 Polar Record 52 (267): 660–671 (2016). © *Cambridge University Press 2016.* *doi:10.1017/S0032247416000218*

Securing sustainability: the case for critical environmental security in the Arctic

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Received January 2016; first published online 20 April 2016

ABSTRACT. The politics, economies, and ecology of the Arctic region are experiencing fundamental transformation driven largely by human-caused environmental change. Drawing on the work of Robert Cox, this article presents a critical account of environmental security that allows security issues in the Arctic to be reconceptualised. It outlines the environmental changes transforming the Arctic, and theorises the Arctic as a regional environmental security complex in which conditions of security for state and non-state referent objects are predicated on a particular ecological context. It then surveys state- and human security issues in the Arctic, and argues that environmental change has destabilised the ecological base on which the contemporary Arctic as a cooperative region supportive of human activity has been built. The article concludes by outlining alternative ways of conceiving of Arctic security that are more compatible with maintaining the region's ecological base, and suggests that dominant approaches to Arctic security are pathological because they remain premised on the control, extraction and consumption of hydrocarbon resources. It argues that, in the context of the geological Anthropocene, security cannot be sustainable if it fails to address the relationship between human wellbeing and human-caused environmental change, or informs practices that further contribute to environmental change.

Introduction

The human-caused transformation of the Arctic ecosystem is having widespread socio-political impacts across the region. One oft-discussed question is how security should be understood within the changing circumpolar region. Security is a contested social construct, but has not typically been positively associated with 'sustainability,' usually the core concept when addressing challenges arising from Arctic transformations. To the contrary, in its dominant form security has been criticised for being inherently unsustainable while the militarised defence of national security is destructive of the natural environment. At the same time national security practices are often mobilised in defence of a Western way of life that is both ecologically unsustainable and the primary driver of the current global ecological crisis. Given the rapid environmental changes occurring in the Arctic, reassessment of foreign and security policies by circumpolar states, and renewed regional interest from a range of actors including non-Arctic states, international institutions, and multinational corporations, a key question is: what is a sustainable conception of security in the Arctic?

This article argues that to be sustainable, Arctic security must be based on a critical understanding of human-caused environmental change. First, drawing on the work of Robert Cox (1981), it presents a critical account of environmental security that allows for a reconceptualisation of security issues in the Arctic. Second, it outlines current changes to the Arctic environment, emphasising that the scope and speed of ecological transformation is exceeding human capacities to adapt. Third, the article theorises the circumpolar Arctic as a regional environmental security complex in which conditions of security, variously defined, are predicated on a particular ecological context. It surveys state- and human security issues in the Arctic, and argues that environmental change has destabilised the ecological base on which the contemporary Arctic as a cooperative region supportive of human activity has been built. The article concludes by arguing that, in the context of the geological Anthropocene, no conception of security can be sustainable that fails to address the relationship between human wellbeing and human-caused environmental change. It finds that dominant approaches to Arctic security are pathological because they remain premised on the control, extraction and consumption of hydrocarbon resources. To be sustainable, security must be assessed against its role in contributing to or mitigating environmental change as it manifests in the Arctic and around the world.

Theoretical background: making environmental security critical

The term 'environmental security' has been commonly used since the 1970s, though initial research shied away from interrogating the source of environmental problems in favour of examining the costs and consequences of environmental damage. Gradually, transnational issues such as nuclear irradiation, chemical use in industry, agriculture, and warfare, resource scarcity and human-caused environmental changes influenced alternative conceptions of security mobilised in opposition to Cold War discourses of superpower conflict (Buzan and Hansen 2009: 128). But even after the environment emerged as a legitimate sector of security analysis, many scholars employed state-centric conceptions of environmental security that precluded threats to non-state referent objects and obscured the role of states, corporations, and individuals in constituting environmental hazards (Barnett

https://doi.org/10.1017/S0032247416000218 Published online by Cambridge University Press

2001; Greaves 2014). Environmentally induced violence remained the focus of most environmental security scholarship (Homer-Dixon 1991; 1994), limiting its analytical and normative potential. In this way, conventional accounts of environmental security disciplined the radicalism inherent in incorporating the environment into security analysis.

