's view, Greenland could serve as a "foothold" for China to "fully participate in Arctic affairs" (Xiao, 2017: 110). In a comment to one of the authors at a conference in 2016, Yang Jian expressed it more diplomatically, stating that China is happy with Greenland as a part of Europe, but fears that an independent Greenland might become a *de facto* part of the US.

Zinc and REE: Global Supply and Demand

Zinc

Zinc is one of the most widely used non-ferrous metals.[9] Galvanizing, mainly for the automotive sector, accounts for over 50% of total zinc usage worldwide (Statista.com, 2017). Despite a declining demand for zinc in North America and Europe, the global demand for zinc increased by about 31% from 2005 to 2015, driven in particular by China's increasing demand (122%) (Meng, 2017). The forecasts for the zinc markets generally predict a continued upward trend due to the closure of several major mines and growing global demand.

China has met some of its demand for zinc by increasing domestic production of zinc concentrate (by 76% in the period 2007-2017) (US Geological Survey, 2018). China produced 5.1 million t in 2017, equivalent to 39% of the global production. China has not been able to compensate the production resulting in depleted reserves. Hence, the lifetime of the Chinese zinc reserves has dropped from circa 11 to 8 years in the past decade. This is in contrast to the Rest of the World (ROW), where reserve lifetime has grown from 15 to 24 years. For this reason, China has to make alliances with zinc miners outside China to secure its future supply of zinc.

REE

REE comprises 17 elements always occurring together of which 15 provide unique commercial properties that are essential raw materials for the production of emerging energy and communication technologies, such as wind-turbines, electrical vehicles, computers and smartphones. This has led to swiftly expanding markets for REE products, for which China has achieved a monopolistic role in all segments of the REE value chains. Growing demand outside China for REE raw materials stemming from the above market sectors amplifies concerns over the quasi-monopolistic supply situation, and consequently REE is considered a Critical Raw Material[10] by the European Union (EU) and the United States (US) (EC, 2018; US DOI, 2018). However, political strategies in the EU and other Western countries aimed for the development of REE supplies outside China have been unsuccessful.

Global REE mine production in 2015 is reported to be about 126,000 t Rare Earth Oxides (REO) of which about 20,000 t is produced outside China (US Geological Survey, 2016), although the figures are inaccurate due to unregistered and non-reported operations. Over the past three decades, the demand for REO have increased about 5% annually. The fast-growing global demand for REO in combination with Chinese taxes and quotas have put a pressure on ROW to develop new REE mines. However, the Chinese dominance of the value chains, and the technically complex process transforming the REE mineral concentrate into various types of separated

commercial REE products, are constraints for new projects. These reasons make Chinese REE groups obvious partners for potential new REE mining projects in ROW.

Figure 1: Production of zinc concentrate in China and ROW from 2007 to 2017, based on data from the US Geological Survey, 2007 to 2017.

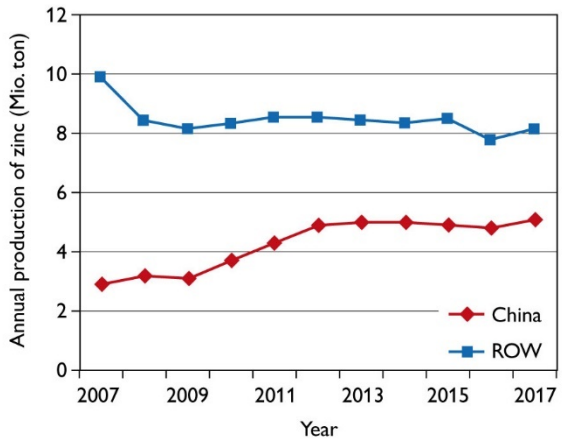
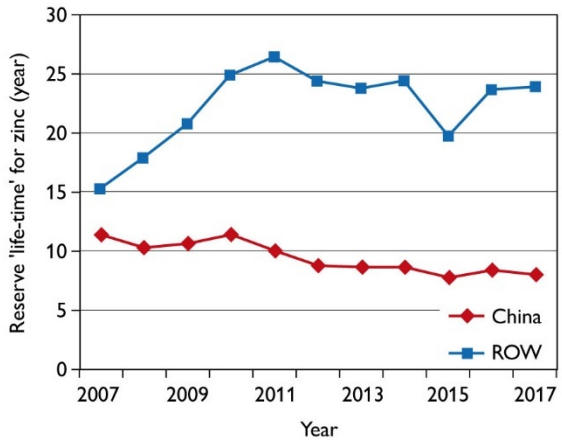


Figure 2: Lifetime (years) of zinc reserves in China and ROW from 2007 to 2017, based on data from the US Geological Survey, 2007 to 2017.



