**Geopolitics and Ice Humanities: Elemental, metaphorical and volumetric reverberations[[1]](#footnote-1)**

Klaus Dodds (Royal Holloway, University of London)

Abstract

This paper develops further interrogation into ‘icy geopolitics’ and what it might tell us about how we treat substances like ice as geopolitical matter. It brings together various literatures that speak to ice as a substance and substantial matter. Second, ice is represented and experienced in a multitude of ways, from oral cultures of indigenous communities living and working in the Arctic and mountainous environments. This matters again because ice as metaphor is often complicitous with the settler colonial framing of empty, unstable and ungoverned spaces. The paper takes this icy interrogation and brings it into contact with the experiences and struggles of Arctic peoples and states alongside non-Arctic states seek to press their interests in the midst of ongoing melting and thawing. Icy geopolitics is being reconfigured; melting is said to be ‘triggering’ further expressions of territorial colonization and resource extraction and/or commitment towards indigenous autonomy, stewardship and conservation. The territorial volume is being put to work while at the same time it is being melted, thawed, opened and closed by human and more than human forces.

Introduction

This paper develops further interrogation into ‘icy geopolitics’ and what it might tell us about how we treat substances like ice as geopolitical matter. It brings together various literatures that speak to ice as a substance and substantial matter. Second, ice is represented and experienced in a multitude of ways, from oral cultures of indigenous communities living and working in the Arctic and mountainous environments. This matters again because ice as metaphor is often complicitous with the settler colonial framing of empty, unstable and ungoverned spaces. Ice continues to be richly productive for Euro-Western cultures, with ice and cold serving to illuminate geopolitical conflict, hellish domains and everyday encounters. More recently, the ice core has been instrumental in enabling the Arctic and Antarctic to be data-mined so that earth history can be narrated and visualised.[[2]](#footnote-2) New spaces such as outer space can and do get framed through previous elements, analogous spaces and territorial imaginaries. Outer space gets framed as ‘high seas’, and ice-filled environments serve as a metaphorical and territorialised analogy for the moon.[[3]](#footnote-3) All the while, indigenous communities in northern territories enjoy rich oral traditions, which have long imagined ice and snow as part of a wider network of objects, materials, myths and forces. Within those cosmologies, ice, land, and climate are regarded as lively, sentient and dynamic.

Thereafter, the paper shifts attention to the territorial volume and the role of elemental forces and pressures. Political geographers have turned to subterranean and submarine environments to stage a productive encounter with the height and depth of the territorial volume.[[4]](#footnote-4) During the Cold War, the two superpowers were eager to manipulate and ‘game’ the territorial volume of ice and snow in the pursuit of geopolitical advantage. In 1950s and 1960s, for example, ice core research was developed, and a clandestine Cold War project Camp Century in Greenland was a pioneering site for such endeavours.[[5]](#footnote-5) Extracting ice cores and a secret project to hide missiles under the ice were able to co-exist with one another.[[6]](#footnote-6) Those elemental pressures and forces carried with it very human consequences as well. Indigenous peoples were dispossessed, re-located and tested upon in the North American Arctic.[[7]](#footnote-7) Making the territorial volume secure carried with it tremendous socio-cultural and ecological consequences.[[8]](#footnote-8)

Finally, the paper takes this icy interrogation and brings it into contact with the experiences and struggles of Arctic peoples and states alongside non-Arctic states seek to press their interests in the midst of ongoing melting and thawing. Icy geopolitics is being reconfigured; melting is said to be ‘triggering’ further expressions of territorial colonization and resource extraction and/or commitment towards indigenous autonomy, stewardship and conservation. The territorial volume is being put to work while at the same time it is being melted, thawed, opened and closed by human and more than human forces. ‘Vanishing ice’ carries with troubling echoes of earlier frontier-like discourses about the ‘vanishing Indian’, as peoples and ecologies get written out and taken out by ongoing settler colonialism, resource-led capitalism and sovereignty politics.[[9]](#footnote-9) Meanwhile melting and thawing are positioned as, paradoxically, complicitous in this latest iteration of what we might think of as ‘volume-work’.

Icy Geopolitics?

What does it mean to speak of ‘icy geopolitics’? The moniker ‘icy’ is used by contemporary political geographers to get at something more elemental rather than simply as a geographical marker such as ‘polar’, ‘Arctic’, ‘Antarctic’ and/or ‘North Pole’.[[10]](#footnote-10) ‘Icy’ is more than a marker of the material, however. As a term it is capacious and capable of metaphoric reverberation. In English, for example, ‘icy’ is used to reflect on the nature of social relationships that are devoid of inter-personal warmth and intimacy. Relationships can be described as ‘cold’, ‘frosty’ and ‘icy’. But ‘icy’ is not necessarily synonymous with fixed and immobile. Ice can melt and thaw; personal relationships might ‘warm’ and as physical geographers remind us the thermodynamics of glaciers are crucial in determining advance, retreat, shrinkage and fissuring.[[11]](#footnote-11) As historians of science recognise, metaphor and analogies have and continue to play a foundational role in constructing and organising scientific knowledge, albeit in ways that are often embedded and informed by colonial, gendered and racialised imaginaries.[[12]](#footnote-12)

Appeals to or even for an ‘icy geopolitics’ (informed by classical and critical geopolitical scholarship) have become ever more fashionable in recent years, especially with reference to the Arctic region.[[13]](#footnote-13) Intense speculation that the territorial volume of the Arctic region continues to be transformed by geophysical and geopolitical forces serve to encourage a new generation of observers to note how Arctic space is imagined as ‘empty’ and available for identification, reification and occupation. New ‘ceremonies of possession’, in Patricia Seed’s terms, appear to be gathering momentum, as interested parties ‘scramble’ to audit ‘rapid change’, map and survey seabed and ocean, and articulate opportunities for further capital accumulation.[[14]](#footnote-14) At its starkest, melting sea ice being held responsible, unwittingly perhaps, for ‘unveiling’ of a new subterranean resource frontier.[[15]](#footnote-15) Nature itself was producing new opportunities for capital accumulation. Accumulation by disappearance. No need to invoke any ‘hidden hand’.[[16]](#footnote-16) Disappearing ice was not the only thing attracting attention. The density and mass of ice also mattered. Permafrost continues to thaw generating not only subterranean instability but also unleashing methane gas as previously frozen organic matter warms. In Siberia, it was reported that rotting animal carcases were provoking outbreaks of anthrax. Nature was out of control and responsible for new forms of geo-engineering producing at its most dramatic sink holes that resembled bomb craters. Melting (opportunity) and thawing (danger) appeared to be generative of ‘icy geopolitics’ with things being too hot when they should be cold and too mobile when they should be static.[[17]](#footnote-17) As Bruun and Medby reflected in their review, “The thawing of the Arctic ice not only renders accessible any resources *in* and *underneath* the ocean, but also increases accessibility *across* it…anticipation plays a significant role in Arctic geopolitics, which is often imagined in terms of *future* economic opportunities believed to follow from an Arctic thaw”.[[18]](#footnote-18) Polar infrastructures, including ice-breakers, satellite-based surveillance, and port/air facilities offer their own affordances for spatial control and monitoring.