This de-radicalisation of environmental security resembles the generalised disciplining of environmentalism within global politics. In his comprehensive account of Green political theory, Andrew Dobson (2007) differentiates 'environmentalism' from 'ecologism' as distinct dispositions towards the human-nature relationship. Whereas environmentalism connotes 'a managerial approach to the environment within the context of present political and economic practices' (Dobson 2007: 26), 'ecologism holds that a sustainable and fulfilling existence presupposes radical changes in our relationship with the non-human natural world, and in our mode of social and political life' (ibid.: 3). Environmentalism, so defined, dominates current discourses of global environmental problems, advocating 'greener' modes of production and consumption without questioning the underlying ecological sustainability of such practices. Indeed, mainstream environmental policies generally favour 'technological fixes' precisely because these do not disrupt the technologies, systems, or behaviours that cause environmental problems in the first place (Greaves 2013). By contrast, ecologism begins from the premise that humanity is embedded within natural systems, and what must be sustained is the viability of Earth as a 'safe operating space for humanity' (Rockström and others 2009). Thus, ecologism views a globalised 'hydrocarbon society' (Yergin 2003) based on the extraction and consumption of non-renewable fossil fuels as incompatible with ecological sustainability.

Environmentalism and ecologism demonstrate the distinction between 'problem-solving' and 'critical' forms of social theory. According to Robert Cox (1981: 128), problem-solving theory 'takes the world as it finds it, with the prevailing social and power relationships and the institutions into which they are organised, as the given framework for action.' Such theories are commonplace and often useful: they can resolve discrete problems such that the social, political, and economic structures within which they occur remain intact. Problem-solving theories are unproblematic so long as benefits generated by existing structures outweigh their negative impacts. By contrast, critical theory rejects the limitation of problem-solving theories to existing configurations of material and ideational power. To Cox (1981: 129), critical theory

> is critical in the sense that it stands apart from the prevailing order of the world and asks how that order came about. Critical theory, unlike problem-solving theory, does not take institutions and social and power relations for granted but calls them into question by concerning itself with their origins and how and whether they might be in the process of changing. It is directed towards an appraisal of the very framework for action, or problematic, which problem-solving theory accepts as its parameters.

Environmentalism reflects a problem-solving approach to humanity's impacts on the rest of the natural world. Mainstream environmental politics is non-radical in that it attempts to 'green' current economic and social systems responsible for generating global environmental problems: '[i]ts dominant guise [is] an environmentalism that seeks a cleaner service economy sustained by cleaner technology and producing cleaner conspicuous consumption' (Dobson 2007: 5–7). By contrast, ecologism seeks to realign relations between humanity and the complex ecological network in which it exists, upon which it subsists, and which it is disrupting. Ecologism thus reflects the application of critical theory to the structures and practices of human civilisation that are undermining the ecological basis for our continued survival and prosperity.

Following Cox and Dobson, *critical* environmental security can be deduced by applying critical theory to the area of security and the environment. For instance, Jon Barnett (2001:12) distinguishes environmental security 'as the threats to national security that arise from environmental degradation' from ecological security 'as the human impacts on the security of the environment itself.' Whereas environmental security is a problem-solving approach that seeks to mitigate environmental threats to states and their interests, ecological security prioritises the maintenance of a stable natural environment conducive to human flourishing. Under the former, environmental factors catalysing inter-group conflict or the environment itself are perceived as threatening state or human security. In the latter, the environment is a series of systems and sub-systems upon which human life depends, and whose functioning consistent with human survival is being undermined by humanity's own ongoing activities. Since the terminology used to describe eco-centric approaches to security and the environment vary across scholars and disciplines, this paper characterises such approaches as *critical* understandings of environmental security.

Three features characterise critical environmental security: it rejects the *a priori* link between security and violence, recognises human and non-human objects of security analysis above and below sovereign states, and acknowledges how security is mediated by environmental factors originating within, as well as beyond, national boundaries. Indeed, if threats to the global biosphere derive from the normal functioning of the capitalist global economy (Dalby 2009; Foster and others 2010), then the sources of environmental insecurity emanate from the very structures that govern most human activity. Global industrialised capitalism, with its reliance on carbon fuel, and the neoliberal economic order, which privatises wealth while collectivising environmental costs, are thus central to critical environmental security: '[i]t is the broader social and ecological degradation wrought by modernity which is the overriding context for any

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discussion of security' (Barnett 2001: 65). Critical environmental security thus recognises that the very ways in which humanity has organised its civilisation are what is causing the global ecological crisis causing insecurity for people across the world.

