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Research Article

Local (or Not) Insecurity on Arctic Twitter/X: Global Insecurity and Climate Change

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Abstract: While Twitter, now known as X, has been used to study political sentiments around elections and political discourse broadly speaking, less research has explored questions of insecurity. Using a data set of Arctic tweets between 1 January 2020 and 31 March 2023, and the R programming language, I asked how posts regarding this region framed the debate around insecurity. My work finds that spikes of insecurity on Arctic Twitter/X did not directly correlate with moments of global insecurity such as the Russian invasion of Ukraine in 2022 or the COVID-19 pandemic from early 2020. Instead, they reference environmental insecurities such as the 2020 Norilsk oil spill in Russia and other Arctic-specific events that almost all have to do with climate change, both locally and globally. These findings suggest that similar to public opinion polls, local insecurities have more resonance with Arctic publics, rather than highly politicized moments of global insecurity.

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Advance Online Article

The position of X, formerly Twitter, in the social media landscape has been in a constant state of flux for the past several years. As of April 2024, the platform ranked twelfth on a list of the most popular social networks worldwide with its number of monthly active users falling far behind Facebook, YouTube, WhatsApp, Instagram, and TikTok.[1] It has about the same number of monthly users as Pinterest. However, the platform remains an important part of the political discourse where debate and communication takes place, as well as a setting where public opinion and news agendas are partially formed through mechanisms of agenda setting.[2] Political elites, journalists, academics, and those who contribute to the broader agenda-setting dynamics of public discourse, have all played an important role on the platform.[3] In the wake of Elon Musk's purchase of Twitter in October 2022 and the rebranding to X in July 2023, the social media platform has again gained significant media attention, with many asking questions about the return of far-right commentators that had been previously banned, the "unbanning" of Trump from the platform, and the nature of censorship in the so-called "town square" of the Internet.[4]

The literature on Twitter/X, political communications, agenda-setting theory, and public opinion has been developing for several years. While little work deals specifically with the Arctic, there has been recent work that explores how public understandings of threats—particularly environmental—are discussed on Twitter. For example, some scholars have explored how climate change emerges as a key theme in tweets from regions affected by hurricanes, and that unreliable outlets tend to refer to "climate change" as "global warming."[5] Others have investigated the interactions between how climate risks are portrayed on Twitter and social perceptions of those risks, and profiled social media users to determine how they could influence opinions on the platform.[6] Similarly, Twitter has been used as a source for data analytics in understanding real-time communication of weather monitoring and flood warnings.[7] Specifically, researchers have focused on the differences between elite actors and Twitter users when communicating about reports such as the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), finding that certain issue areas of the report, such as the section on meat consumption, became central on Twitter while they remained small in the overall report—illustrating increasing polarization around climate solutions.[8]

Donald Trump's usage of the platform, both in the lead-up to the United States 2016 election, as well as during his presidency (2016–2020) and the 2020 presidential election, led to heightened interest in the role Twitter plays in fomenting violence, distrust, and negative sentiments.[9] Trump is far from the only politician to use social media or Twitter specifically to shape political discourse, influence elections, or share information in a way that the traditional news media would not allow.[10] Such tools allow politicians to connect directly with their base and often have a tendency to polarize citizens against one another.[11] Twitter has also been studied in connection to how politicians, such as former Ukrainian president Petro Poroshenko, have used it to sell insecurity,[12] how marginalized communities such as Inuit are represented during elections,[13] and how specific relationships exist between individuals and trends on issue areas like NORAD.[14]

In the context of the Arctic, Twitter has been used as a data source in limited instances. As cited above, some researchers have explored how NORAD is discussed on the platform, while others have emphasized how Inuit issues were represented on Twitter during the 2019 Canadian electoral campaign. Others have utilized Twitter to examine and quantify the spatial expansion of Arctic tourism.[15] Another researcher used social network analysis to look into how Arctic development policy circulated on Twitter, and to conceptualize the actors involved in information circulation.[16] More recently, scholars have attempted to see whether misinformation plays a role in how Arctic Indigenous languages are represented on Twitter.[17] The limited literature focusing on the Arctic as a region under analysis, as well as the recent work of how climate threats are perceived on Twitter, presents a particular opening for the research that motivated this study. In short, given research on the public perception of risk on Twitter, we can ask how might perceptions of insecurity at large play out in an Arctic context. This is particularly important given the growing centrality of traditional security concerns in the Arctic such as heightened tensions between China, Russia, and the United States,[18] concerns about hybrid threats in the region,[19] and militarization of the region writ large.[20] Investigating the extent to which these traditional security risks are reflected in the discourse on Arctic Twitter/X, the community of accounts posting about the Arctic, is one of the aims of this study.