This iterative reading of ‘icy geopolitics’ is perhaps a little too easy to posit but it has nonetheless proven very popular.[[19]](#footnote-19) Ice is dynamic and lively matter. It can and does appear and disappear. It melts, thaws and freezes. It can turn into meltwater and discharge itself from icebergs, glaciers and other bodies of ice. There has been a plethora of conferences, seminars and research programmes dedicated to better understanding the Arctic region as marked by rapid state-change in ice, ocean and air.[[20]](#footnote-20) The Arctic Ocean, in particular, has become a focal point for interest in its dynamic edges, legal and political borders, ocean chemistry, and sea ice coverage.[[21]](#footnote-21) David Beer makes the point about how metrics are integral to contemporary governance. Metrics on sea ice distribution, permafrost thaw, glacial retreat contribute to febrile forms of Arctic geopolitics.[[22]](#footnote-22) The ice metrics of the sort produced by the National Snow and Ice Data Center (NSIDC) contribute to that geopolitical churn, even if the numbers are being ‘scrambled’ by unprecedented warming and corresponding melting/thawing trends.[[23]](#footnote-23) Arctic states and their allies, working with those ‘ice numbers’, to plan and speculate about whether they need to invest in more icebreakers, organise cold weather military training, map and survey oceanic seabed, approve new mining leases, and/or invest in onshore and offshore infrastructure.

As scholars working with the material politics of sand, ice, snow and air have shown, there is scope aplenty for thinking further on the territorial foundations of the inter-state system and the idealised legal and political distinctions between land and sea, surface and sub-surface and earth and outer space.[[24]](#footnote-24) The territorial volume of the polar regions has attracted a medley of metaphors, tropes and geographical analogies such as the ‘ends of the earth’, ‘tip of the iceberg’, and snow and ice acting as a ‘blanket’ and ‘veil’.[[25]](#footnote-25) They are not geo-politically innocent, and often coincided with either scrambles for geographical knowledge and/or enhanced investment in mapping, infrastructure and militarization. The elemental aspects of ice proved more than capable of disrupting the calculative presumptions of states. Notorious Cold War projects such as Camp Century inside the Greenland inland ice were foiled by glacial fissures and pressure points. The ongoing ‘volumetric turn; in political geography and cultural anthropology usefully reminds us that the territorial volume and the labour required (‘volume work’) deserves further elaboration.[[26]](#footnote-26) Ice and water disrupt the presumption that territory can be calculated as if it was akin to ‘dry land’.[[27]](#footnote-27) The Arctic as a multi-elemental territorial volume, is both volumetric and voluminous in the sense of being able to accommodate not only new actors and agents (human and non-human such as migratory fish) but also capable of melting (glacier and sea ice), thawing (permafrost), and expanding/retreating (coastline and sea ice edge) depending on the material form under investigation.[[28]](#footnote-28) Debates on the volumetric could do more to explore how the elemental dimensions are multi-elemental, multi-form and subject to different elemental pressures. There are intense temporalities to icy geopolitics because ice expands, contracts, thickens, thins and disappears in the form of meltwater and discharge.[[29]](#footnote-29) Melting ice can and does have devastating consequences – physical, human and spiritual.[[30]](#footnote-30) Large-scale glacial melting can overwhelm downstream communities caught in the path of an extreme flood-event.[[31]](#footnote-31) Dramatic state-change can then provoke new state-led interventions in glacier management and cause spiritual discombobulation for local communities. Meltwater is political because it is an object of interest to state administrators, power companies and agri-business, and is integral to many indigenous and aboriginal communities living and working with sea ice, glacial ice and inland ice.[[32]](#footnote-32)

Ice and its relationship to the geopolitical deserve further examination because they reveal in the places like the Arctic something else that can and does get lost in those appeals to the elemental and volumetric. As indigenous scholars remind their readers, humans, ice and animals and land and sea are integrated into one another in complex reciprocal relations. Metis scholar, Zoe Todd, argues that human-ice-land relations are informed and enriched by stories, relationships and memories.[[33]](#footnote-33) For her appeals to materialism and more than human ontologies are another way for settler colonial ideologies and practices to persist in the North American Arctic as well as on and through southern indigenous territories. Indigenous peoples have long recognised that ice is lively matter. Settler colonial states have worked hard either to master and exploit those environments and/or used indigenous peoples to colonize places where ice is widespread. Ice has been and continues to be caught up with violence and ongoing colonial processes where Arctic states continue to invest and expand their legal, military and political footprint on northern territories onshore and offshore. Cultural anthropologists such as Ann Fienup-Riordan and her colleagues have had ongoing collaborations with Yup'ik communities in Alaska and their collective work stands as a powerful reminder that substances like ice are part of complex, intimate and sentient life-worlds.[[34]](#footnote-34) There are multiple ways of knowing and defining ice, and to echo Zoe Todd’s work on ‘fish pluralities’, geopolitical scholars interested in the elemental and the volumetric need to be cautious about the claims that are made on and for territorial volumes in earth, water and ice.[[35]](#footnote-35)

Materialities, Territories, and Volumes

In the last decade, political geographers and cultural anthropologists in particular have had a shared interest in reconsidering the elemental and material geographies of the earth. Informing this engagement has been a number of threads. First, a focus on the vertical and later volumetric was informed by a belief that geopolitics was inattentive to the material politics of a three-dimensional earth. Geopolitics stood accused of being a flat discourse.[[36]](#footnote-36) While this might be contestable, it is not unreasonable to say that a great deal of critical geopolitical scholarship in the 1990s and early 2000s was preoccupied with language, representation and framing as opposed to the material politics of the earth.[[37]](#footnote-37) Other academic fields such as political ecology have been comparatively neglected in favour of popular cultural fields.[[38]](#footnote-38) Feminist geopolitics provided an important counterpoint to the neglect of bodies, gender and wider intersectional politics.[[39]](#footnote-39) Second, the pioneering of work of scholars such as Phil Steinberg on the material politics of the ocean has become much more widely recognised. Published in 2001, his book *The Social Construction of the Ocean*, advanced political geographical thinking on from the occasional forays of scholars in the 1980s.[[40]](#footnote-40) Working later with co-authors such as Kim Peters, Steinberg has been instrumental in drawing attention to what he later called the ‘wet ontologies’ of oceanic-space. Steinberg and Peters remind their readers that seas and oceans provide a productive space to think about place and territory in more fluid and volumetric terms, that don’t lose sight and feel for the accompanying dynamic materiality.[[41]](#footnote-41) Third, Stuart Elden’s highly cited paper ‘Securing the volume’, drew our attention to how we might think with and through volume. Using Israel and Palestine as his case studies, the volume is shown to be porous, mobile, and capable of being subject to multiple security and surveillance projects.[[42]](#footnote-42) Finally, ice is a troubling substance for international maritime law. For example, the United Nations Law of the Sea Convention (1982) had little to say about ice bar one article (234) on ice-covered waters.[[43]](#footnote-43) Sovereignty over the world’s seas and oceans is determined by land territory and the establishment of a territorial sea starts with the identification of a baseline (the low water mark on a coastline). Ice-covered coastlines create baseline problems because they disrupt the presumption that territory is dry and uncovered. Permanent ice covers up coastline and recent work by geographers and lawyers has focussed on whether there is a need for the development of ice law in the face of either melting of ice and/or new landforms emerging as a consequence of ice disappearance.[[44]](#footnote-44)