The changing (Arctic) environment

Earth's climate is changing as greenhouse gas (GHG) emissions primarily from burning fossil fuels, deforestation, and other land use changes concentrate in the atmosphere, causing retention of solar energy and thus warming of the planet's surface. The United Nations Intergovernmental Panel on Climate Change (IPCC) indicates average global temperature has warmed by nearly 1° C since 1880, and is predicted to warm by another 2–3° C before the end of this century (IPCC 2013: 5, 20). While impacts vary by region, global warming is causing species extinction, biodiversity loss, desertification, rising sea levels, coastal flooding, declining crop yields, reduced freshwater, increased frequency and severity of extreme weather events, and displacement of vulnerable people, particularly in the Global South (IPCC 2013; World Bank 2013). Total estimated costs of climate change vary from 1–3.3% of global GDP depending on a range of factors and assumptions, while mitigating climate change is estimated to reduce these costs by 1% of global GDP per year (IPCC 2013; OECD 2015). GHGs already in the atmosphere will drive climate change throughout this century, and 'continued emissions of greenhouse gases will cause further warming and changes in all components of the climate system' unless mitigation occurs (IPCC 2013: 19).

Sufficient mitigation is, however, unlikely. The World Bank estimates 'recent emissions and future emission trends imply higher 21st century emissions levels than previously projected. As a consequence, the likelihood of 4˚C warming being reached or exceeded this century has increased [. . .]. In the absence of further mitigation action there is a 40 per cent chance of warming exceeding 4˚C by 2100 and a 10 per cent chance of it exceeding 5˚C in the same period' (World Bank 2013: xv). Combined annual rates of natural and human-caused emissions exceed any period in the last 22,000 years, and atmospheric GHG concentrations are higher than any point in the past 800,000 years, with the planet on track to exceed the worst-case scenarios modelled by the IPCC (IPCC 2013: 11). These conditions are well outside the range in which human civilisation has developed, and will result in a radically different global climate from that in which current social, demographic, and geographic configurations emerged. Moreover, recent data suggest climate models are conservative in their estimates, and acute environmental changes are occurring faster than predicted (Derksen and Brown 2012; Scherer 2012). Increasing global temperature has raised concern over the prospect of 'tipping points' that might catalyse rapid, uncontrollable threshold effects with catastrophic consequences for ecological integrity and resilience around the globe (Lenton and others 2008; Lenton 2012). In particular, scientists worry positive feedbacks generated by climate change may exacerbate global warming, including, *inter alia*, release of methane from thawing Arctic and sub-Arctic permafrost, reduced reflectivity of solar radiation (albedo) due to diminished polar ice, or the collapse of the Greenland or Antarctic ice-sheets (IPCC 2013: 16).

The concentration of these feedbacks in the polar regions is not coincidental. As the most sensitive areas to climate variation on the globe, the poles are the proverbial canaries in the coal mine experiencing the fastest and most dramatic climate change on the planet. But whereas Antarctica has a less varied climate and no permanent inhabitants, warming temperatures are reshaping Arctic ecologies and societies in profound ways. Numerous studies, notably the *Arctic climate impact assessment* (ACIA 2004) and the IPCC's *Fourth* and *fifth assessment reports* (IPCC 2007; 2013), document the changes occurring in the Arctic. Sea ice declined by 9–13% per decade between 1979–2012 (IPCC 2013: 9), reaching an historic low nearly 50% below the average 1979–2000 extent in the summer of 2012 (NSIDC 2012). Warming is occurring faster than predicted, and some expect the Arctic to be free of summer sea ice in as few as 30 years, decades before it was predicted (Wang and Overland 2009). Climate records continue to be broken, and dramatic changes include more extreme seasonal variation, reduced sea ice, receding glaciers, diminished snow cover, thawing permafrost, changing terrestrial water systems, invasive species, temperatures increasing at twice the global average, and other stressors on plant and animal populations (ACIA 2004; IPCC 2007, 2013; Larsen and others 2014). According to the *Arctic climate impact assessment*: '[t]he sum of these factors threatens to overwhelm the adaptive capacity of some Arctic populations and ecosystems. The increasingly rapid rate of recent climate change poses new challenges to the resilience of Arctic life' (ACIA 2004: 5). This view is confirmed by the IPCC's *Fifth Assessment Report*, which notes: '[t]he rapid rate at which climate is changing in the polar regions will impact natural and social systems and may exceed the rate at which some of their components can successfully adapt' (Larsen and others 2014: 1570).