My work is interested in how tweets that cover the Arctic represent insecurity. Previous work exploring how security issues are addressed in public opinion polls generally finds that local security issues, such as housing and food insecurity, are prioritized over large global insecurities, such as long-standing issues that have entered the public consciousness like terrorism.[21] Whether such trends remain true on X/Twitter—a site of public opinion—is unclear. Further, what type of insecurity is present on Arctic X/Twitter and when does it spike?

In this article, I offer results from a Twitter data set that focuses on the Arctic, with an emphasis on insecurity. Using tweets that were posted between 1 January 2020 and 31 March 2023, I find a series of thirteen spikes where a particular post was retweeted (RT) more than 150 times across the time period. These spikes do not correlate with instances of global insecurity such as the outbreak of the

war of aggression in Ukraine in February 2022, the COVID-19 pandemic, or the release of IPCC reports throughout the time period. While climate change certainly is a question of global security and did emerge, it was not directly correlated with geopolitical instances of insecurity, and there were generally no heightened and politicized crisis moments that might have popped up in the same way that the Ukraine war or the COVID-19 pandemic might have emerged. I further examined the top ten RTs in the month of each spike to see the type of insecurity referenced, finding that the majority were local insecurities—such as the 2020 Norilsk oil spill in Russia, heat waves, or the Alaska National Wildlife Refuge (ANWR)—and that most had to do with climate change. This suggests that similar to public opinion polls, Twitter data also shows that insecurity for the public tends to correlate with environmental issues and is not sensitive to geopolitical international tensions (such as Russia versus the West). Further, for the Arctic, it is climate change that continues to be the most pressing security issue, rather than other escalatory rhetoric suggesting that a new Cold War in the Arctic must be accompanied by militarization.

Methodology

The analysis below was conducted using a database titled "Twitter on Information and Disinformation on the Arctic Region" coordinated by Mathieu Landriault and Jean-François Savard using the API (Application Programming Interface) credentials of Observatoire de la politique et la sécurité de l'Arctique (OPSA).[22] The database was created using the R programming language in RStudio[23] with the following packages: dplyr, ggplot2, gridExtra, Lexicoder Sentiment Dictionary (English), plotly, quanteda, quanteda.textplots, RStudio, rtweet, shiny, and shinydashboard.[24] The database included posts extracted from Twitter between 1 January 2020 and 31 March 2023, encompassing 2,834,609 in total, but did not include geo-location data. The time limitation was due to Elon Musk's acquisition of Twitter: in 2023, Musk discontinued free access to the company's API. Thus, additional tweets and collection beyond the collected tweets was not possible. That being said, the analysis of discourse used retweets as its primary object of analysis. A tweet is a single post made on X/Twitter, a retweet (RT) is a feature that allows users to share someone else's post with their own followers. Spikes of retweets were analyzed across the time period by measuring the number of RTs posted in a month. Importantly, the "spikes" of interest are a visualization of activity around the most popular tweets in the sample that fell within the Arctic data set and that also used one of the "insecurity" dictionary words under analysis.

The original data set provided to me included tweets with one of the following words: 1) Arctic, 2) Inuk/Inuit, 3) Sami(s) / Saami(s), 4) Greenland, and 5) Arctic Council. Using these words meant that the total number of tweets in the data set was limited to 31,681 tweets in total. Certainly, these words limited the results to those in the English language and may have limited the scope of tweets under analysis as well as privileged an international audience rather than localized. However, given that the data set was also in use by other researchers, the initial keywords could not be changed—rather, additional dictionaries could be added for further detailed analysis. For this analysis, I was interested in tweets that contained phrases that indicated insecurity of some sort. Table 1 lists the word used to indicate such feelings of insecurity on Twitter.