If water and rock shaped the volumetric turn in recent years, ice and snow have followed in their wake. Ice is a richly suggestive subject-matter. It can and does shift from solid to liquid, thicker and thinner, concentrated and diffuse, still and mobile. It can be found in the atmosphere and at submarine, subterranean and surface levels. The entanglement of the surface, sub-surface and atmosphere is integral to the fate of ice. Foreign object matter on the surface of a glacier or sea ice, for example, can interfere with solidity of ice and stimulate melting. Ruptures and fissures can weaken ice, expose it to new forms of organic colonization and in the case of permafrost provoke the release of gases. Ice can melt, re-freeze, shift, slide and disappear. It is elemental bricolage.[[45]](#footnote-45)

As other scholars including Hannes Gerhardt et al demonstrate, ice is a compelling subject matter for political geographers interested in materiality and territorial volume.[[46]](#footnote-46) Using the contemporary Arctic as their case study, Gerhardt and colleagues make the important material point that climate change, and specifically warming and melting, are problematising notions of permanency and stability. The net-result being to destabilise territorial imaginaries of Arctic states such as Canada and Russia, as sea ice that might once have been considered semi-permanent is now thinning, retreating even disappearing. As Dittmer and colleagues noted, this elemental state-change proved productive for new expressions of Arctic geopolitics.[[47]](#footnote-47) What all these authors shared in common was an interest in the liminal qualities of ice, and its capacity to confuse and complicate elemental distinctions between land and sea. As a highly dynamic substance, the thickness and distribution of sea ice has in particular highlighted how both the representational politics as well as the material politics of the Arctic can and do vary as a consequence. While sea ice retreat is often credited as a driver of Arctic geopolitics, critical scholarship has tended to concentrate on how the volume, duration and extent of ice has produced a potent material politics which has melted and/or solidified social and political life. Rapid material change in the Arctic has also been credited as being a positive driver of Arctic governance and international co-operation. As Arctic states, built on a post-Cold War peace dividend, to construct a new regional governance order where sustainability and environmental protection would come to the fore.[[48]](#footnote-48) Co-operative measures owe their genesis in part to a recognition that the elemental qualities of the Arctic are such that it necessitates collaboration in areas such as search and rescue and pollution control. The Arctic Council, created in 1996, as an inter-governmental forum for such measures is often cited as indicative of this trend.[[49]](#footnote-49)

Ice’s volume deserves careful consideration, as it reveals and obscures a series of social-material terrains of and for accumulation, dispossession, risk, vulnerability and state power projection. In her memoir, Canadian Inuit activist Shelia Watt-Cloutier demanded that Inuit should have the right to be ‘cold’, as she reflected on how material change in the Arctic was intimately tied to everyday life.[[50]](#footnote-50) As the Arctic continued to warm, she argued that traditional indigenous knowledge was not only being ‘scrambled’ but also that living and working in previously ‘cold environments’ becomes less secure. Sea ice is thinner, permafrost is less firm and glacial meltwater is more voluminous. Ice’s fate reveals at worse a cruel necro-politics, which has dire implications for the sustainability of indigenous communities and the ecologies that make life possible. Cloutier’s message was not one of despair but rather a rallying-cry for an assertive ‘indigenous geopolitics’ which demanded that Arctic states such as Canada recognise their rights as indigenous peoples.[[51]](#footnote-51) What disappearing ice revealed for Cloutier was that indigenous peoples in the Canadian North needed to demand more from the settler-colonial state of Canada and be prepared to forge new relationships within and beyond the Arctic region. Ice and cold and should help to articulate social and geopolitical relations and contribute to the articulation of strategic goals for indigenous peoples. Rather than an opportunity for others to posit the repeated need for indigenous peoples to be more resilient and or adaptive to material change.[[52]](#footnote-52)

In the interrogation of icy geopolitics that follows, the three sections address further a particular facet of geopolitics and its relationship to iciness. The first considers icy relations and interactions. The second considers the importance of material state-change such as melting and thawing in the production and control of the Arctic region. And the final section considers contemporary geopolitics of the Arctic, with a focus on how the fate of melting sea ice reveals important debates about geopolitical agency, cultural significance and maritime governance. Metaphors such as melting and thawing, in this context, become vehicles to articulate on the one hand an unstable Arctic while also offering up the possibility of new geopolitical possibilities, including innovations in indigenous governance and extra-territorial party involvement.

Storied Territorial Volumes

In their exploration of ice and concrete, as staging ground for a discussion of environmental change, Simonetti and Ingold make the point that ice is inherently ambiguous.[[53]](#footnote-53) As such its ambiguity can also mean that it can be productive of geopolitical relations, identities and dynamics. As they note, “The significance that humans attach to material things seem, by contrast, to be continuously in flux as they are constructed and interpreted in currents of discourse and practice – and as such, they are malleable to circumstances”.[[54]](#footnote-54) If we describe ice as a trope, we draw attention to a significant and recurring theme, usually involving a figurative or metaphorical use of words and expressions. Ice is not the only object that has been recognised as metaphorically and materially resourceful.[[55]](#footnote-55)

In Robert Frost’s popular poem *Fire and Ice*, the poet draws inspiration from Dante’s *Inferno* and the 7th layer of icy hell. At the apparent end of the world, Frost’s poem posits an elemental division between the hate (ice) and desire (heat). In Dante’s hellish world, sinners are trapped in a lake of ice and are deprived not only of warmth and light but also any possibility of ascending to heaven. Cold and immobile, their chilly fate is the envy of very few. Modern-day viewers of *Game of Thrones* will understand well that ice is equivalent to death and that George Martin’s Northern Wall bears an uncanny similarity with Frederick Jackson Turner’s American ‘frontier’, where beyond the wall lies wilderness, savagery, and yet potential opportunity. And as Frost reminds us in his poem Birches, ice’s destructive power makes itself felt on the natural world as well. Ice storms can be unforgiving in their capacity to bend and snap the trunks and branches of trees, for example. The melting of snow and ice brings with into sharp focus new dangers of flooding and saturation.