Moreover, climate change represents just one aspect of the ecological crisis facing Earth and its inhabitants. Johan Rockström and numerous colleagues (2009) identify climate change, biodiversity loss, and human interference in the nitrogen cycle as three global ecological boundaries (out of seven) whose safe thresholds have already been exceeded due to human activity. Two others, ocean acidification and interference in the phosphorus cycle, are nearing their limits. The compound effects of an industrialised human civilisation of more than seven billion people are straining Earth's carrying capacity and its ability to provide a 'safe operating space for humanity' as the title of Rockström's and others article in *Nature* suggests (Rockström and others 2009). The

https://doi.org/10.1017/S0032247416000218 Published online by Cambridge University Press

post-industrial impacts of humans on the biosphere have caused the emergence of a new geological era: the Anthropocene (Crutzen 2002: 23). Characterised by humanity's capacity to affect changes in natural systems on a planetary scale, the Anthropocene signifies a radical shift in human beings' relationship with the global biosphere. Given its profound implications for human wellbeing and survival in the Arctic and beyond, it has also spurred calls to reassess the meaning of 'security' in a rapidly and radically changing global context (Barnett 2001; Dalby 2002, 2009; Floyd and Matthew 2013; Hoogensen Gjørv and others 2014).

Changing Arctic environmental security

Environmental changes are redefining an Arctic that has typically been understood on the basis of its unique ecological features, such as high latitude, extreme winter temperatures, specific biota, and encirclement of the largely frozen Arctic Ocean (ACIA 2004: 4; Young and Einarsson 2004: 17, 18). Climate change is altering the ecology that has underpinned all human activities in the Arctic, including its constitution as a distinct regional security complex (RSC). Buzan and Wæver (2003) identify regions as the most relevant level of security analysis because the degree of interaction between international actors is generally determined by geographic proximity. Regional security complexes are thus the level at which most actors' security is determined, with RSCs defined as 'a group of states or other entities [that] must possess a degree of security interdependence sufficient both to establish them as a linked set and to differentiate them from surrounding security regions' (Buzan and Wæver 2003: 47, 48). The Arctic has historically not formed its own RSC but, particularly during the Cold War, been either an 'unstructured security region' or 'insulator' between the North American, European, and Soviet/post-Soviet RSCs (Buzan and Wæver 2003: 41, 62). So long as Arctic relations reflected broader Cold War dynamics, it could not comprise a regional security complex of its own. The de-securitisation and relative normalisation of superpower relations in the 1990s was thus a prerequisite for the emergence of a distinct Arctic RSC (Åtland 2008).

The Arctic RSC is partly defined by growing interdependence among circumpolar states and establishment of more robust regional institutions and mechanisms for interstate cooperation (Keskitalo 2004; Young 2009). However, it is also based on the ecological holism and environmental interdependence that characterises the region. The environment is key to understanding security in the Arctic because, as Heather Exner-Pirot (2013: 121) notes, 'the Arctic is exceptional in that the environmental sector dominates circumpolar relations.' Climate conditions have structured conditions of security in the circumpolar region. While Arctic environments provided a series of unique natural systems that supported human subsistence, the inaccessible terrain, vast distances, cold weather and sea ice also helped deter military aggression and prevent inter-state conflict, such as allaying concerns of a Soviet ground invasion of Canada during the Cold War (Coates and others 2008: 55). As recently as 2009, Canada's senior uniformed military officer stated: '[i]f someone were to invade the Canadian Arctic, my first task would be to rescue them' (quoted in Keupp 2016). Moreover, concerns over the Arctic environment helped catalyse cooperation between the Soviet Union and its Arctic neighbours, making efforts to protect the common Arctic environment a contributing factor in improving East-West relations that helped end the Cold War (Keskitalo 2004; Åtland 2008).

Many analysts have examined environmental hazards such as climate change, transboundary pollution, ecological degradation, and resource depletion as issues of Arctic security (Dhanapala and others 2008; Yalowitz and others 2008; The Aspen Institute 2011; Kraska 2011; Hoogensen Gjørv and others 2014). The changing environment is also driving state efforts to reassess their Arctic security interests. Since 2006, all eight Arctic states have released new regional foreign and security policies responding to the changing climate (Heininen 2012). These policies clearly perceive Arctic challenges and opportunities through the prism of environmental change, particularly the opening of the Arctic Ocean to maritime traffic, resource extraction, non-state actors, and potential state rivals. Ecological factors thus mediate the emergence and severity of security issues, including those in the military and political sectors. Since many scholars define the Arctic principally in terms of its environment (ACIA 2004, 4; Young and Einarsson 2004: 17, 18), and environmental issues have been and remain central to circumpolar politics, some argue it should be viewed as a regional *environmental* security complex (Exner-Pirot 2013; Chater and Greaves 2014).

