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Geopolitical and geoeconomic risks overtake climate narratives in Arctic coverage

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Climate change particularly affects the Arctic, leading to increased accessibility and becoming more important from geopolitical and geoeconomic perspectives, associated with increasing strategic competition. Here, we provide a quantitative assessment of these developments using newspaper-based indicators of Arctic-related climate, geopolitical, and geoeconomic tensions. The analysis shows that these indicators evolve differently over time and that the importance of geopolitical and geoeconomic tensions has increased at both monthly and yearly frequencies. The indices show distinct trend and volatility patterns across the different dimensions of media coverage. These findings quantitatively support qualitative assessments of the Arctic's growing strategic significance. While media-based indicators capture perceived rather than objective risks, they offer a systematic and time-consistent way to map developments in the Arctic and complement existing qualitative analyses.

The changing Arctic: climate change, strategic competition, and newspaper-based indices

The Arctic has a long history of resource extraction and claims, trade, and conflicts, however, the icy conditions have frozen many conflicts[1,2]. In turn, some perceived the Arctic even as a zone of peace as Gorbachev stated in 1987. Even if this assessment was exaggerated, it is fair to say that perceptions of the Arctic are changing[3]. In early 2026, newspaper articles about US President Trump's attempt to acquire Greenland and thus counter the strategic Arctic development of China and Russia in particular dominated the headlines. Of course, this development is being driven by improved access resulting from climate change and the retreating ice. Accordingly, these developments go hand in hand, implying that the so-called zone of peace seems to be a thing of the past[4,5]. However, these developments are hardly documented quantitatively and, accordingly, we extend and develop in this paper quantitative, newspaper-based indices to demonstrate the increasing attention towards the Arctic and the recent surge in geopolitical and geoeconomic drivers of this attention.

Over recent decades climate change has been noticeable in the Arctic[6]. The implications are changing the accessibility of the region creating economic interests and strategic competition. Rising temperatures are leading to a decline of summer ice sea extent and ice sea thickness[7,8] making ice-free summers possible within decades[9]. These changes adjust the opportunities for new ways to operate in the Arctic (e.g. melting ice could lead to new ice-capable vessels) and call for technological innovation[10]. Furthermore, with diminishing ice cover, Arctic hydrocarbon and mineral resources awake interest in exploration. Around 25% of the world's unproven gas and oil resources as well as deposits of critical materials are believed to be located in the Arctic[11]. A geology-based assessment by the U.S. Geological Survey (USGS) in 2008 estimated these resources at approx. 90 billion barrels of oil, 44 billion of natural gas liquids and 1,669 trillion cubic feet of natural gas[12].Russia, in particular, has been actively exploring and producing oil and gas in the Arctic[13]. Furthermore, the Arctic is rich in minerals, including cobalt, graphite, lithium and nickel, zinc, copper, iron ore and rare earths[14]. As climate change progresses, these resources become more accessible[15], and even though the conditions remain harsh and the exploration cost remain uncertain, geoeconomic competition is increasing[10,16].

In addition, the global great power competition also extends into the Arctic[17]. Russia's annexation of Crimea in 2014, followed by Ukraine's invasion in 2022 has substantially affected cooperation and stabilization in the Arctic, particularly visible in Arctic Council-related activities[18–20]. This led to rising tensions between Russia and NATO, which were further intensified by Finland's and Sweden's accession[10]. Since then, both sides are investing in Arctic infrastructure and military equipment: Russia is modernizing this Northern Fleet by adding new equipment and reactivating old bases[21–23] while also conducting the most activities in the Arctic (Table SI_5)[24]. The US and Canada have recently announced plans to modernize and invest in its Arctic fleets (Figure SI_6), e.g. ordering new ice-capable vessels[25,26]. or cooperating with other NATO countries during their production[27].

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Under the banner of its "near-Arctic" status, China has expanded its presence in the Arctic region by integrating the Arctic into its belt and road initiative[28–31]. China's multifaceted strategy integrates scientific research, infrastructure development, and strategic diplomacy. Research stations in Svalbard, satellite ground stations in Sweden and Iceland, and the operation of the Xuelong icebreakers enhance China's regional footprint[10]. Common interests further tighten security and economic cooperation between China and Russia[32]. Chinese state companies hold stakes in Russian Arctic LNG projects, China gets access to cheaper energy, natural resources and the Arctic maritime domain[28,33]. In return, China provides financing and technical support for Russia[18,34].