China's Five-Year Plans for Zinc and REE

China has a well-developed and clearly defined national strategy for REE, a resource it considers "strategic". Whereas the EU and the US use the term "Critical Raw Materials" to refer to minerals that are crucial for the economy, China's National Plan for Mineral Resources (2016-2020) uses the term "strategic minerals" (战略性矿产) to refer to minerals that are essential for "protecting national economic security, defense security, and strategic emerging industries" (State Council, 2016: 14). The plan lists REE as one of 24 "strategic minerals," whereas zinc is listed as one of 35 "key minerals" (重点矿种) (which also includes REE). Zinc, in other words, is not a "strategic" resource for China, but still important for its industry.

Despite China's many years of market reforms, both the zinc and REE sectors are subject to five-year plans issued by the Ministry of Industry and Information Technology (MIIT) and approved

by the State Council. While REE has its own five-year plan at ministry-level, zinc is part of the five-year plan for the non-ferrous sector. (MIIT Plan No. 316, 2016; MIIT Plan No. 319, 2016). The five-year plan for non-ferrous metals is 44 pages long while the REE plan is 30 pages long. In the five-year plan for non-ferrous metals, zinc is mentioned 25 times, compared to copper (88 times) and aluminum (127 times). This suggests that zinc is regarded as far easier to regulate or much less in need of regulation than REE.

Both the REE and the non-ferrous sectors in China are controlled by companies partly or fully owned by different levels and/or sectors within the state. The goals set for the REE industry are, however, much tighter than in the non-ferrous sector. Most importantly, access to producing (extracting and processing) REE is regulated through a quota system to which only six selected companies (the "Six Big") have access (Zeuthen, 2017). Zinc and other nonferrous metals, on the other hand, are produced according to more loosely defined goals. Both fields are subject to centralization processes aiming to modernize the sector through larger, fewer and more efficient facilities. Given the very different incentives for implementing these policies, however, the REE sector is several steps ahead of the non-ferrous sector in this regard.

Table 1: Comparison between the five-year plans for zinc and REE.

	Zinc	*REE*
Quota-system	Goals for growth in production in five-year plan: No clearly specified upper limit.	Production quotas managed strictly, so only the Six Big have access to declining quotas.
Industrial ambition	• Five-year plan encourages larger and more advanced enterprises in regional clusters. • No specific enterprises mentioned.	• Five-year plan states how the Six Big should consolidate their positions and develop into world leading enterprises. • Regional clusters with down-stream industry encouraged.
Foreign investment policy	Foreign investments in China allowed.	Foreign investments in China not allowed.
Overseas strategy	Focus on BRI countries.	Focus on advanced resource countries.

Both in the non-ferrous and REE sectors, companies are encouraged to engage in overseas activities. In both sectors, an important element of engaging overseas is industrial upgrading opportunities through cooperation with supposedly more advanced global (Western) partners. In the non-ferrous sector, emphasis is on the BRI-countries in Asia and Eastern Europe, while the REE sector is encouraged to cooperate with countries with advanced mining industries. The five-year plan for REE states that "The initiation of a number of REE development projects and the first steps towards handling REE separation in countries with a generally strong resource sector such as the US, Australia, Russia, South Africa, Chile, and Brazil has relieved the pressure on supplies from our country" (MIIT Plan No. 319, 2016: 7).

MIIT encourages investment overseas with the aims of gaining knowledge and displaying the Chinese REE sector in a world-class context. However, despite the MIIT listing the opportunity to show off world-class technologies as an incentive for overseas engagement, it elsewhere in the five-year plan describes the REE sector as backwards or intermediate with an ambition of becoming world-class. This paradox most likely reflects the great diversity of China's REE sector. While a large number of smaller producers that used to bypass the export quota system have been closed down as a result of the more strictly implemented production quota system and harsher environmental requirements, some survive and are incorporated into the Six Big. Some of these facilities are far from world-class. By stating the ambition of becoming world-class, the five-year plan justifies further centralization. MIIT's support for developing REE separation plants in leading resource countries suggests that it may in fact see China as a global leader within the REE sector that no longer needs to dominate the sector by processing REE in China, but instead by leading international cooperation within the field.