In their original formulation of RSCs, Buzan and Wæver emphasise the importance of unit proximity and interdependence in determining conditions of (in)security. They note that regions refer 'to the level where states or other units link together sufficiently closely that their securities cannot be considered separate from each other. The regional level is where the extremes of national and global security interplay, and where most of the action occurs' (Buzan and Wæver 2003: 43). Building on this, I argue here that proximity to and dependence on the environment makes it the most important variable for security in the Arctic. The Arctic is a regional environmental security complex due to the importance of ecological factors in constituting the context for human behaviour in an otherwise inhospitable climate. While some scholars note that climate change will render the circumpolar region a more welcoming place for human activities in the future (Smith 2011), the near-term effect is disruption of existing patterns and practices of human life. Consequently, as rapid and unpredictable climate change destabilises the environment, it alters existing conditions of security for state and non-state referent

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objects across the region, and the practices through which security must be pursued. The remainder of this section surveys current security issues facing circumpolar states and their inhabitants, and these threats' connections to environmental change.

State security issues

Environmental change has assumed an increasingly prominent place on the international security agenda. The United Nations has identified climate change as a security issue at least since 1994, and it has been discussed as such by the General Assembly and the Security Council (Detraz and Betsill 2009). At least 17 states have constructed climate change as some form of security threat, and specific climate security related policies have been released by Australia, France, the United Kingdom, and the European Union (Brzoska 2012: 168). In the Arctic, state security has been affected by the changing environment in at least three ways: it has catalysed regional cooperation, improving regional security. It has furthermore made the Arctic more accessible to state and commercial actors, raising the stakes for outstanding boundary disputes and resource development, and it has contributed to the emergence of various unconventional security issues. The Arctic has become a heavily securitised space as maintaining territorial integrity and securing natural resources for extraction, particularly hydrocarbons, have been constructed by circumpolar states as closely tied to their national security interests.

Though climate change is generating new security challenges, cooperation on environmental issues catalysed a major improvement in Arctic security towards the end of the Cold War, as the impending collapse of the Soviet Union opened space to normalise inter-state relations. Soviet leader Mikhail Gorbachev's seminal Murmansk speech in October 1987 called for the Arctic to become a 'zone of peace' characterized by a nuclear weapons-free zone in Northern Europe, negotiations on restricting military activity and scaling down conventional armaments in the region, and implementation of confidence-building measures (Åtland 2008: 294). Environmental issues were the locus of these efforts as Soviet/Russian officials engaged with their Western counterparts on a range of initiatives, resulting in greater scientific and environmental cooperation and establishment of the Barents Euro-Arctic Region, the Arctic Environmental Protection Strategy, and eventually the Arctic Council (Keskitalo 2004). The Murmansk speech set in motion a new institutional structure for the post-Cold War Arctic in which states and indigenous peoples are permanently represented, and all participants routinely iterate their commitment to a peaceful, cooperative, and rule-governed regional order. From the perspective of conventional inter-state security, the Arctic of the 1990s and early 2000s was far more secure than it had been during the preceding decades when it was a buffer zone between competing superpowers and a potential site of nuclear conflict.

However, in recent years the Arctic has undergone a moderate remilitarisation and relative increase in inter-state tension. Arctic states have increased military spending and activities, and some have employed bellicose rhetoric while asserting their regional interests (Huebert and others 2012). While the United States maintained its post-Cold War Arctic military presence, militarised rhetoric and activities have increased in Canada (Huebert 2010; Lackenbauer 2010; Bergh 2012), Norway (Åtland and Pedersen 2008; Jensen and Rottem 2010), and Russia (Antrim 2010; Zysk 2010; Åtland 2011). Circumpolar states have reinvested in Arctic military capabilities and infrastructure and have undertaken sovereignty assertion patrols and more frequent military exercises. Renewed activities such as long range bomber patrols and 'buzzing' neighbours' airspace have caused reactions and over-reactions to each other's military activities. Claims of non-Arctic states like China and South Korea to a legitimate role in the region, despite the latters' investments in Arctic research and ice-breaking capabilities, were initially dismissed (Huebert and others 2012). Growth in civilian activity, primarily related to tourism and destinational shipping, also requires military assets be stationed regionally to provide search and rescue capabilities in case of accidents. While some military activities have been cooperative, such as joint exercises between multiple Arctic states and several meetings of all Arctic military chiefs, it is unclear how regional relations will be affected by new tensions related to non-Arctic phenomena, such as Russia's annexation of Crimea and support for armed separatist groups in eastern Ukraine, and subsequent Western sanctions. But pan-Arctic cooperation continues, and though some scholars have expressed concern over the prospect of regional conflict (Huebert 2010), others reject the likelihood of armed violence in the region (Young 2009; Keil 2014).