For much of the Cold War, it was difficult to escape the sense that ice, as metaphor and trope, was all-prevalent. As metaphor, ice acts as a figure of speech that describes an object or action in a figurative rather than literal sense. So, for example, the two self-described superpowers the United States and the Soviet Union were described as being involved in a ‘Cold War’ because of an apparent absence of direct military confrontation. While some credit George Orwell for the original formulation, presidential adviser Bernard Baruch in a speech before the Senate’s Special Committee Investigating the National Defence Program noted in October 1947 that, “Although the shooting war is over, we are in the midst of a Cold War which is getting warmer”.[[56]](#footnote-56) For those who lived through it and reported on it, the ‘Cold War’ was capable of experiencing and enabling freezing, thawing, thinning and eventually disappearing. The ‘ice curtain’ that was said to exist along the frontier between Alaska and the Soviet Far East had, inevitably, melted away in the early 1990s.[[57]](#footnote-57)

We use ice and cold idiomatically to either express displeasure at someone and/or as a descriptor of personality and behaviour. In everyday speech, English-speakers might speak of giving someone ‘the cold shoulder’ or ‘freezing someone out’ from a social grouping. If an individual is said to be ‘cold’, moreover, they are said to be unresponsive, lacking in empathy and possibly sociopathic. When brought into contact with heat and fire, ice and cold can and does undergo material state-change. A political consensus can ‘melt away’, a ‘freeze’ in relations can be defrosted, and a geopolitical culture can undergo a ‘thaw’, as was said to have happened in the post-Stalin era in the Soviet Union. In Russian literary and visual culture, there is a rich iconographic tradition of representing thawing as a moment of emancipation, as the Russian winter loses its grip. Ilya Ehrenburg’s 1954 novel, *The Thaw*, was credited at the time with capturing the cultural shifts in the Khrushchev era.[[58]](#footnote-58) Thaw can and does produce slush and mud, however, which has been considered indicative of enfeeblement and sclerosis. While many will be familiar with the idea of slush funds, ‘slush’ and ‘thaw’ in the Soviet era was caught up in a double meaning of both the warmth and renewal of spring or the mud and mess of a thawing winter.[[59]](#footnote-59)

At the other end of the earth, Antarctica, the continent’s cold and relative isolation was said to have been productive of a more co-operative form of geopolitics. The territorial volume of the Antarctic acting as both a platform for collaborative geopolitics and a constraint to more aggressive forms of geopolitics. The ice was either too cold/extreme/barren for Cold War geopolitical calculations of the sort seen elsewhere and/or remote for large-scale military activities. Spurred on by the International Geophysical Year 1957-8, the 1959 Antarctic Treaty was considered to be innovative precisely because it managed to ‘freeze’ rival sovereignty claims. When scholars used the term ‘thaw’ in their analyses of Antarctic geopolitics, it was usually to warn that the delicate balance between claimant and non-claimant states was in danger of being disrupted. The absence of such ‘thawing’ was usually taken to be a positive; indicative of the status quo prevailing. Alternatively, Antarctica has been thought of as a stage for superpowers such as the US and Soviet Union to ‘thaw’ out their relationship with one another – and thus the trope ‘thawing’ used to convey the possibility of positive state-change. This trend continues today with observers noting that the US and Russia have managed a diplomatic ‘thaw’.[[60]](#footnote-60)

In British imperial discourse, ice operates as a recurrent trope. In George Orwell’s depiction of imperial Burma, ice was a subtle accomplice to intersectional encounters with race, tropical climate and European health. A shortage of ice induces white colonial stupor as the tropical heat takes its toll on European bodies. Melting ice also acted, figuratively, to signify the onset of imperial decline and the rise of anti-colonial sentiment. ‘No ice until Monday’ proves rich with possibility as if to suggest that ice might be integral to cooling the spectre of agitation and unrest in colonial Burma.[[61]](#footnote-61) In the American cultural context, however, it was not uncommon to describe the country as a ‘melting pot’ (including a 1908 play of the same name) where the identities and practices of immigrants were thought to be capable of ‘melting away’.[[62]](#footnote-62) The experience of America, however, would suggest that the ‘melting pot’ itself proved to be a resilient crucible for expressions of racism, eugenics, exclusionary nationalism and irredentism.[[63]](#footnote-63)

Far from being inert, lifeless and fixed, ice proves itself to be flexible, dynamic and contingent on prevailing geophysical, climatological and socio-cultural circumstances. As with other metaphors and tropes, their endurance is in part rooted in this intrinsic flexibility. Leslie Hepple interrogated the enduring metaphorical power of the state as organism in his discussion of South American geopolitical writings. He notes that the organic metaphor proved particularly potent in the proverbial grip of military regimes during the 1960s and 70s. The nation-state as living organism served to hyper-sensitize military regimes to any perceived external violations by neighbours, as well as encouraging violent repression of suspected dissidents all in the name of preserving the ‘health’ of the state and its security.[[64]](#footnote-64) General Pinochet travelled to Antarctica in the early 1970s in order to demonstrate that the Antarctic peninsula was integral to Chile’s national security. In 1992, however, samples of ‘Chilean Antarctic ice’ were shipped to the EXPO in Seville as a way of demonstrating Chile’s post-military transformation and environmental stewardship.[[65]](#footnote-65)

More recently, in her work on climate change, Kate Manzo has drawn attention to the enduring power of metaphor and trope in making sense of geophysical change – with the ‘greenhouse effect’ being the most notable. As Manzo noted, words like ‘climate’ have two significant meanings; one literal and the other metaphorical.[[66]](#footnote-66) As the World Meteorological Organization summarised, “Climate in a narrow sense is usually defined as the "average weather," or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. The classical period is 30 years…”.[[67]](#footnote-67) Metaphorically, however, climate is a short-hand to refer to prevailing attitudes, ideologies and practices of a group, period or place. In her interrogation of climate iconography, Manzo found that cold weather cartoons were particular prevalent and linked to affective atmospheres of fear and unpredictability. Complicating matters, geopolitical metaphors such as cold and freeze were circulating at the same time as global warming gained greater prominence in the 1980s and 1990s. In the Cold War past, as a consequence, ice might have been used visually to signify isolation, desolation and frayed geopolitical relations. By the end of the Cold War, ice has taken on different connotations such as those associated with vulnerability, incomprehension and out of control earth systems sometimes encapsulated by the idea that the earth has particular ‘tipping points.’[[68]](#footnote-68)

When it does yield its grip on humans and environments, melting (a transition from solid to liquid state due to heating) and thawing (usually involves something frozen such as ice slowly reaching a temperature beyond freezing) have functioned as powerful tropes for state-change. Poets, writers, film-makers and artists have recognised the potent symbolism of melting ice and slush as indicative of something else. The melting of ice has been taken to be indicative of change, sometimes unwelcome and sometimes devasting. Icy geopolitics is literally felt first hand by those who are vulnerable, exposed and precarious on the basis of class, gender, ethnicity and citizenship.[[69]](#footnote-69) As indigenous peoples across the Arctic have experienced, and continue to experience, their territories and homelands have been mined for resources including data, militarised in the name of national security, legalised for the purpose of operationalizing the ‘Arctic Ocean coastal states’, and working hard to ensure that land claim agreements and self-governance are respected and protected.