Using this dictionary of words, I was interested in two phenomena: 1) when were instances of insecurity most prevalent (i.e., when were there spikes of insecurity language and could they be correlated with global moments of insecurity), and 2) what type of insecurity was referenced. To test this, I looked for moments across the time period in question where retweets measured above 150 and then looked at the content of the top ten RTs to see what type of security was indicated. Importantly, dictionary approaches, and the Lexicoder Sentiment Dictionary specifically, have been reported to capture and code content in a way consistent with human coders.[25] This particular dictionary was developed by first observing Michele Gelfand's Threat Dictionary tool and the 240 words included in her lexicon.[26] The database only allowed a limited number of words associated with a sub-dictionary, meaning that the 240 words included in Michele Gelfand's tool would be far too many. The dictionary was thus reduced by taking out duplicate words, such as both "catastrophe" and "catastrophic," as well as terms that were not relevant to the Arctic such as "famine." The dictionary was again reduced to a reasonable number of words that covered different types of threats to the region—search and rescue insecurity, such as "emergency" or "risk," environmental security issues such as "disaster" or "polluted," as well as those relating to interstate competition such as "threat" and "dangerous." Some words in the dictionary were too vague such as "doubts" or "amid" or "anguish" as they could refer to issues not specifically dealing with insecurity. I also chose words that could refer to insecurity in general such as "fear," "worry," and "afraid" meant to capture broader insecurities that could refer to the COVID-19 pandemic or to horizontal escalation from the war in Ukraine to the Arctic. To ensure that incidents involving COVID or Ukraine were captured, I specifically looked within the top ten tweets to see whether allusions to either event came up.

Table 1. Dictionary of words associated with insecurity

Fear	Disaster
Threat	Emergency
Anxiety	Frightening
Insecurity	Harm
Afraid	Polluted
Catastrophe	Risk
Collapse	Warn
Dangerous	Worry

Source: Developed by author from Michele Gelfrand's Threat Dictionary.

The "spikes" found across this time period were measured by those going over 150 retweets (RTs) for a few reasons. First, a threshold of 150 RTs provided a reasonable sample size for the number of spikes under analysis in the context of the data. While literature on retweeting and broader Twitter conventions have suggested that RTs are measures of popularity, these researchers also acknowledge that this is highly contextual.[27] For example, during emergencies, retweeting patterns tend to increase around, during, and after a disaster, but that the numbers vary considerably.[28] While 150 thus may seem arbitrary, the number was chosen due to the relative rarity of this phenomena across the data set, illustrating that 150 was a good metric for choosing RTs that went above the "normal" conversational ecology on the platform.[29] However, second, when a spike passed at least 150 RTs, it was likely that the content was shared beyond the original author's immediate followers—suggesting that the content resonated with a broader audience on Arctic Twitter. This largely has to do with the retweet's function as a mechanism of information diffusion. Such dynamics are particularly clear in research conducted on revolutions such as that of the 2013 Egyptian political uprising where retweets illustrated how users passed information on to others.[30]

All figures in this article are visualizations from this database. Restricting the textual analysis to the top ten RTs was done in order to explore the most influential and widely shared content. In short, by only looking at the top ten RTs, I concentrated the analysis on content that received the most attention and engagement within each spike that encompassed at least 150 RTs. The restriction was also done for reasons of efficiency and practicality.

Findings

From 1 January 2020 to 31 March 2023, there were thirteen spikes in which there were more than 150 retweets that used keywords in the "insecurity" dictionary of words. The retweets in Table 2 are a list of the top ten retweets occurring during the month in question, which included an "insecurity" word in them. These time periods did not correlate with key critical junctures that related to global moments of insecurity, such as the publication of the IPCC reports (related to climate security), the outbreak of Russia's war of aggression in Ukraine, or key moments during the COVID-19 pandemic. Given this lack of linkage between key global security events and flares of insecurity on Arctic Twitter, the analysis continued by looking at what types of insecurities emerged in the top ten retweets during each calendar month (from the 1st to the 30th/31st of each month).

The analysis below proceeds as follows. I have divided the spikes into each year under analysis, from 2020 to 2023. Figures 1–3 display the number of retweets over time. The X axis represents the dates throughout the years—as seen in each individual month—and the Y axis the frequency of RTs. The Y axis is scaled based on the RTs. Each figure shows the spikes under analysis. Tables 1–3 then outline each month that exceeded 150 RTs in the first column, the second column presents the number of RTs, and the third column presents the general topics that came up in the top ten RTs. The topics were inferred inductively based on the content of the tweets.