In this context, also the significance of the Northern Sea Route (NSR) as a transport corridor becomes essential[35,36]. Part of Russia's Arctic strategy is developing the area for economic growth by revitalizing the NSR[23]. Through the climatic changes transit through the Arctic becomes increasingly possible[8,37–39]. Transiting through the Arctic could shorten cargo transport between Europe and Asia[39–41], potentially saving multiple days[42]. In 2022, 115 vessels transited the NSR, showing a notable increase compared to previous years[43] with China being the main user[44]. Therefore, both countries are investing in infrastructure projects and its own fleet to secure this incentive[10,21]. Both Russia and China stand to benefit from this development, as navigation can be subject to domestic regulations in national Arctic territory[8,45] and Russia possessing more than 53% of Arctic coastline[10]. In this context, Russia adopted an amendment in 2022 requiring foreign state vessels to submit applications for transit[46].

The described geopolitical shifts, accelerating climate change effects, and expanding (geo-)economic development in the Arctic are also affecting the lives of Indigenous Peoples in the Arctic. Arctic governance mechanisms have historically provided a unique space for Indigenous knowledge and participation to influence policies, particularly around sustainable development and building resilience. However, growing economic and strategic interests increasingly undermine respect for Indigenous spaces, as control over land, resources, and logistics becomes central to state interests – raising the risk of displacement and exclusion from decision-making[47]. This tension is reflected in legal and political struggles, where states often prioritize resource exploitation, while Indigenous communities defend livelihoods rooted in environmental stewardship and cultural continuity[48]. Despite their crucial contributions to climate mitigation and adaptation[49], Indigenous voices face mounting constraints, especially in the context of the Russian invasion of Ukraine, which has further limited advocacy space, complicating efforts to assert rights and self-determination while also silencing critical perspectives[50].

While the changing climate conditions in the Arctic are relatively well measured and documented, the increasing geopolitical and geoeconomic tensions receive increasing attention but are not yet systematically documented. For that purpose, we apply the Geopolitical Risk Index (GPR) of Caldara and Iacoviello (2022)[51] to the Arctic, and develop the Arctic Geoeconomic Tension Index, building on the work of Mohr and Trebesch (2025)[52]. We compare this to an Index which focuses only on climate change related newspaper articles of the Arctic.

Caldara and Iacoviello (2022) construct a newspaper-based index to measure adverse geopolitical events on a monthly and yearly basis, using the share of newspaper articles covering different threats and acts related to geopolitical tensions[51]. Caldara and Iacoviello argue that economic modelling and forecasting acknowledges that adverse geopolitical events can impact macroeconomic variables like adjustments of the capital stock, higher military spending or changed saving decisions. At the same time, this modelling lacks a metric to represent real-time geopolitical impact, resulting from the perceived geopolitical risk by the press, the public, global investors, and policymakers[51]. Hence, they take the stance that media coverage of geopolitical events, following the news demand of the public, global investors and also politics in times of increased, perceived, geopolitical risk, provides a robust indicator to measure this impact. And in fact, Caldara and Iacoviello (2022) demonstrate that their Index has in fact predictive power to forecast changes in investments, employment and stock returns[51]. Bondarenko et al. (2024) expanded the GPR by including native languages (esp. Russian) and adjusting the GPR to become more country specific[53]. They found that shocks in the English-language GPR have limited effects on the Russian economy while the Russian GPR is leading to adverse economic responses[53].

Mohr and Trebesch (2025)[52] argue that states use even more subtle methods to pursue their economic interests, which can be understood in a geopolitical context but still go beyond what is referred to as geopolitics in political discourse[52]. In particular, when it comes to access to resources, geo-economic and geopolitical actions do overlap. In turn, our index allows for a more nuanced view of developments in the Arctic by distinguishing between these two areas. Of course, our indices are descriptive only, but given the rapid climate, political, and economic changes in the Arctic, we believe it is helpful to supplement a qualitative, narrative-based view with a quantitative index that allows changes to be classified over time.