Melting and Thawing Volumes

In her recent reflection on ‘infared’, Nicole Starosielski notes that sovereignty has made itself felt through the ‘thermal world’, acknowledging ”thermal sovereignty is inherently volumetric”.[[70]](#footnote-70) Without referencing the Arctic and Antarctic explicitly, her short intervention usefully points to the design, experimentation, implementation of thermal strategies. It contributes further nuance to debates about the volumetric, giving due attention to the fact that height and depth can be dynamic and sudden to change depending on thermal regimes, extreme events and tectonic forces. While Stuart Elden helpfully drew attention to securitizing impulses, the territorial volume in his reading of Israel/Palestine is one where human intervention looms large in the form of tunnelling, security infrastructures and surveillance regimes.[[71]](#footnote-71) But the volume, in ice-filled worlds, has the potential to be a great deal more dynamic and subject to intense thermal spatialities and temporalities.

In the Arctic, the territorial volume is dynamic, isolated and yet settled, subject to variation in darkness and light, freezing and melting, thawing and re-thawing. Elemental distinctions between land, sea and ice are rarely straightforward, as glacial landscapes can and do conceal and obscure underlying geology. Peninsulas can turn out to be islands once ice has melted away. Ice and snow compress landscapes and once removed terrain can undergo uplift or rebound. When sea ice melts it not only disappears but can encourage further discharge from land-based ice formations – so melting can precipitate loss of other bodies of ice without the process of melting being directly culpable. Ice’s relationship to melting is not straight forward. Freshwater discharge has knock-on implications for sea ice formation as well. While nation-states looked to ice-covered mountains as ‘natural borders’, ice and snow have been more troublesome accomplices of settler colonialism and state power.

As Marco Ferrari and colleagues have highlighted, glaciated landscapes prove challenging to surveyors, past and present, seeking to establish boundary-marking points, establish geographical lines along watersheds, and proved capable of confounding map-makers of coastlines and interiors. In their ‘Moving Border’ project, they focus on Italy’s northern borders high in the European Alps and note how melting snowfields and perennial glaciers have scrambled previous markings of the watershed on official maps.[[72]](#footnote-72) As the watershed shifts so the international border follows in its wake. Recognising the scale and scope of the challenge, Italy and Switzerland introduced the legal notion of the ’moving border’, and in 2009 it was reported that the Swiss government announced that the border had moved some 150m into the national territory of Italy. The Swiss Federal Office of Topography continue to monitor relevant watersheds and glaciers in the affected area. Italy reached agreement with Switzerland and Austria to honour the idea of the ‘mobile border’. Melting glaciers inspired legal and geopolitical innovation, and in the 2009 case where Switzerland ‘gained’ territory from Italy it was noted that the government in Berne was not going to mark this ‘gain’ on new official maps of the country. Recognising in the process that territorial loss and gain is politically sensitive matter.

During the Cold War, there was no shortage of audacious plans to manipulate the thermal regimes of the Arctic territorial volume.[[73]](#footnote-73) If ‘mobile borders’ is a contemporary response to ongoing climate change and accompanying warming in the European Alps, there were plans to accelerate and manipulate melting elsewhere in the ice-covered regions of the world. Military planners were interested in cultivating the cold of the northern latitudes in what Matthew Farish describes aptly as ‘frontier engineering’.[[74]](#footnote-74) The United States flirted with the idea of nuclear engineering (Project Chariot), which was going to use the explosive heat of a nuclear bomb to re-design the permafrost coastline of Alaska. The point being, ultimately, to create a ‘natural harbour’ in and around Cape Thompson on the North Slope. The Soviet Union explored the idea of melting Arctic sea ice with an outlandish plan to build a vast dam that would cross the Bering Strait. The idea was to re-direct ocean currents and even the Gulf Stream so that warmer air and water might be brought to bear on the Arctic Ocean.[[75]](#footnote-75)

There were also more damaging aspects to this Cold War thermal geopolitics, if ice and cold was targeted for heat and warming, the prevailing cold and desolation was also used to plan for infrastructural investment on permafrost. In the 1950s, cold environments in the North American Arctic also played host to plans to re-locate indigenous peoples from northern Quebec and Pond Inlet to two location on High Arctic islands. What their experiences later revealed was the cumulative impact of the harsh environment that did not ‘thaw’. The conditions were so extreme that those small communities endured inter-generational trauma, as a shortage of food made the re-located Inuit vulnerable to sickness, depression, malnutrition and poverty. In 2010, after a legacy of enquiries and investigations, the then government led by Stephen Harper delivered an official apology. Unlike the dramatic flood-event in Peru that Mark Carey described, the lack of thaw and melt acted as a form of ‘slow violence’ (in Rob Nixon’s terms), which chipped away at the resilience of the small re-located communities.

In recent years, the trope of a ‘melting Arctic’ has been firmly established in academic, media and policy analysis. Coinciding with the planting of a Russian flag in August 2007 at the bottom of the Central Arctic Ocean, ‘2007’ was a then record for sea ice minima. Lurid headlines about a new ‘scramble for the Arctic’ coincided with fresh concerns about an Arctic that was undergoing further fundamental state-change. Melting and thawing invited and continue to invite reflection and speculation on three attributes that are thought to contribute to particular iterations of polar or Arctic geopolitics – loss; exposure; and inundation.[[76]](#footnote-76) By focusing on competing imaginaries, however, there is a danger that the scope and significance of material transformation of the Arctic is not sufficiently under-scored in our accounting of the material qualities of Arctic geopolitics.

Thawing and melting in the Arctic is provoking a gamut of changes affecting human and non-human communities across land, ocean, ice and air. These encapsulate an array of actors, substances, sites and processes. For example, melting ice in glaciers and ice sheets can and does lead to the release of toxicants previously frozen in ice bodies. It is perfectly possible that Arctic environments will be affected by chemical releases such as DDT pesticides. While Rachel Carson may have warned her readers about a ‘silent spring’, Arctic communities face the unwelcome prospect of a ‘silent melt’.[[77]](#footnote-77) Thawing permafrost in Russia has been held culpable for releasing not only methane but also diseases such as Anthrax as rotting carcasses become exposed to surface heat.[[78]](#footnote-78) In 2016 an outbreak of Anthrax caused fatalities and illness in the Yamal Peninsula. Permafrost, found in vast areas of the Russian and Canadian Arctic, is ground that remains frozen for more than two consecutive years, and is an amalgam of ice, soil, vegetation matter and sediment. Permafrost is also found offshore, within the continental shelves off the Arctic Ocean. While permafrost can remain frozen for thousands of years, it is heat-sensitive. Warming temperatures can and do cause thawing in what is termed the active layer of soil on top of the permafrost. As the active layer thaws, carbon dioxide and methane is released. Scientists working on permafrost in Canada and Russia are warning that further thawing carries with the disturbing prospect of methane release, which is 20-30 times more potent than carbon dioxide as ‘greenhouse gas’. For communities affected by permafrost thawing, the implications are grave for infrastructure such as ground becomes unstable, and vulnerable to coastal erosion and extreme episodes of flooding.