Beginning in January 2020, two spikes occurred—one with 150 RTs and another with 250 RTs. An examination of the top ten RTs during this month shows that the tweets under analysis had to do with climate change in some capacity or with environmental issues such as the Greenland Ice Sheet. For example, one tweet stated "dangerous new offshore drilling in the Arctic Ocean would put polar bears and other arctic marine mammals at unprecedented danger. Tell President Trump to protect the Arctic Ocean from dangerous new offshore drilling." Another mentioned "ice is being lost from Greenland seven times faster than it was in the 1990s. That means sea level rises are more likely to reach 67 cm by 2100. A rate of rise will put 400 million people at risk of flooding each year."

In February 2020, there was one spike of 250 RTs. The topics again touched on issues of climate change, permafrost, offshore drilling, and the Greenland Ice Sheet. Amongst the top ten RTs some explicitly talked about melting permafrost, saying "permafrost collapse is irreversible," calling the Arctic the "fastest warming place on earth," with others mentioning that "scientists studying climate change expected layers of permafrost in the Canadian Arctic to melt by the year 2090, instead it is happening now." Another tweet stated "scientists studying climate change expected layers of permafrost in the Canadian Arctic to melt by the year 2090, instead its happening now. #climateemergency." Other tweets touched

on offshore drilling, again bringing attention to how offshore drilling would be damaging to polar bears and Arctic environmental habitats saying, "their survival is under threat." Greenland's Ice Sheet was another topic with one tweet saying "Greenland's ice sheet lost 2 billion tons of ice in a single day! There's no time to wait, we're in a #climateemergency."

Table 2. Spikes of retweets in 2020 that exceeded 150 and the topics in top 10 retweets

Time Period	Number of Retweets (RTs)	Topics
January 2020	150 and 250	Greenland Ice Sheet, Sea Ice, Climate Change, Offshore Drilling
February 2020	250	Climate Change, Permafrost Thaw, Offshore Drilling
June 2020	Over 2,000	Norilsk oil spill, Climate Change
August 2020	300	Greenland Ice Sheet, ANWR, Climate Change
November 2020	300	ANWR, Climate Change
December 2020	350	ANWR, Climate Change

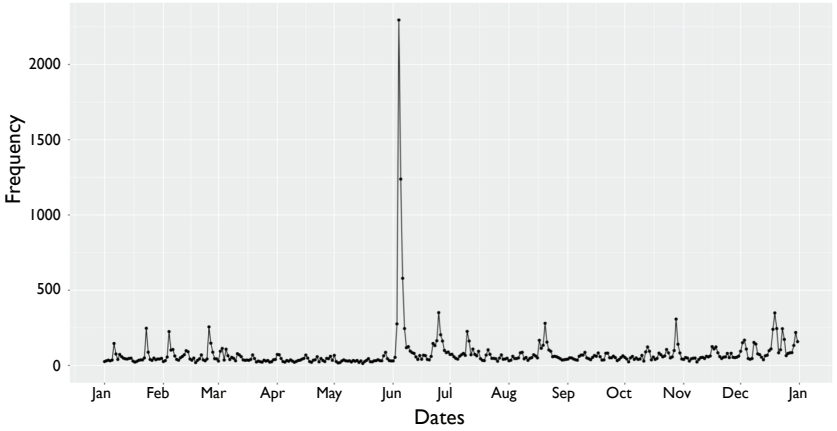

Figure 1. Frequency of tweets in 2020, by month

The largest spike across the whole collection of tweets was in June 2020 when there were over 2,000 RTs touching primarily on the Norilsk oil spill, which was caused by a leaking disesel storage tank. Of the top ten tweets, seven referenced the oil spill in some way. One tweet stated "an environmental catastrophe is unfolding right now in Russia" in reference to the Norilsk oil spill, while another stated "a catastrophe is taking place right before our eyes," again in reference to the oil spill. Others called it a "full-scale environmental disaster." Still other tweets focused on the role of climate change as an ongoing problem, with three tweets mentioning high temperatures, specifically noting that recently "temperatures within the Arctic Circle topped 100 degrees, shattering records … we must never lose sight of the biggest existential threat facing the planet: climate change."