We demonstrate that the three indices evolve differently at yearly and monthly levels and that geopolitical and geoeconomic tensions are becoming increasingly significant. Our findings confirm recent qualitative descriptions and analyses of developments in the Arctic. Furthermore, we supplement the indices with a time series analysis showing that the trend and volatility patterns of climate- and geopolitics-related newspaper coverage differ considerably.

Results

Overall, an increasing trend in perceived geopolitical risk and geoeconomic tensions can be observed (Fig. 1). While climate change related articles dominated between the years 2002 and 2013, geopolitical and geoeconomic related articles, of course fueled by increased accessibility resulting from climate change, seem to become more important. The indicator therefore confirms the narrative and qualitative analysis, namely the increase of geopolitical risk and geoeconomic tension in the Arctic, mainly connected to the ongoing strategic and partially economic competition[54].

A similar pattern can be observed by the monthly indicators (Fig. 2) which show that recently geoeconomic interests and geopolitical risk increase in the newspaper coverage of the Arctic. Nevertheless, although the proportion of newspaper articles discussing the effects of climate change on the Arctic relative to those focusing on geopolitics and geoeconomics is declining, the topic remains relevant. This is especially true given that the melting ice is awaking geo-economic interests and fueling geopolitical risks.

The different characteristics are supported by the time series analysis of the indicators, summarized in Tables 3 and 4. Table 3 shows the differences in a linear trend, supporting the view that not only climate change related topics show a lower trend compared to the other topic but also that this evident in the period after February 2014. Please note that we have chosen February 2014 as the breakpoint to reflect the change in reporting following Russia's annexation of Crimea. Table 4 shows the difference in the volatility patterns for the residuals resulting from the linear time trend for the three indices. The estimation in Table 4 supports the view that climate change is driving newspaper coverage more persistently, whereas news related to geopolitical events rather results in volatility spikes. The volatility of newspaper coverage related to the Arctic and geoeconomic tensions shows pattern of both though.

Conclusions

The global geopolitical and economic order is undergoing a profound structural change, moving away from a predominantly rules-based system toward an era in which geopolitical and geoeconomic interests increasingly shape economic and security policy. These global shifts are also visible in the Arctic. The Arctic region has evolved from a largely cooperative, low-tension area, into one of the most strategically critical regions in current geopolitics due to strategic, economic and resource interests. As melting ice opens new shipping routes, provides better access to potential resources, and security considerations, the Arctic is becoming a focal point where these spaces intersect.

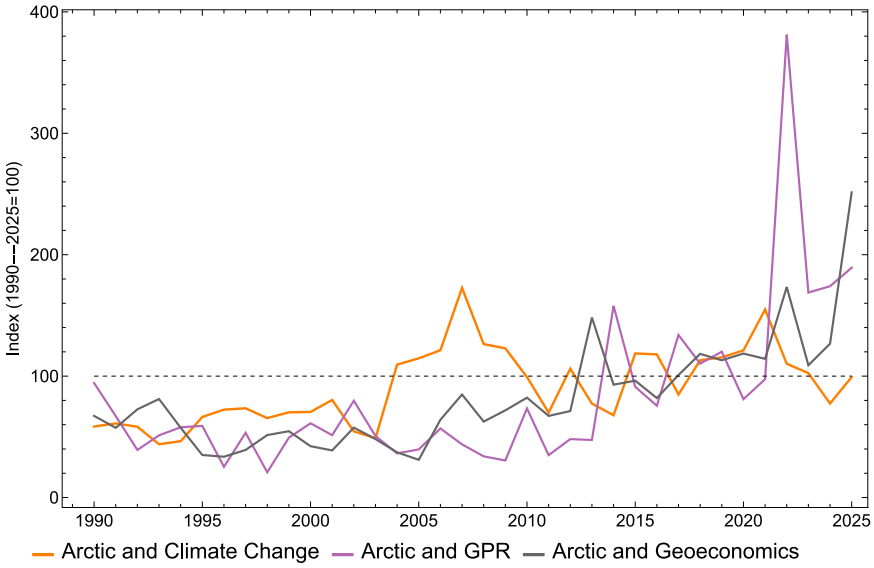

Fig. 1 | Arctic yearly Indices, representing the frequency of newspaper articles on climate change, geopolitics and geoeconomics. This figure shows the share of articles on events related to climate change in the Arctic, geopolitical risk, measured by the GPR, and geoeconomic tensions.