This increased militarism has been catalysed by environmental change, particularly the increasing navigability and accessibility of historically ice-covered waters. When the Arctic Ocean was frozen for most of the year, states had little incentive to quarrel over regional disagreements. Disputed Arctic boundaries had little effect on core national interests, and states were unwilling to risk destabilising the global strategic balance or their diplomatic relations over trivial Arctic issues. Crucially, the inaccessibility of many Arctic resources made them geopolitically insignificant. As sea ice has receded, however, states have paid greater attention to the delimitation of their Arctic maritime boundaries and expressed interest in settling outstanding disputes. This has coincided with the need to submit claims to their extended continental shelves within ten years of ratifying the UN Convention on the Law of the Sea (UNCLOS) (Riddell-Dixon 2008; Dodds 2010). While Norway and Russia negotiated their boundary in the Barents Sea in 2010, maritime boundary disputes remain between Canada and Greenland (Denmark) and Canada and the United States, and there is geographic overlap between the Canadian, Danish, and

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Russian continental shelf submissions under UNCLOS. Although generally expected to be resolved through negotiation, cooperation in determining their extended continental shelves might be one area strained by the recent deterioration in Western-Russian relations, and, given the lengthy and non-binding nature of adjudicating claims by the Commission on the Limits of the Continental Shelf, their outcome is uncertain.

In addition to the symbolic value and national attachment to certain Arctic geographies, notably the North Pole (Mazo 2014), what lies behind states' interest in asserting and expanding their Arctic sovereignty is pursuit of future economic benefits from Arctic resources. At stake are shipping lanes, fisheries, and hydrocarbons, the latter estimated to be 90 billion barrels of oil (13% of undiscovered global resources) and 46 trillion cubic metres of natural gas (30% of undiscovered global resources) (Gautier and others 2009). Major conflicts are unlikely given that doubt remains over the viability of developing these resources, and because the majority are believed to lie in undisputed sovereign territory (Keil 2014). But the connection between sovereignty assertion and energy resources is clear: '[i]ssues of Arctic energy and development and Arctic sovereignty are linked [. . .]. When no one was talking about actually developing Arctic resources, the many sovereignty issues could be and were ignored' (Beauchamp and Huebert 2008: 342). In practice, many continue to be ignored, though the stakes involved in the symbolic politics of Arctic territory have grown as resource extraction has become a growing possibility. Though all Arctic states continue to emphasise the absence of conventional military threats in the region and reaffirm their commitments to peaceful resolution of Arctic disputes, many have also securitised Arctic energy, with Canada, Norway, and Russia constructing Arctic resources as central to their national economic security interests (Beauchamp and Huebert 2008; Jensen and Skedsmo 2010; Jensen 2012). Thus, while there is little evidence the warming environment will directly result in interstate violence, the opening of the Arctic has led to a renewed emphasis on military activity, and the prospect of resource wealth has raised the stakes for states asserting and defending their Arctic sovereignty claims.

Finally, environmental change has led to the emergence of unconventional security issues. Prospective risks such as illegal shipping, smuggling, irregular migration, even terrorism, in increasingly accessible Arctic waters have attracted high-level concern and informed training scenarios for some armed forces (Byers 2009: 16–18; Fitzpatrick 2012), though they have yet to actually materialise. Many unconventional security issues are also directly or indirectly related to the extraction of Arctic resources. New security governance practices are being established to respond to threats related to the growing volume of maritime traffic, such as new agreements on regional search and rescue and oil spill emergency response (Chater and Greaves 2014). In this respect, the changing environment causes new threats, such as increased risk of damage to vessels and oil rigs from sea ice and unpredictable weather, and new objects of security, including the Arctic ecosystem itself. Indeed, significant popular concern has emerged over the possibility of a major oil spill, shipwreck, or extraction related accident occurring in the Arctic region, with some communities employing legal or advocacy tactics to prevent resource projects from taking place (Fondahl and Sirina 2006; Wingrove 2010; Kristoffersen and Dale 2014).