In August 2020, there was a spike of 300 RTs that focused primarily on the Greenland Ice Sheet, the Alaska National Wildlife Refuge (ANWR), and climate change. Some tweets reported on the collapse of an ice shelf in Canada, calling it a "climate emergency." Other tweets focused primarily on Greenland, stating that "collapse of the Greenland Ice Sheet could be a tipping point, if melting cannot be slowed and the ice sheet saved, there will be dramatic, compounding impacts around the world." Still others focused on sea ice melting, saying "we're in a climate emergency. Time to stop the delays and act" and touched on high temperatures in the Arctic Circle stating "91˚f/33˚c on the shores on the arctic Ocean in Northern Canada today, we're in a climate emergency." Multiple tweets used hashtags like #climatecrisis to indicate this insecurity thinking. Others focused on the potential opening of ANWR for drilling. Such a policy move, some said, would put "animals at risk from Alaska oil drilling."

In November 2020, there was again a spike of 300 RTs touching on issues that primarily had to do with ANWR and climate change broadly. Tweets talking about ANWR focused on its opening saying that "this rushed process will violate indigenous rights, destroy sacred lands, and harm wildlife." Others said, "new oil drilling and spilling in the arctic ocean would put polar bears in unprecedented danger" and that "the Trump administration is endangering the Arctic National Wildlife Refuge … this decision ignores the threat of climate change." Tweets having to do with climate change pointed to rising temperatures, stating "global temps continue to rise at an alarming rate … this is a climate emergency," and two tweets referred to the Arctic region being in a "climate emergency."

The last spike in December 2020 was 250 RTs and again primarily had to do with climate change and the opening of ANWR. Tweets that referenced the opening of ANWR talked about the Arctic being "in danger" and "at risk of energy development," specifically that ANWR "is under threat" and that opening it would "threaten local wildlife, indigenous cultures and the global climate." When climate change was mentioned, the post generally touched on how the

loss of sea ice would "threaten global food security … lead to dangerous extreme weather events" and the polar jet stream crisis—all part of a "rapidly expanding ecological climate catastrophe."

During 2021, there were significantly fewer spikes than during 2020—only two in comparison to six. During February, there was one spike of 250 tweets that covered a broad range of Arctic issues, including the Northern Sea Route, a blockade of an iron mine in Nunavut, the continuing impacts of the Norilsk oil spill, and climate change. The Northern Sea Route (NSR) was mentioned as this related to melting sea ice and climate change, and that its opening represented the fact that "we are in a climate emergency." A specific regional issue was also touched on in two tweets regarding Inuit hunters protesting an iron mine in northern Canada. The tweet reported on this blockade, saying that Inuit were protesting as the expansion would "harm local wildlife." Similarly, the Norilsk oil spill was referenced regarding the fine that the company Norilsk Nickel would face as being part of the "worst ecological disaster in the Arctic."

The second spike during 2021 was in November—where there was again a spike of 250 RTs. This spike represented one of the three spikes in which any type of traditional military security risk was brought up alongside climate change and the Norilsk oil spill. Some tweets referenced the COP26 conference (the 26th United Nations Climate Change conference), the Greenland Ice Sheet, dangerous climate change, and the "death spiral of the Arctic also represent[ing] the death spiral of humans and life on earth"—all touching on climate change as a threat to the region. For example, one tweet stated "dangerous #climatechange is here now" and another claimed "arctic feedback loops could trigger a climate catastrophe around the world." Another tweet brought attention to the pollution caused by the Norilsk oil spill, describing how the Norilsk company "poisoned rivers, killed off boreal forests, and belched out more sulfur dioxide than active volcanos." Traditional security was mentioned once in relation to a visit of the Norwegian Minister of Defence to NATO, reporting on a "great first visit from Norwegian minister of defense to discuss strenghtening the strong defense cooperation between the US & Norway. We discussed NATO challenges in the Arctic, our shared perspective on the Russia threat and the ongoing operations."