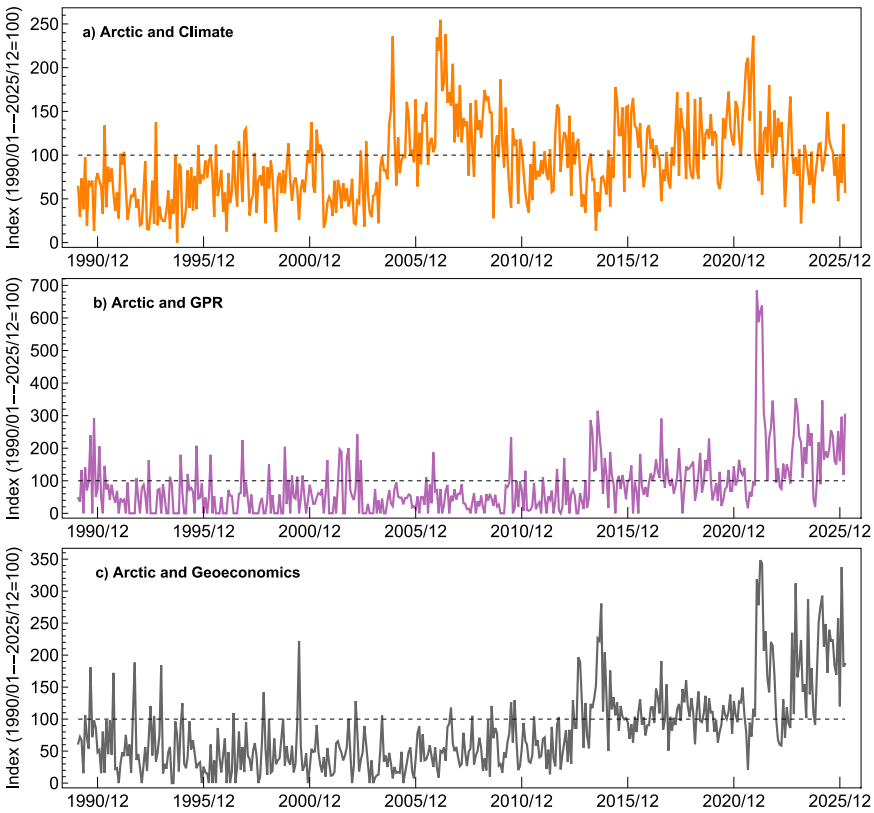

Fig. 2 | Arctic monthly indices, representing the frequency of newspaper articles on climate change, geopolitics and geoeconomics. This figure shows the share of articles on events related to climate change in the Arctic (**a**), geopolitical risk, measured by the GPR (**b**), and geoeconomic tension (**c**).

To provide a more quantitative description of this development, we apply and extend the framework of Caldara and Iacoviello (2022) to the Arctic. Caldara and Iacoviello (2022) have introduced the newspaper-based geopolitical risk (GPR) index to measure how geopolitical tensions and adverse effects are perceived. We apply the GPR to the Arctic, i.e. limiting the population of articles in major English-language newspapers to those that are related to the Arctic. Based on this population of articles we compare how climate change related topics and geopolitical topics drive newspaper coverage, obtaining the latter by applying the selection criteria of the GPR. Furthermore, we extend the work of Caldara and Iacoviello (2022) by constructing a geoeconomic tension indicator building on Mohr and Trebesch (2025). Mohr and Trebesch (2025) argue that states use even more subtle methods to pursue their economic interests, which might remain for a certain period of time below the surface of actual geopolitical tensions.

We show that the three indices evolve differently, at the yearly and monthly level, and that the significance of geopolitical and geoeconomic tensions is increasing. We hereby confirm recent qualitative descriptions and analyses of developments in the Arctic by using quantitative indices. Furthermore, we supplement the indices with time series analysis, showing that the trend and volatility pattern of the climate-related and geopolitical-related newspaper coverage differs considerably.

Table 1 | Newspaper selection for the Arctic extension of the GPR.