Permafrost thawing and melting glaciers is provoking instabilities within Arctic territorial volumes but also new opportunities to exploit, profiteer and discover. Geophysical instabilities can and do provoke territorialising and stabilising imperatives. In the Canadian Arctic, melting and retreating glaciers have encouraged renewed interest in the physical and human geographies of the region. Precipitating in turn a sense of urgency as the stories contained in the ice about human history, and the history of the planet are lost as glaciers take with them their precious ‘signatures’. Melting provides an opportunity to conduct further research on newly exposed ancient plants previously covered with ice. On Baffin Island, for example, it was reported that disappearing glaciers were providing opportunities for scientists to extract samples for further analysis in university laboratories across North America.[[79]](#footnote-79) Scientists were quoted as noting that it was a ‘race against time’ to extract evidence of ancient plant life before wind and rain degraded the exposed vegetation.[[80]](#footnote-80) Echoing previous colonial discourses of the ‘vanishing native’ in the Arctic, thawing and melting become opportunities for further scrutiny of vanishing landscapes and seascapes, and Arctic ecologies thought of as ripe for data extraction.

Estado Novo? Solid-Liquid Geopolitics in a Changing Arctic

In the Arctic, today, we have evidence aplenty of elemental state-change, some of which speaks well to what Kim Peters and Jennifer Tuner have described as a ‘politics of capacity’.[[81]](#footnote-81) Ice is melting, permafrost is thawing and ocean acidifying. The implications for indigenous and non-indigenous communities and actors are multi-faceted and numerous. In the recently released Canada’s Arctic Marine Atlas, it is noted that:

The dramatic loss of the Arctic’s sea ice is one of the most visible signs of how climate change is affecting the North. It threatens iconic species like Walrus and Beluga Whales that depend on ice and cold, forcing adaptations and attracting new predators to the region…At the same time, warmer temperatures are restructuring the Arctic food web at every level, from the tiny phytoplankton that nourish Cod, to the Polar Bears that eat those fish. Conservation efforts can increase the resilience of Arctic ecosystems. A healthy marine environment is essential for Indigenous peoples who rely on marine mammals and fish for food security.[[82]](#footnote-82)

In this emerging world of solid-liquids (in Simonetti and Ingold’s terms), ‘dramatic loss’ is also working hand-in-hand with opportunities for ‘gain’. Environmental state-change in the Arctic has been accompanied by an expansion in the application of law and presence of geopolitics. The Arctic acts as a space for and of geopolitics and law. The legal and political geographies of the maritime Arctic are informed by Law of the Sea framework (and specifically UNCLOS). Ice-covered coastlines and waters provide a degree of complexity to its operationalization, however. The identification of territorial seas and exclusive economic zones depend on so-called baselines. Ice-covered coastlines obscure the low water mark (which is used as the baseline for identifying a 12 nautical mile territorial sera) and thus present opportunities for Arctic coastal states to use ice formations to establish their respective baselines. Alternatively, coastal erosion and permafrost thawing can destabilise baselines and call into question whether territorial seas should contract if the baseline alters. Sea ice retreat and coastline erosion touches upon, quite literally, some foundational premises that are used to inform the nature and extent of the sovereign rights of coastal states. Specifically, UNCLOS contains Article 234 which allows coastal states to take measures to prevent and reduce the risk of marine pollution in ice-covered areas. What happens to that provision when sea ice and other forms of ice are no longer present for what is specified as ‘most of the year’. The Arctic is providing plenty of evidence for thinking through the implications of geophysical instability, as coastlines, ice-covered areas and newly exposed water bodies bring with it a set of fresh challenges and opportunities for coastal states to extend their sovereign rights and/or work more collaboratively with one another in the name of collective stewardship. The land-sea interface is anything but stable.

International lawyers and political geographers interested in ice melt have initiated a scholarly conversation around the dynamic status of sea ice in the Arctic Ocean and other polar waters. As sea ice thickness and distribution diminishes, what are the implications for the application and future development of the Law of the Sea? The territorial volume of the maritime Arctic is being nibbled away at the margins (the coastlines) and exposed to further scrutiny elsewhere (the waters and seabed) due to sea ice retreat. In the maritime Arctic, the entangled relations between ice, human and non-human worlds has arguably been foregrounded by international legal opportunities and demands for clearly-identified baselines, identification of extended continental shelves and demarcation of maritime boundaries. As Franck Billé reminds us, there is no shortage of examples of coastal states eager to re-imagine and materialise their hydro-territorial territories in order to buttress coastal outlines, while recognising that the maritime, subterranean and aerial domains are deeply intermeshed with one another.[[83]](#footnote-83) In Bille’s analysis hydro-territorial labour is designed to claim additional territory but in other parts of the world it might be something akin to protecting the integrity of the national territory itself.

New areas of the Arctic Ocean, such as the Central Arctic Ocean water column and seabed, are attracting ever more interest from coastal and non-coastal states as well as environmental campaign groups. The exposure of the waters around the CAO set in train a political and legal process designed to generate new measures regarding the possible development of commercial fisheries. In 2008, the five Arctic Ocean coastal states (A5) issued the Ilulissat Declaration that noted, by virtue of their sovereignty and sovereign rights, they were uniquely positioned to act as environmental stewards. Arctic state-change was used as an imperative to act. Resistant to the idea that the international waters of the CAO should be ‘internationalised’, the declaration was designed to show-case their willingness to act as custodians and stewards. The A5 began to meet and discuss stewardship and this led to the articulation of the 2015 Oslo Declaration on High Seas Fishing in the Central Arctic Ocean. Three years later, the A5 working with five extra-territorial parties including China and the EU signed an Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean (2018). Inuit from Canada, Greenland, the Russian region of Chukotka and Alaska represented by the Inuit Circumpolar Council were represented within the official delegations and witnessed the formal signing of the agreement.

What was notable about the 2018 Agreement was that it was intended to be anticipatory in the sense that commercial fisheries had not yet developed in the CAO. But underlying the intent of the Agreement was a spatial and elemental paradox. The Agreement’s preamble recognises the element of state-change affecting the Arctic Ocean:

Recognizing that until recently ice has generally covered the high seas portion of the central Arctic Ocean on a year-round basis, which has made fishing in those waters impossible, but that ice coverage in that area has diminished in recent years;

Acknowledging that, while the central Arctic Ocean ecosystems have been relatively unexposed to human activities, those ecosystems are changing due to climate change and other phenomena, and that the effects of these changes are not well understood.

While the changes are acknowledged to be ‘not well understood’, the spatial scope of the Agreement is identified under Article 1 as, ““the single high seas portion of the central Arctic Ocean that is surrounded by waters within which Canada, the Kingdom of Denmark in respect of Greenland, the Kingdom of Norway, the Russian Federation and the United States of America exercise fisheries jurisdiction”.[[84]](#footnote-84) The spatial scope of the Agreement uses legal parameters such as high seas jurisdiction to engineer the basis for an agreement which otherwise might not have been possible despite acknowledgement about the material change (melting sea ice) being diminished.