Chinese Assessments of Greenland's Mineral Resources

A search of academic articles in CAJ reveals that Chinese geologists have since around 2011 begun to show a more active interest in Greenland's mineral resources. We listed articles simultaneously cataloged under the subjects "Greenland" (格陵兰) and "minerals" (矿产).[11] The search generated eight relevant articles published between 2011 and 2018 in the journals Geological Science and Technology Information (GSTI) (two articles), Land and Resources Information (four articles), Mineral Exploration (one article), and Coal Geology of China (one article). An internal search at the website of GSTI using the keyword "Greenland" generated an additional five articles, resulting in a total of 13 relevant articles. The articles in Land and Resource Information, a bulleting published by the Ministry of Natural Resources (then Ministry of Land and Resources), were explored in Zeuthen (2017). We thus focus on the articles in GSTI, the only journal with "core" status[12] among the collected journals. All seven articles in GSTI were part of the same August 2013 issue[13]. The publication of these articles followed a series of diplomatic exchanges between Greenland and China, which began with a visit to Beijing by Greenland's minister for industry and natural resources in 2011, where he met with China's then vice premier Li Keqiang and representatives from China Development Bank. In April 2012, Xu Shaoshi, then China's minister of land and resources, visited Nuuk, and in July 2013, a large Chinese investor delegation visited Greenland.

The articles, coauthored by geologists from China University of Geosciences and the Chinese Academy of Geological Sciences (a research institution under China Geological Survey), provide detailed assessments of Greenland's mineral resources. The assessments, based almost exclusively on Western studies of Greenland's mineral deposits, are technical in style and seem to be written with Chinese geologists and mining companies as intended readers. Two of the articles provide a general assessment and overview of Greenland's mineral resources. One describes Greenland's deposits of REE, iron, gold, platinum-group elements (PGE), zinc, lead, and nickel, pointing out that global warming is turning Greenland into "a focal point for the global mining industry and a hotspot for investments." The article highlights that Greenland possesses rich mineral resources that are yet to be exploited, and that "Greenland's most superior mineral commodities are ones that China urgently needs" (Lu et al., 2013: 55). The authors seem especially interested in

Greenland's REE, stating that "mineralization conditions for REE in Greenland are unique in the world; REE is one of Greenland's most advantageous mineral resources" (ibid.: 52).

The second article, titled "Introduction to Greenland's Important Metallic Minerals and their Distribution," provides an overview of Greenland's metallic mineral resources and various geological formations in Greenland. It highlights that, because of global warming and the rapid depletion of global resources, Greenland's mineral resources have caught the attention of many countries around the world. This article, too, seems to focus primarily on Greenland's REE, stating that "Greenland's have abundant REE resources; today nine REE deposits have been found, including the world's second largest in Kvanefjeld" (Li et al., 2013: 22).[14]

The Two Projects in Greenland

Citronen Fjord Zinc Project

The Arctic hosts six operating zinc mines, among them the second largest in the world, Red Dog in Alaska, and several major mines that are now abandoned (S&P Database, 2018). Additionally, a number of advanced zinc exploration projects are being developed, e.g. the Citronen Fjord project, which makes the Artic a potential major zinc-supplying region. The Australian Ironbark Pty Ltd exploration group, controls the right to exploit the Citronen deposit up to the year 2046, pending further regulatory approvals (Ironbark, 2015). In January 2017, Ironbark appointed China Nonferrous Metal Industry's Foreign Engineering and Construction Co (NFC) to develop the project further in compliance with standard codes in Greenland and China, and with the financing requirements of Chinese banks (Ironbark, 2017). The press release states that NFC is chosen due to their technical capabilities and because they can deliver a turnkey fixed price Engineering, Procurement, and Construction (EPC) solution to develop and commission the project. The Citronen Fjord deposits holds a measured reserve of 9 million t grading 6.6 % zinc and 0.6% lead, in addition to about 21 million t of indicated and inferred resource, and the lifetime is estimated to 14 years. Shipment of the concentrate in the Greenland Sea is a technical challenge and will mainly be possible in August. Ironbark reports that the concentrates are aimed for European smelters (Ironbark, 2013). However, the combination of (i) the geographical position of the Citronen Fjord deposit, carrying the potential for a shortcut to China via the North-East Passage, (ii) the growing Chinese demand for zinc concentrates, and (iii) the fact that NFC is the appointed turnkey contractor, makes the Chinese market a likely destination for the concentrates.