Region	Newspaper	Available since
North America	The New York Times	1992
	Wall Street Journal	1979
	The Washington Post	1977
	Toronto Star	1986
	The Globe and Mail	1977
Russia	Moscow Times	1997
	Interfax Russia & CIS Newswire (Military, Business & Financial, General, Energy)	1999
Europe	Financial Times	2006
	Daily Mail	1981
	The Guardian	1981
South America	The Rio Times	2021
Asia	The Japan Times	2002
	The Japan News	2002
	The Korea Herald	1998
	The Korea Times	1998
	Al-Jazeera English	2007
	Arab News	2008
Australia	The Australian	1996
	Herald Sun	2011
Africa	Mail & Guardian Online	2005
	Daily Nation	2012

We considered all major English-language newspaper globally that were available in the Factiva database. Availability differs among these newspapers.

To better understand the evolution of geopolitical risk in the Arctic, it is essential to contextualize the identified trends within the broader history of Arctic-related developments. While our analysis highlights the key drivers and fluctuations of geopolitical and geoeconomic tension over time, an important complementary further perspective will involve examining what has occurred before, during, and after past risk peaks in terms of Arctic cooperation, policy strategies (by different actors), and international agreements[55]. Events appear more singular, with no clear buildup or aftermath in terms of strategy implementation or collaborative actions. Partially, recent peaks – which tend to be driven more by strategic-related considerations – are surrounded by a noticeable increase in Arctic-focused activity, particularly in the form of strategic documents and national Arctic policies. The growing number of strategies issued by Arctic states, non-Arctic stakeholders, and Indigenous groups, along with the parallel rise in defense spending, military modernization, and strategic interests, suggests a promising direction for future research to further substantiate our quantitative findings of increasing geopolitical importance. Still, the indices describe perceived developments by coverage in the media.

Accordingly, it can be argued that key factors that pose geopolitical risks are not reflected. Nevertheless, the portrayal of developments in the media is not only descriptive but also responds to demand for news from the public, the economy, and politics. Accordingly, changes in the proportion of articles in the media show not only what is happening, but also what is currently of interest. And indeed, Caldara and Iacoviello (2022) have shown that their GPR index has predictive power. This evidence is still pending for our indices and should be addressed in subsequent research. But even with such evidence, it should be clear that we regard our indices as a systematic attempt to map developments in the Arctic in a time-consistent manner, which can supplement but of course cannot replace qualitative analyses and descriptions.

Methods

Following Caldara and Iacoviello (2022) we build different, yearly and monthly, indices, $I_{i,t}$, measuring the frequency of newspaper articles related

Table 2 | Search queries and search keywords for our indices.

Search query formations	
Arctic articles (N)	Arctic_words NOT Exclusion_words
Arctic climate articles (N_c)	Arctic_words AND Climate_change_words NOT Exclusion_words
Arctic GPR articles (N_{gpr})	Arctic_words AND GPR_words NOT Exclusion_words
Arctic GET articles (N_{get})	Arctic_words AND Geoeconomic_words NOT Exclusion_words
Keywords for search queries	
GPR_words	(((war OR conflict OR hostilities OR revolution* OR insurrection OR uprising OR revolt OR coup OR geopolitic*) near2 (threat* OR warn* OR fear* OR risk* OR concern* OR danger* OR doubt* OR crisis OR troubl* OR disput* OR tension* OR imminen* OR inevitable OR footing OR menace* OR brink OR scare OR peril*)) OR ((peace OR truce OR armistice OR treaty OR parley) near2 (threat* OR menace* OR reject* OR peril* OR boycott* OR disrupt*)) OR ((military OR troops OR missile* OR "arms" OR weapon* OR bomb* OR warhead*) AND (buildup* OR "build up*" OR sanction* OR blockad* OR embargo OR quarantine OR ultimatum OR mobiliz*)) OR (("nuclear war*" OR "atomic war*" OR "nuclear missile*" OR "nuclear bomb*" OR "atomic bomb*" OR "h-bomb*" OR "hydrogen bomb*" OR "nuclear test" OR "nuclear weapon*") AND (threat* OR warn* OR fear* OR risk* OR concern* OR danger* OR doubt* OR crisis OR troubl* OR disput* OR tension* OR imminen* OR inevitable OR footing OR menace* OR brink OR scare OR peril*)) OR ((terror* OR guerrilla* OR hostage*) near2 (threat* OR warn* OR fear* OR risk* OR concern* OR danger* OR doubt* OR crisis OR troubl* OR disput* OR tension* OR imminen* OR inevitable OR footing OR menace* OR brink OR scare OR peril*)))
Exclusion_words	(movie* OR film* OR museum* OR anniversar* OR obituar* OR memorial* OR arts OR book OR books OR memoir* OR "price war" OR game OR story OR history OR veteran* OR tribute* OR sport OR music OR racing OR cancer OR "real estate" OR mafia OR trial OR tax)
Arctic_words	(Arctic* OR "Northern Polar Region")
Arctic_Geoeconomic_words	(geoeconomic* OR sanction* OR embargo* OR blockade* OR tariff* OR "trade agreements" OR sabotage OR espionage OR cyberattack* OR "foreign aid" OR "control over resource*" OR "control over shipping route*" OR "resource* competition" OR "competition for resource*" OR "melting ice resources" OR deep-sea drilling OR EEZ* OR ((shipping route* OR trade route*) AND ("North-West Passage" OR "Northern Sea Route" OR "Transpolar Sea Route" OR "Arctic Bridge Route")) OR "control over shipping route*" OR strategic interest* OR strategic competition OR economic interest* OR "tensions" OR "economic security" OR (invest* NEAR5 (Arctic* OR "Arctic development")) OR icebreaker* OR polar ship*)
Climate_change_words	(climat* OR "climate change" OR "environmental protection" OR "global warming" OR "climate protection" OR "global heating" OR "melting ice" OR "polar melt" OR "environmental change")