Table 3. Spikes of retweets in 2021 that exceeded 150 and the topics in top 10 retweets

Time Period	Number of Retweets (RTs)	Topics
February 2021	250	Northern Sea Route, Nunavut Mine Expansion, Norilsk Oil Spill, Climate Change
November 2021	250	Traditional Security, Climate Change, Norilsk

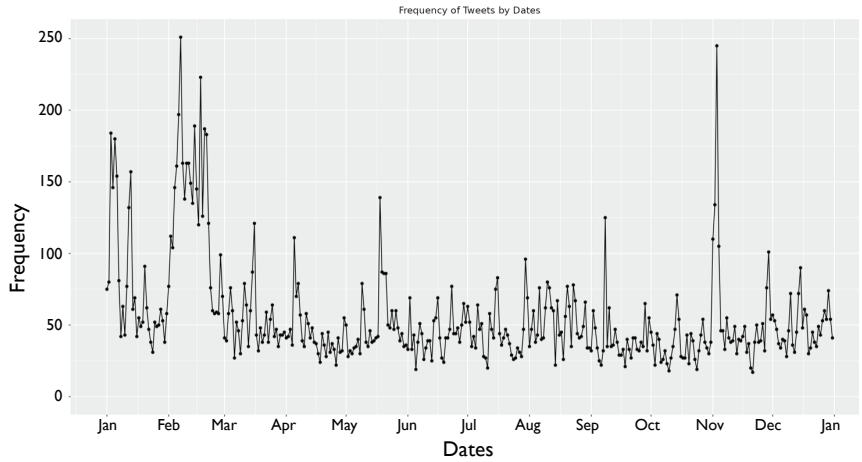

Figure 2. Frequency of tweets in 2021, by month

The period of 1 January 2022 to 31 March 2023 saw an increase of insecurity spikes compared to 2021. In March 2022, there was a spike of 150 RTs. While one might assume that this spike was closely related to Russia's invasion of Ukraine, none of the top ten RTs showed this or even mention Ukraine. While Ukraine was a keyword searched for, the insecurity dictionary could have captured tweets that referred to the crisis using crisis or security language. Instead, the tweets focused on broad threats originating from climate change and Arctic sea ice. For example, some discussed the future, saying "extreme wildfire risk will become so widespread that even the arctic and other regions … could be in peril of burning." Other tweets highlighted methane concentration in the Arctic, icebergs drifting, and thinning sea ice. For example, one reported that "NASA satellite sees Arctic sea ice thinning at frightening rate" and another stated "methane concentrations above the Laptev Sea are disturbing … the East Siberian Arctic shelf must be put into the highest state of emergency." One tweet may have been in relation to

the war in Ukraine but also seemed to advocate *for* climate change, stating that "Russia's actions are largely about oil and gas … Russia needs to advance global warming to open up Arctic shipping routes and access its Arctic oil."

In June 2022, there was another spike of 200 RTs. We see some small indications that traditional security concerns are reflected in this spike, but they certainly did not make up the majority of the top ten RTs, accompanied by language around climate change, and protests about the mine in Nunavut. Some referenced a new heat record in Norilsk, the possibility of the collapse of Arctic sea ice, the collapse of Arctic ecosystems, and food insecurity in Nunavut. For example, one stated "There is a heatwave in the Arctic" and another stated "Arctic expert predicts final collapse of sea ice within four years." Yet another stated "Arctic ecosystems have been in some kind of collapse phase for years." Two local instances of security emerged, with tweets about food insecurity in Nunavut and suicide rates in the Canadian Arctic. Interestingly, increasing focus on the Arctic in a military sense was reflected in two tweets, one of which talked about a new United States Army division in Alaska, and its emphasis on Arctic warfare and Russian military moves in the Arctic stating "Russian military moves in the Arctic worry the US and NATO." With increasing popular media attention on Arctic militarization, this is not surprising.

By October 2022, another spike of 300 RTs emerged, again reflecting a similar division of concerns about climate change and militarization. Tweets that emphasized climate change spoke about fears that "all arctic glaciers will disappear … humanity only has 50 days left to avoid a climate catastrophe," the retreat of glaciers in Iceland, an increase in temperature in the Arctic, and the destruction of Arctic sea ice. However, accompanying these climate insecurities were also fears about Russian nuclear submarines in the Arctic Sea reflected in two tweets. For example, one reported on news that "NATO issued an intelligence warning indicating the Russian Belograd nuclear submarine has been mobilized somewhere in the Arctic sea. It may test its Poseidon drone torpedo."

December 2022 was an interesting and amusing anomaly in the data set as there was a spike of 350 RTs. Rather than the tweets having anything to do with the Arctic, however, almost all top ten RTs discussed the Arctic cold front that hit the United States and caused severe drops in temperature across the country. The final spike under analysis occurred in February 2023, with 250 RTs. The primary topics during this spike were climate change and the Willow Project, an oil drilling project on Alaska's North Slope. Tweets tended to emphasize the threat that the Alaskan Arctic faced with the Willow Project's approval, with one saying it "could be a huge threat to the people, nature, and wildlife that call Alaska home." Others emphasized the loss of sea ice around Greenland, and more broadly how "climate change in the Arctic Circle gravely threatens all people."