However, when confronted with protests or activism related to climate change and the extraction of Arctic resources, circumpolar states have often characterised such activities as illegitimate, criminal, terrorist, or threatening to their national interests. For example, in recent years, Canada has vilified, surveilled, and criminalised activism opposed to its climate policies and support for the carbon intensive bitumen sands in Alberta (Le Billion and Carter 2012; Greaves 2013). Canada's *Counter-Terrorism Strategy* identifies environmentalists alongside animal rights, anti-capitalist, and white supremacist groups as the most likely perpetrators of 'domestic issue-based extremism', likening their violent potential to the 1995 Oklahoma City bombing and the extremist attacks in Oslo in 2011 (Public Safety Canada 2012). Indigenous groups, including the *Idle No More* movement, were also monitored by Canadian law enforcement for their anti-extractive activism and organising activities (Dafnos 2015). Meanwhile, in 2012 Russia temporarily suspended the indigenous organisation *Russian Association of Indigenous Peoples of the North* (RAIPON), a Permanent Participant at the Arctic Council, when the latter joined a call for a ban on oil extraction in areas of traditional land use on Russia's continental shelf. The following year, federal officers seized a *Greenpeace* vessel in apparent contravention of UNCLOS following an attempt by *Greenpeace* activists to board a Gazprom oil rig in the Barents Sea (ITLOS 2013). The Russian government subsequently enacted legislation authorising oil companies to protect their assets using armed private security, citing the need for hydrocarbon infrastructure in the Arctic to 'carefully be protected against terrorists and other potential threats' (Staalesen 2014). While the environment has long mediated understandings of security threats in the Arctic, both the activities enabled by environmental change and political opposition to them have been constructed as security issues by Arctic states. These issues highlight the relationship between environmental change in the Arctic and conventional and unconventional security threats related to national defence, sovereign territoriality, natural resource extraction, and domestic political opposition.

Human security issues

A growing literature also examines issues affecting the survival and wellbeing of human communities instead of the sovereign state, namely human security issues (UNDP 1994). The human security impacts of climate change have generated numerous studies employing various theoretical frameworks, levels of analysis, and

https://doi.org/10.1017/S0032247416000218 Published online by Cambridge University Press

regional focuses (for example Leichenko and O'Brien 2008; Matthew and others 2010; Floyd and Matthew 2013; Hoogensen Gjørv and others 2014). While current impacts and future predictions vary across geographic and social contexts, we have known for decades that 'humanity is conducting an unintended, uncontrolled, globally pervasive experiment whose ultimate consequences could be second only to a global nuclear war' (Government of Canada 1988: 292). Environmental change exacerbates existing human security hazards such as poverty, overpopulation, pollution, resource depletion, and vulnerability to extreme weather events, and generates new threats where there were previously none.

In the Arctic, human security issues are those with significant impacts on human wellbeing, and which *in extremis* undermine prospects for human survival. Researchers have identified up to 11 direct and indirect climate related impacts on Arctic human health, including increased rates of accidents and fatalities due to unpredictable ice and weather patterns, new vectors for communicable disease, changes to food- and waterborne pathogens, increased exposure to environmental contaminants, and ozone depletion causing increased exposure to ultraviolet radiation (Hild and Stordahl 2004; Séguin 2008). Health concerns have also grown as the quality and availability of 'country foods' has declined, particularly large mammals, fish stocks, and plant life (Hild and Stordahl 2004; Meakin and Kurvits 2009). Store-bought food is more expensive and less nourishing than country foods, so many people are exposed to greater food and health insecurity as communities shift towards wage-based economies and it becomes more difficult to provide food using land-based subsistence methods: '[t]hese changes have led to increased rates of modern diseases such as obesity, diabetes and cardiovascular diseases [. . .] Those who rely mainly on market foods become increasingly dependent on cheaper, unhealthy choices' (Rautio and others 2015: 313–314). Climate change also worsens existing transboundary pollution such as mercury and persistent organic pollutants (POPs), which increase rates of cancer and cause neurological damage in children, and are aggravated by pollutants such as black carbon and contamination from military and industrial activity conducted during the Cold War (Downie and Fenge 2003; AMAP 2011). Produced by heavy industries located far from the Arctic, POPs are particularly dangerous because bio-magnification causes them to become increasingly concentrated at higher levels of the food chain, culminating eventually in humans. POP contamination is directly worsened by climate change because warmer temperatures increase their toxicity and speed their rate of degradation into the environment (Noyes and others 2009).

Warming is also undermining critical infrastructure across the region. As thawing permafrost destabilises the ground upon which many Arctic communities are built, impacts are apparent in damage to roads, bridges, airstrips, pipelines, homes, and sewage systems (ACIA 2004; Auld and others 2007). Some communities have been forced to relocate as coastal erosion renders their homes uninhabitable (ACIA 2004: 80; DeMarban 2014). The US Army Corps of Engineers identifies as many as 178 Alaskan villages as threatened (EPA 2014), as are coastal communities in Canada, Greenland, and Russia (ACIA 2004: 81; Barnhart and others 2014). Glacier melt is also expected to raise global sea levels by as much as 10 feet over the next century, further threatening low-lying communities and coastal areas (Gillis and Chang 2014).