Kvanefjeld REE project

Presently, about 31 REE projects outside China have reached advanced stage of development (Kalvig & Machacek 2018). Of these, six are situated in the Arctic: one in Alaska, three in Northern Canada, and two in Greenland. The latter two are Kringlerne and Kvanefjeld, both categorized as large tonnage/low grade deposits, although the REE ratio make them suited for the high-price REE market segments. Currently, plans for developing the Kvanefjeld project are more advanced and developing Kvanefjeld will require a larger investment than the Kringlerne project. Both projects have applied for exploitation license. The Kringlerne project, also known as the Tanbreez project, is privately-owned and thus no information about business partners is available through stock exchange releases. The Kvanefjeld project is owned by Australian based Greenland Minerals & Energy Ltd (GME). It is a multi-element deposit in which REE, uranium, zinc and fluor are

meant to be extracted. In April 2014, GME announced a Memorandum of Understanding (MoU) with NFC, aiming to develop a new REE supply chain. Under the MoU, separation would be carried out in China by the NFC subsidiary, Guandong Zhujiang Rare Earths Company (GME, 2014). However, in September 2016 GME A/S announced that Shenghe Resources Holding Co Ltd (Shenghe), a Chinese REE miner, had acquired a 12.5% interest in GME, with the aim to bring REE processing technology and market understanding to the project (GME, 2016).

The Chinese Companies

As a result of the five-year plans discussed above, both the zinc industry and the REE sector have experienced a massive decline in the number of companies engaged in the industries. The investor in Kvanefjeld, Shenghe, has been particularly capable of navigating the quota system through partnerships with companies partly or fully owned by different of the Six Big with access to quotas. In addition, the company's main activities are placed in Sichuan where the MIIT hopes to further develop already existing extraction and processing clusters. Since the largest investor, the Institute of Multipurpose Utilization of Mineral Resources, a subdivision of China Geological Survey (hence forth the CGS subdivision), owns only 14% of the company, the company requires less permissions for operating overseas than companies such as NFC, where a single state entity owns a larger share (Quan, 2017). In addition, permissions required by Australian and US authorities also depend on the degree of state ownership. In the latter half of 2017, Shenghe was the only larger REE producer that had unused REE production quotas (ibid.).

Table 2: NFC and Shenghe compared based on messages to Chinese stock exchanges including annual reports.

	NFC	*Shenghe*
2017 turnover	19 billion CNY.[15] 19% down from 2016.	5 billion CNY. 280% up from 2016.
History	Founded as a subsidiary of China Nonferrous Metal Mining (CNMC) in 1983, as a fully state-owned company specialized in overseas operations. Listed on the Shenzhen Stock Exchange in 1997. Through investment in subsidiaries, NFC's domestic activities have also become considerable. CNMC owns 34%.	Fundamentally restructured in 2013 when the Institute of Multipurpose Utilization of Mineral Resources, CGS and a number of largely Sichuan-based public partners and private investors bought Taiyuan Science and Engineering Tiancheng Technology Company Limited, renamed it Shenghe Resources and bought Shenghe Leshan Resources.
Overseas Activities	• In 2017, 58% of turnover from overseas activities. Up from 39% in 2016 (largely due to domestic decline). • Ongoing investments in 28 projects classified as larger projects in 2017 with a total contract sum of 36 billion CNY. One project in Serbia (174 million CNY). All others in Asia and Africa.	• Started engaging in overseas activities in 2016 when it acquired a company planning to build a REE separation plant in Vietnam and took a 12.5% stake in GME. The share in GME made the company the largest non-financial shareholder of GME. • In 2017, the company led a consortium that bought the last active US REE mine,

	• In 2009, CNMC attempted to buy 51.6% of Lynas Corp that controlled a REE processing plant in Australia. Australia's Foreign Investment Review Board (FIRB) blocked the transaction.	Mountain Pass, in California (after Molycorp's bankruptcy). • GME-acquisition approved by FIRB. Mountain Pass acquisition approved by CFIUS, the US Foreign Investment Committee.
Mining commodities	Zinc, lead, copper, bauxite and REE (REE mainly through recently obtained subsidiaries, acquired in collaboration with shifting partners among the Six Big). Also has interest in other minerals, but not part of core business.	Almost exclusively REE. May become the first Chinese limited company to trade uranium though Kvanefjeld (Quan, 2017). The company itself, however, claims that it will not trade uranium (Zeuthen 2017).