In other areas of the Arctic Ocean, indigenous communities are involved in new partnerships designed to consult with local communities as well as incorporate indigenous knowledge into marine management. In January 2016, ICC Canada focussed attention on the management and protection of the Pikalasorsuaq polynya. This open water area of water between Greenland and Canada is some 80,000 square kilometres in area and acknowledged to be ecologically productive of and for marine and bird life. Historically, it was also an important area for Inuit hunting and travel. A management commission led by the international commissioner Okalik Eegesiak was established to develop a shared vision of stewardship between the indigenous communities on either side of the polynya. The commission’s task is noted as:

The Pikialasorsuaq Commission has undertaken consultations with Inuit communities on both sides of Pikialasorsuaq in Nunavut and Northern Greenland to facilitate local and regional input; to incorporate indigenous knowledge; and to recommend an Inuit strategy for safeguarding, monitoring and management of the health of Pikialasorsuaq for future generations.[[85]](#footnote-85)

The Commission stands as a reminder that state-change in the Arctic brings to the fore how there are important issues to be grappled with that extend beyond the procedural and problem-solving framing of geopolitics and environmental politics. Questions of knowledge production and consultation with indigenous peoples loom large in the work of the commission and allies such as the Pew Charitable Trust and Oceans North.[[86]](#footnote-86) Public participation and consultation is integral to the work of the commission and what becomes clear is how the ‘North Water’ becomes a new frontier for marine conservation on the one hand and on the other a space for indigenous peoples to mobilise their stories about the Anthropocene.[[87]](#footnote-87) Melting sea ice and inland ice is recognised as not just being an environmental-scientific question/framing but also a material marker of the entanglement of human and non-world worlds. The Greenland ice sheet is composed of more than just ice; radioactive debris from atmospheric nuclear testing, metal pollutants, and gas traces to name but a few.[[88]](#footnote-88) Arctic geopolitics is not simply a reflection of the legal, political and military calculations and policy impulses of coastal and non-coastal states, it is a staging ground for elemental change in, on and beneath land, sea, and ice as well as in the air.

As the territorial volume undergoes elemental state-change, the capacity and scope for volume work alters some of which contributes to distinct iterations of indigenous/northern Arctic geopolitics. The most recent example has been the negotiation over the 2018 Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean. The agreement signed by the five Arctic Ocean coastal states (A5) including Canada, Greenland and Russia alongside extra-territorial parties such as China and the EU recognises that indigenous and local knowledge should be incorporated into any fisheries management of the CAO. While some observers have noted that this recognition is welcome in the sense of acknowledging the potency of indigenous ecosystem understanding, the A5 were slow to recognise such a possibility. While sea ice retreat contributes to fundamental state-change in the CAO, indigenous people and their knowledges were considered to have no role to play in the far reaches of the Arctic Ocean. The territorial volume was literally beyond the reach of indigenous peoples and their knowledge claims. For the last decade, however, Inuit have been contesting this implicit demarcation of territorial volumes, arguing in 2014 via the Kitigaaryuit Declaration that, “a precautionary approach in developing commercial fishing in the international waters of the central Arctic Ocean [be taken] and support a moratorium until fish stocks have been adequately assessed and a sustainable management regime is in place that fully engages and involves Inuit”.[[89]](#footnote-89) Despite representation on national delegations during the final stages of the negotiation of the 2018 Agreement, it is unclear as to how indigenous and local knowledge would be incorporated into decision-making processes; and whether acknowledging indigenous knowledges would lead to different kind of resource management, anticipatory or otherwise.

**Conclusion**

The polynya might actually be useful analytic for ‘icy geopolitics’ and other kinds of engagement with territorial volume and terrain. As Stuart Elden reminds his readers, terrain is highly mobile and dynamic and warns us that terrain has informed and nourished regressive forms of environmental determinism and earthly nationalisms.[[90]](#footnote-90) In the Arctic, the melting and thawing terrains are informing and nourishing a diversity of geopolitics. In places like the polynya, forever subject to opening, closure and rupture, there is evidence for different kinds of political relationships and expressions of interest. The North Water polynya (NOW), between Greenland and Canada, acts as a site for indigenous, bi-national and international co-operation. It is a volume capable of hosting a different kind of geo-politics from the one which preoccupied with American and Soviet navies, who saw polynyas as ‘safe spaces’ for their nuclear-powered submarines to surface. As Kirsten Hastrup and colleagues stress, “While constituting an oasis of open water, NOW is circumscribed by the sea ice during a substantial part of the year. Both human and other life forms in and around the polynya depend as much on the presence of the ice and the ice edge, as on the open water as such. Since the 1990s, the extent and volume of the sea ice in the Arctic have declined drastically in a possibly irreversible process”.[[91]](#footnote-91)  In the dynamic volumetric space of the polynya, human and other life co-mingle with one another, depending in part on the relationship between sea ice and open water. It also provides opportunities for indigenous communities to intervene and shape those territorial volumes of the Arctic region.

But icy geopolitics is ultimately a slippery affair. Ice is slippery. It is capable of rapid state change. But it can be slippery in other ways. Indigenous peoples have discovered in the past that settler states/coastal states can and do promise to consult and incorporate indigenous knowledge and perspectives but the mechanisms for achieving consultation and participation often are found wanting. This can be particularly striking when coastal states worry about their sovereign rights, security and stewardship roles in their maritime and ice-covered territories. Appropriating and protecting their respective territorial volumes trumping any commitment to acknowledge and facilitate indigenous engagement. Peters and Turner’s recent analytical turn towards ‘capacity’ from ‘volume’ is useful in the context of icy geopolitics, as it reminds us that agents, knowledge, regimes, and practices co-mingle in polar worlds that are being melted, thawed and transformed by metaphorical and material forces.[[92]](#footnote-92) The politics of capacity might be elemental, metaphorical, infrastructural, and some other combination therein. But as indigenous scholars such as Zoe Todd remind us, appeals to materialism and materialist ontologies carry with them also attendant dangers that settler colonialism ends up being reified further. Attending to the volumetric, the material, the thermal and the elemental does not remove the need to account for knowledge-power regimes and profoundly unequal inequalities in, on and under ice.