Table 4. Spikes of retweets in 2022-2023 that exceeded 150 and the topics in top 10 retweets

Time Period	Number of Retweets (RTs)	Topics
March 2022	150	Climate Change, Arctic Sea Ice
June 2022	200	Climate Change, Traditional Security, Nunavut Mine, Heat wave
October 2022	300	Climate Change, Traditional Security
December 2022	350	Arctic Cold Front in USA
February 2023	250	Climate Change, Willow Project

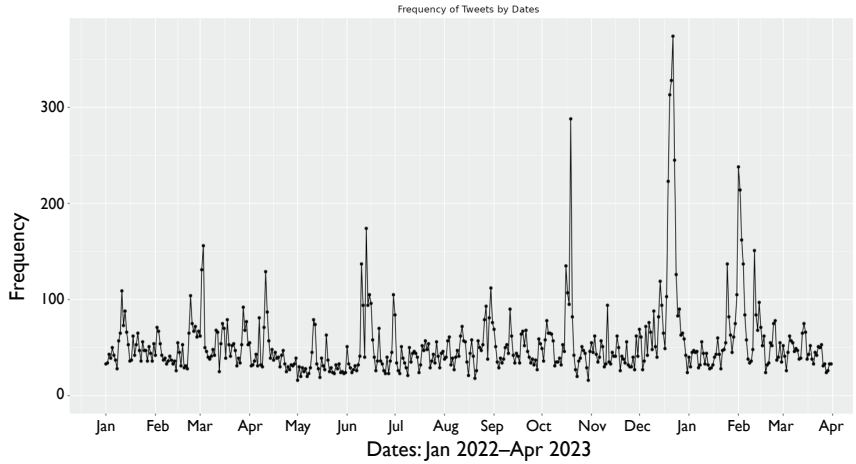

Figure 3. Frequency of tweets in 2022-2023 by month

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Analysis

There are two key takeaways based on the above findings. First, most spikes were driven by local environmental issues such as the opening of the Northern Sea Route, ANWR, the Norilsk oil spill, and the Willow Project, in contrast to global feelings of traditional insecurity. In other words, much of the literature and media reports have called attention to rising traditional security issues such as the Ukraine war, rising tensions between the United States and Russia, as well as between the United States and China, and their impacts on the Arctic.[31] However, these issues were not present in the data set, apart from a few mentions. Insecurity on Twitter was thus not really reactive to rising West–Russia tensions. This implies that there is a significant split between the academic consensus on Arctic security issues and what is present on X/Twitter. While this may not be surprising, it begs the question of how much influence that academics who are active on X/Twitter have on the platform. Many prominent Arctic scholars are quite active on Twitter regarding security issues, such as Andrea Charron, Will Greaves, and Marc Lanteigne. However, it appears that their more nuanced read on Arctic security issues—as encompassing both the local and the geopolitical—are not the most retweeted. Further, the prevalence of local security issues is not solely a phenomenon that has appeared on Twitter, but rather a clear trend in how public opinion understands security threats.[32]

Second, climate change appears as a central theme across every spike. While climate change may not be named specifically in a tweet, many local environmental issues that cause insecurity are the result of or related to climate change as a macro-driver, such as the melting of the Greenland ice sheet, warming in the Arctic, and ecosystem collapse. The presence of climate change issues across the content of top tweets confirms the close connection between climate change as a topic and the insecurity dictionary.

It is certainly not new that environmental issues are a key part of Arctic security with concerns arising in the 1990s around threats to the Arctic environment, including the melting of sea ice, nuclear waste, and increasing pollution.[33] By the mid-2000s, climate change was described by Sherri Goodman as a threat multiplier in the region, and others have described shared environmental threats as the key for the institutionalization of the Arctic region.[34] Today, environmental security threats related to climate change are central to discussions of the Arctic, with most scholars taking a comprehensive approach that understands these environmental security threats as intrinsically linked to shipping, fishing, defence and traditional security, as well as humanitarian crises.[35]