While NFC was founded and is controlled by an SOE directly under the State Council, Shenghe was founded by the CGS subdivision and shares substantial parts of its leadership with that subdivision. Although both companies are state-controlled, they are both (especially Shenghe) skilled at benefiting from different policies and institutions present in the Chinese and global environments wherein they operate. Shenghe is capable of being treated as a private company when needed and a state-owned enterprise with access to production quotas and beneficial credits when that is needed to gain new business opportunities both globally and domestically (Idem.).

When asked about his interest in Greenland during an interview with one of the authors in February 2017 (when the "Ice Silk Road" was not yet an official policy), the Chairman of Shenghe, who was also the director of the CGS subdivision, explained that he expected BRI to embrace Greenland. At the same time, he stressed his uncertainty of the project's viability irrespective of these plans. He did, however, believe that a future Arctic Silk Road policy would facilitate financing of the project (Zeuthen, 2017). Shenghe appears to be aware of beneficial policies of any kind that would make investment in a particular locality especially attractive.

Conclusion

Understanding China's intentions in Greenland is challenging. By analyzing what companies and policy advisors do and say, we may get an impression of why selected actors do as they do, but even under the very authoritarian leadership of Xi Jinping, China's interests in Greenland are still mainly controlled by incentives. Through analysis of Chinese-language policy documents and academic articles from the mining sector, this article has explored the different possible drivers behind Chinese engagement in two mining projects in Greenland. We suggest that Chinese involvement in REE projects abroad are more likely to be driven by China's interest in the strategic resource itself, whereas decisions of where to engage in zinc projects are more likely to be determined by China's foreign policy priorities.

Greenland has strategic value for China both as a source of important minerals and as a foothold for accessing the Arctic region. As suggested by a growing number of Chinese scholars in Chinese-language publications, Greenland could come to play a key role in China's Arctic strategy. Clearly,

parts of the Chinese state are building Arctic knowledge that may be used to facilitate investment in Greenland in the future, investments that could serve to support China's Arctic access.

The mineral sector's goal is to supply the minerals needed by China. At the same time, however, the industry is open towards utilizing incentives that other parts of the Chinese state bureaucracy might provide for geostrategic reasons and is subordinate to directives. The exact combination of mineral need and geostrategic incentive may vary from project to project, but in the case of Greenland, it appears as if the geostrategic element of possible future decisions on mining is considerable.

Notes

1. However, China's involvement in the Kvanefjeld Rare Earth Element (REE) and uranium project in Southern Greenland also places it in the middle of the Greenlandic uranium debate – one of the most divisive political issues in Greenland today. See Bjørst (2017).
2. "Advanced projects" are projects for which the ore reserve is defined. Ore reserves are ores that are known to be economically viable.
3. References to Rare Earth Elements (REE) are made to the commodity term comprising the non-specific seventeen elements, such as REE minerals and REE products, although only a few of them are present in the REE products. References to Rare Earth Oxides (REO) are applied for quantification/statistic purposes.
4. The Kvanefjeld project will also produce zinc, although of very low grade.
5. The article focuses on REE and zinc, since they are the main commodities involved in the two projects.
6. Also known under its literal translation One Belt, One Road.
7. For more on China's security interests in Greenland and the Arctic, see Lulu (2017) and Brady (2017).
8. However, as Brady (2017: 117-118) has demonstrated, both the Arctic and Antarctic have been part of BRI since Xi Jinping's visit to Hobart, Australia in 2014.
9. Non-ferrous metals are metals that do not contain any iron. The main non-ferrous metals are aluminum, copper, lead, nickel, tin, titanium and zinc.
10. Critical Raw Materials (CRMs) are raw materials that are considered to be of great importance for the European economy and subject to high supply risk.
11. 23 results were listed. 15 articles did not discuss mining in Greenland or were not relevant for our analysis.
12. Chinese core journals are nationally-recognized journals in China, with a much lower acceptance rate than non-core journals. According to Peking University Library, who publishes the list of core journals, more than 100 Chinese journal workers and experts from Chinese top universities and libraries participate in the selection of core journals.
13. The existence of the GSTI articles was first noted in Western research by independent researcher and blogger Miguel Martin, also known under the name Jichang Lulu. See Martin (2018).

14. The remaining five articles in GSTI present research updates on some of Greenland's most significant mineral deposits, including the Kvanefjeld and Citronen fjord deposits.
15. 1 USD = 6.41 CNY 1 June 2018

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