This table details the search queries that were used for our indices (incl. used Boolean operators) and the respective keywords to compile these queries.

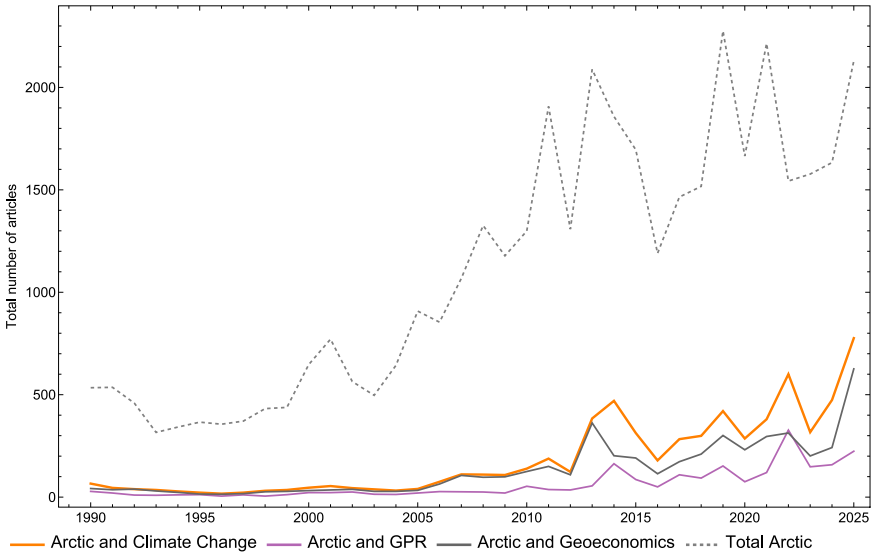

Fig. 3 | Total number of articles for the different queries over time. This figure shows all three indices seperately relative to the total number of Arctic articles.