Thus it appears that this reality present in the literature and in how Arctic states themselves have formulated their policies towards the region is also true on X/Twitter. Importantly, there is an interesting contrast between the localized issues of environmental insecurity that were identified and the clear global role of climate change in the Arctic. In short, while global insecurities that we might have expected to appear on Twitter, such as concerns surrounding the 2022 Russian invasion of Ukraine or the COVID-19 pandemic did not, climate change certainly did. Future research could do more to untangle whether certain types of global insecurities are more represented on social media due to, for example, the role of non-governmental organizations and their use of Twitter as a platform. Additional work could also expound on more crisis-driven moments of global insecurity such as those relating to war or disease outbreaks, in contrast to slower moving crises such as climate change. The narration of these slower moving crises is inherently more difficult to securitize given the lack of shocking news events.

These two takeaways illustrate that Arctic insecurity on X/Twitter appears to be driven by two factors: 1) those individuals experiencing or reporting on local Arctic insecurities, and 2) global concerns about climate change, of which the Arctic plays a central role. In short, these two dynamics clearly show that environmental and climate security are central to Arctic Twitter in a way that sidelines issues of traditional military security.

Conclusion

With Elon Musk's recent purchase of Twitter and rebranding to X, the platform is quickly changing from how it behaved in the past to something new. Many popular users of Twitter both in and outside the Arctic community appear to have left or are at least threatening to leave the platform now called "X". However, social media is still a bellwether for how a particular subsection of public opinion operates online. Research has shown that social media can help illustrate how public opinion changes in reaction to environmental crises, for example, while other scholars have unpacked how Twitter reframed the central points of the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), which increased polarization around climate change.[36] Given the higher numbers of academics, political elites, and journalists that have used the application[37] and the active Arctic Twitter community, it matters how the Arctic is portrayed, particularly when we consider insecurity.

That tweets on Arctic security centre around local Arctic insecurities, such as the Norilsk oil spill, heat waves, or ANWR, implies the centrality of environmental security issues across the data set. When global insecurities come into the picture, it is solely through the lens of climate change rather than tweets that reported on the 2022 Russian invasion of Ukraine or COVID-19. While the conflict in Ukraine does not necessarily have material impacts in the Arctic, it has already been shifting how Arctic security scholars understand the region and how the region's

Advance Online Article

politics are unfolding.[38] Consider the pausing of the Arctic Council, the accession of Finland and Sweden to NATO, and concern about hybrid threats prevalent across the European Arctic. This emphasis on environmental issues comes into contrast with how scholars and some commentators are framing the region as the home to a new Cold War. For example, many news outlets have published analyses on Svalbard,[39] increased Arctic militarization,[40] and drawn attention to the Arctic as a theatre of competition. This finding dovetails with other recent work and public opinion polls that indicate most publics are concerned with local insecurities rather than global insecurity, with the exception of climate change. For example, research has illustrated that during Hurricane Irma, many tweets did not just cover the storm, but also personal experiences such as abandoning pets.[41] Similarly, additional work has shown that public opinion polls on Arctic security—rather than reinforcing the importance of the 2014 Russian annexation of Crimea as a key global turning point—led to very little change in threat perceptions.[42] Public opinion from Greenland and Iceland are particularly strong examples that local insecurities concern the public much more than great power competition.[43] As X fragments further and the social media landscape becomes more complex in scope, future work should engage further with not only how Arctic insecurity is understood on X, but also on other platforms such as Facebook and image/video platforms including Instagram and TikTok. Such work could examine how aesthetic images of the Arctic may be used to promote a fragile and empty depiction of the region, relying on a colonial reading of the Arctic.

Notes

1. "Most Popular Social Networks Worldwide as of September 2024, ranked by number of monthly active users," *Statista*, accessed 16 September 2024, https://www.statista.com/statistics/272014/global-social-networks-ranked-by-number-of-users/.
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23. RStudio is an integrated development environment for the programming language R.
24. R packages are extensions to the R programming language: 1) dplyr facilitates data frame creation, 2) ggplot2 aids in the development of graphs, 3) gridExtra provides functions for grid graphics, 4) Lexicoder Sentiment Dictionary contains a dictionary for the automatic coding of sentiment in text analysis, 5) plotly is an interactive graphing library, 6) quanteda and quanteda.textplots are packages for analyzing textual data, 7) rtweet aids in the organization of Twitter data for R, and shiny and shinydashboard aid in building interactive web applications.
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