1. My thanks to Peter Adey, Harriet Hawkins, Ian Klinke, Chih Yuan Woon and Franck Bille for their supportive comments and conversations. The usual disclaimers apply. [↑](#footnote-ref-1)
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4. R. Squire and K. Dodds ‘Introduction to the Special Issue: Subterranean Geopolitics’ *Geopolitics* Online published 30th April 2019. [↑](#footnote-ref-4)
5. C. Langway *The History of Early Polar Ice Cores* (US Army Corp of Engineers: ERDC/CRREL TR-08-1 2008) URL available at: <http://www.iceandclimate.nbi.ku.dk/about_centre/history/Langway_2008_The_history_of_early_polar_ice_cores.pdf> [↑](#footnote-ref-5)
6. J. Herzberg, C. Kehrt, and F. Torma editors *Ice and Snow in the Cold War: Histories of Extreme Climatic Environments* (Oxford: Berghahn 2018). [↑](#footnote-ref-6)
7. A Marcus *Relocating Eden: The Image and Politics of Inuit Exile in the Canadian Arctic* (Dartmouth, NH: University of New England Press 1995). On human testing, M. Farish ‘The Lab and the Land: Overcoming the Arctic in Cold War Alaska’ *Isis* 104 (2013): 1-29. [↑](#footnote-ref-7)
8. M. Farish ‘Frontier engineering: from the globe to the body in the Cold War Arctic’ Canadian Geographer 50 (2006): 177-196. [↑](#footnote-ref-8)
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10. Work exploring this more than discursive theme includes, K. Dodds ‘Icy geopolitics’ *Environment and Planning D: Society and Space* 26 (2008): 1-8; J. Dittmer, A. Ingram, S. Moiso and K. Dodds ‘Have you heard the one about the disappearing ice? Recasting Arctic geopolitics’ *Political Geography* 30 (2011): 22-30 and D. Depledge ‘Geopower and sea ice: Encounters with the geopolitical stage. IN: Zubrow, E.B.W., Meidinger, E. and Connolly, K.D. (eds.) *The Big Thaw: Policy, Governance, and Climate Change in the Circumpolar North* (New York: Suny Press 2019). [↑](#footnote-ref-10)
11. C.J. van der Veen *Fundamentals of Glacier Dynamics* (Boca Raton: CRC Press 2013). [↑](#footnote-ref-11)
12. For example, B. Spanier *Impartial Science: Gender ideology in molecular biology* (Bloomington: Indiana University Press 1995). [↑](#footnote-ref-12)
13. N. Wegge and K. Keil ‘Between classical and critical geopolitics in a changing Arctic’ *Polar Geography* 41 (2018): 87-106. [↑](#footnote-ref-13)
14. P. Seed *Ceremonies of Possession* (Cambridge: Cambridge University Press 1994). On the Arctic example, K. Dodds and M. Nuttall, *The Scramble for the Poles* (Cambridge: Polity 2016). [↑](#footnote-ref-14)
15. The idea of the ice being a ‘veil’ that is then lifted by human exploration and activity has found favour in writings on Antarctica. Richard Byrd spoke about ‘Lifting the veil from the Antarctic’ in the *New York Times* on 18th March 1928. At the heart of the front page of the newspaper there is a map with an incomplete outline of the continent of Antarctica. The ‘veiling’ metaphor was particularly prominent in 19th and early 20th century writings on the polar regions. On the Arctic and North Pole, M. Bravo *North Pole* p. 170. What would be interesting is to think about how this ‘veiling’ metaphor endures and how it mutates from a ‘veil of ignorance’ to a ‘veil of resource frustration’. [↑](#footnote-ref-15)
16. S. Millar and D. Mitchell ‘The Tight Dialectic: The Anthropocene and the Capitalist Production of Nature**’** *Antipode*49 (2017): 75-93. [↑](#footnote-ref-16)
17. Arctic Council, *Arctic Climate Impact Assessment* (Cambridge: Cambridge University Press 2005). [↑](#footnote-ref-17)
18. J. Bruun and I. Medby ‘Theorising the thaw: geopolitics in a changing Arctic’ *Geography Compass* 8 (2014): 919-929. Quotes from pages 922 and 923 (italics in original). [↑](#footnote-ref-18)
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22. Ice metrics is something that interests me. David Beer’s book, *Metric Power* (London: Palgrave 2016) seems relevant here. [↑](#footnote-ref-22)
23. National Snow and Ice Data Center (NSIDC) URL available here: <https://nsidc.org/news/newsroom/arctic-sea-ice-2018-minimum-extent> [↑](#footnote-ref-23)
24. The literature includes M. Benwell ‘Going Underground: Banal Nationalism and Subterranean Elements in Argentina’s Falklands/Malvinas Claim’ *Geopolitics* online published 10th November 2017 and M. Nuttall *Under the Great Ice: Climate, Society and Subsurface Politics in Greenland* (London: Routledge 2017). See the forthcoming special issue in *Geopolitics* on ‘subterranean geopolitics’. [↑](#footnote-ref-24)
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26. An important collection of essays exploring the volumetric qualities of territories is F. Bille editor *Volumetric States* (Duke: Duke University Press 2019). [↑](#footnote-ref-26)
27. K. Peters, P. Steinberg and E. Stratford editors *Territory Beyond Terra* (London: Rowman and Littlefield 2018). [↑](#footnote-ref-27)
28. P. Steinberg and B. Kristoffersen ‘‘The ice edge is lost … nature moved it’: mapping ice as state practice in the Canadian and Norwegian North’ *Transactions of the Institute of British Geographers* 42 (2017): 625-641. [↑](#footnote-ref-28)
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30. Important edited collections on melting glaciers in particular include B.Orlove, E. Wiegandt and B. Luckman editors *Darkening Peaks: Glacier Retreat, Science, and Society* (Berkeley: University of California Press 2008) and S. Strauss and B. Orlove editors *Weather, Climate, and Culture* (Oxford: Berg 2003). [↑](#footnote-ref-30)
31. M. Carey *In the Shadow of Melting Glaciers: Climate Change and Andean Society* (Oxford: Oxford University Press 2010). [↑](#footnote-ref-31)
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34. A. Fienup-Riordan and A Rearden *Ellavut/Our Yup'ik World and Weather: Continuity and Change on the Bering Sea Coast* (Seattle: University of Washington Press 2012). [↑](#footnote-ref-34)
35. Z. Todd ‘Fish pluralities: Human-animal relations and sites of engagement in Paulatuuq, Arctic Canada’ *Études Inuit Studies* 38 (2014): 217-234. [↑](#footnote-ref-35)
36. E. Weizman *Hollow Land* (London: Verso 2007). [↑](#footnote-ref-36)
37. S. Dalby and G Toal editors *Rethinking Geopolitics* (London: Routledge 1998). [↑](#footnote-ref-37)
38. P. Bigger and B. Neimark ‘Weaponizing nature: The geopolitical ecology of the US Navy’s biofuel program’ *Political Geography* 60 (2017): 13-22. [↑](#footnote-ref-38)
39. J Hyndman ‘Towards a feminist geopolitics’ *Canadian Geographer* 45 (2001): 210-222. [↑](#footnote-ref-39)
40. P. Steinberg *The Social Construction of the Ocean* (Cambridge: Cambridge University Press 2001). [↑](#footnote-ref-40)
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42. S. Elden ‘Secure the volume: vertical geopolitics and the depth of power’ *Political Geography* 34 (2013): 35-51. [↑](#footnote-ref-42)
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44. M. Byers *International Law and the Arctic* (Cambridge: Cambridge University Press 2014). [↑](#footnote-ref-44)
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53. C. Simonetti and T. Ingold ‘Ice and concrete: solid fluids of environmental change’ *Journal of Contemporary Archaeology* 5 (2018): 19-31. [↑](#footnote-ref-53)
54. Op cit. page 20. [↑](#footnote-ref-54)
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