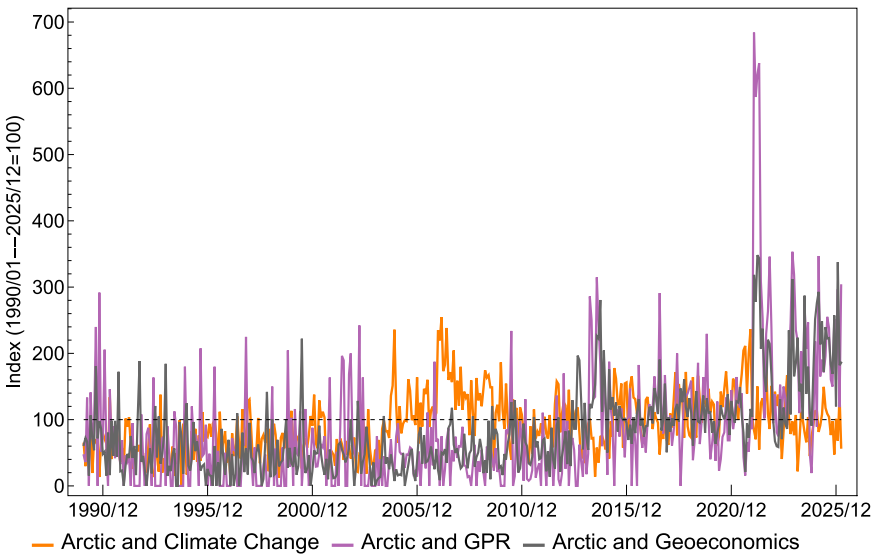

Fig. 4 | Arctic monthly Indices, representing the frequency of newspaper articles on climate change, geopolitics and geoeconomics. This figure shows the share of articles on events related to climate change in the Arctic, geopolitical risk, measured by the A-GPR, and geoeconomic tension.

to climate (c), geopolitical (gpr), and geoeconomic (get) events, all in combination with the Arctic, relative to the total number of articles mentioning the Arctic: $I_{i,t} = 100 * \frac{N_{i,t}}{N_t} / \left(\sum_{t=1}^{T} N_{i,t} / \sum_{t=1}^{T} N_t \right)$ with $i = \{c, gpr, get\}$, and t the time index, measuring either a specific month or year and N is the total number of Arctic newspaper articles and N_i the number of newspaper articles mentioning the specific event. Further background information on the original Geopolitical Risk (GPR) is provided in the Supplementary Information, showing the original search strings in Table SI_6.

We use the original GPR newspaper selection as a starting point (North America newspaper stations) and expand it to include global English-language newspapers that are available in the Factiva database (Table 1). Factiva, developed by Dow Jones and Reuters, provides access to national and international newspaper articles from a wide range of sources[56]. It therefore serves as the foundational tool for our analysis, as the database allows for precise searches using customizable queries and Boolean operators. We included all major English-language newspapers that are available in the Factiva database and reflects our intention to capture geopolitical Arctic events with global dimensions and repercussions (Table 2). One major limitation here is that the availability in Factiva of these differ and therefore also coverage over time. In general, article coverage is driven by the newspaper stations from North America, Russia and Europe. As Russia heavily restricts news in the country, making independence and availability of news difficult to assess, we orient to the news-based measure of geopolitical risk based on country-specific sources from Bondarenko et al.[53]. Due to data availability constraints, our sample period begins in the year 1990 (Table 2).

Figure 3 shows the total number of articles for the different queries, showing that the different topics show different frequencies over time, however, the increasing number of total newspapers covered prevents a meaningful interpretation. Therefore, the GPR and also our indices show the relative share, normalized by the total number of topic specific articles relative to the total number of Arctic articles.

Furthermore, for the monthly index, we show in the main text for each topic the indicator separately. Figure 4 shows all three indices combined.

It should be noted that the Arctic_geoeconomics_words, developed in part building on Mohr and Trebesch (2025) have overlap with the GPR words, both queries including the terms sanction*, embargo*, and blockade*. Accordingly, we ran another query in which geo-economic terms—such as "sanctions," which also appear in the GPR—were excluded. For this index, "Arctic and Geoeconomics excluding GPR," we used the same number of articles for normalization as we did for the "Arctic and

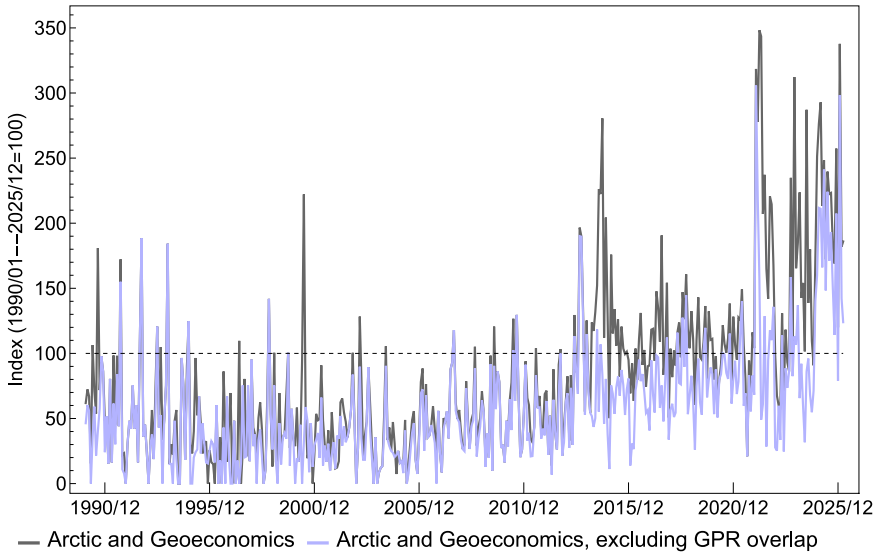

Fig. 5 | Arctic monthly Indices, representing the frequency of newspaper articles on geoeconomics and on geoeconomics, excluding geoeconomic words also present the GPR search string. For both indices, the same number of total Articles is used for normalization which means that the index excluding certain words is lower by construction.

Table 3 | Coefficients of a linear trend for the monthly indices.

Index	Coefficient of the trend (01/1990 — 03/2026)	Coefficient of the trend (02/2014 — 03/2026)
Climate	0.15***	0.04***
GPR	0.32***	0.80***
Geoeconomics	0.30***	0.62***

The asterisks *,**,***, indicate the significance level for $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.

Table 4 | Estimates for the GARCH(1,1) coefficients, α_1 and β_1 for the monthly residuals using the linear trend estimation.

Index	α_1	β_1
	(01/1990 — 03/2026)	
Arctic-Climate	0.25***	0.59***
Arctic-GPR	0.57***	0.15***
Arctic-Geoeconomics	0.26***	0.45***
	(02/2014 — 03/2026)	
Arctic-Climate	0.15***	0.61***
Arctic-GPR	0.61***	0.08***
Arctic-Geoeconomics	0.36***	0.31***

The asterisks *,**,***, indicate the significance level for $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.

Geoeconomics" index. Excluding these words, the correlation between Arctic GPR index and the Arctic Geoeconomic index drops from 0.69 to 0.48. Figure 5 shows the difference between the two indices, indicating that Arctic Geoeconomics is not only driven by this subset of GPR words, but covers import aspects of Arctic Geoeconomic tensions by itself. However, it is also evident that since 2015, the number of articles has been increasing when these words—which are also included in the GPR—appear in the search string. One could therefore argue that geo-economic factors or measures associated with greater aggression, and thus increasingly causing geopolitical risks, are on the rise. Nevertheless, we believe that these search terms reflect both geopolitical and geoeconomic factors, and therefore present in the main text the indices that include this overlap between GPR and geoeconomics.

For the monthly indicators, we fitted a simple linear trend to measure the increase over time, distinguishing between the entire time period (01/1990 until 12/2025) and for the time period since the year 02/2014, i.e. 02/2014 until 03/2026. The estimates for the trend component are displayed in Table 3.

We use residuals from the linear trend models for our three indicator time series to estimate a GARCH(1,1) specification to learn about the variance patterns.

The coefficients in Table 4 show that for the Arctic climate index the volatility is more persistent, i.e., β_1 is rather large. This suggests that climate-change related topics more persistently determine newspaper coverage. In contrast, the coefficients for the Arctic and geopolitical tension indicator (Arctic-GPR) show a rather high-value for α_1, implying that this indicator has more immediate spikes in volatility, stronger driven by shocks. The coefficients for the Arctic and geoeconomic tension indicator show a mixture, i.e. there is a reaction to shocks (but less pronounced as for the geopolitical dimensions), however, emerging geoeconomic topics appear to more dominantly drive newspaper coverage.

Data availability

A more detailed explanation of the original Geopolitical Risk Index and additional quantitative information for our introductory section can be found in the Supplementary Information. The data supporting this article has been included as part of Supplementary Data. The data is publicly accessible via the public repository RADAR (https://doi.org/10.22000/tqwrdxn6z8dskvaf). Further inquiries can be directed to the corresponding author. The index is also continuously updated (on a quarterly basis) on the website of the DynArc project (URL: https://www.kielinstitut.de/institute/dynamic-and-adaptive-marine-conservation-in-the-arctic-ocean-management-resource-economics-and-geopolitics/).

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