Human security in the Arctic is also conditioned by ethnicity and indigeneity. Changes to the physical landscape particularly affect the subsistence practices of indigenous peoples on their traditional territories, undermining multi-generational knowledge of weather and climate patterns, animal movements, and methods of hunting and gathering (Csonka and Schweitzer 2004). Indigenous identities and cultural practices are predicated on a close relationship to the natural environments of their ancestral territories, such that 'cultural survival, identity and the very existence of Indigenous societies depend to a considerable degree on the maintenance of environmental quality. The degradation of the environment is therefore inseparable from a loss of culture and hence identity' (Cocklin 2002: 159). For example, for Inuit this relationship is exemplified by reduced quality and availability of traditional country foods, including game, fish, and berries: '[t]o hunt, catch, and share these foods is the essence of Inuit culture. Thus, a decline in [country foods] . . . threatens not only the dietary requirements of the Inuit, but also their very way of life' (ACIA 2004: 94). Environmental degradation also directly threatens indigenous lives, since increased incidents of death occurring on the land are associated with changing ice conditions and unpredictable weather patterns (Ford and others 2014). Human security issues thus highlight the connections between material and non-material threats, such as those linking indigenous lands, livelihoods, cultures, and identities.

While indigenous peoples experience distinct insecurities associated with environmental change, threats are also distributed by gender, since men and women are affected differently based on gendered and racialised divisions of labour, access to social services, exposure to environmental phenomena, or gender-based violence (Deiter and Rude 2005; Stuvøy 2010). With notable exceptions, such as Sámi in Scandinavia, Arctic indigenous communities experience lower life expectancies and access to medical care, but higher levels of depression, domestic violence, substance abuse, infant mortality, and suicide than southern regions (Hild and Stordahl 2004). For instance, in 2001, as the most recent available data suggests, the average life expectancy for all Canadian men was 77 years, while for Inuit men it was 62.6 years; the gap between all Canadian and Inuit women's life expectancies was more than 10 years (Grenier and others 2005). High rates of suicide among Inuit are 'associated with a view of young males not seeing a

https://doi.org/10.1017/S0032247416000218 Published online by Cambridge University Press

future for themselves as hunters and contributors to their community and at the same time not fitting into the cash employment structures that are becoming the dominant lifestyle' (ACIA 2004: 157). Such lack of optimism is driven by the interaction between colonialism, rapid cultural change, and the changing environment that limits opportunities for subsistence and impedes the acquisition and practice of valued cultural skills (Kral 2013). Higher rates of male suicide, in turn, place a disproportionate economic burden on surviving female relatives to provide for their families.

The interrelationship between such issues as suicide, cultural change, and environmental transformation illustrates the complex nature of human insecurity in the Arctic region, and the multiplicity of insecurities people and communities face. Analysts must also take seriously the intersection of gender, ethnicity, class, and citizenship in the determination of security threats. In sum, since both human and state security in the Arctic has been underpinned by the stability of Arctic environments, as those environments transform, the security of state and non-state referent objects is also affected.

Towards critical environmental security in the Arctic

Environmental change clearly affects (in)security across the circumpolar Arctic, and environmental issues have increasingly been framed as security-relevant in the policies and practices of circumpolar states. While this could be described as acknowledging a form of environmental (in)security, closer examination of the Arctic security policies of circumpolar states suggests a reconceptualisation of environmental security is required to adequately reflect the challenges posed by environmental change, and to render their understandings of security ecologically sustainable. Dominant understandings of environmental change and security in the Arctic reflect a 'problem-solving' approach that responds to the effects of environmental change without challenging its causes, or reflecting on the feedbacks that policy responses to the changing environment will have on the climate. What is required instead is a *critical* approach to environmental security that engages with ecological sustainability more deeply than the conventional inclusion of environmental issues into security analysis.

What might a critical conception examine differently than a mainstream or problem-solving approach to environmental security in the Arctic? A starting point might be to observe how the division of security into distinct sectors of analysis – such as the military, political, economic, societal, and environmental sectors (Buzan, Wæver and de Wilde 1998) – marginalises the impacts of non-environmental threats on ecological systems, while obscuring the ways environmental factors contribute to the emergence of other types of threats. While sectors may help categorise security issues, threats in one sector can endanger referent objects and generate new threats in other sectors, and the very responses states and other actors take to defend themselves may generate new security issues. A critical approach suggests environmental security must embrace the Green theoretical maxim that 'everything is connected to everything else', and move beyond sectoral taxonomies and secure/insecure binaries to understand the role that choices made by states and people play in rendering themselves in/secure.

Thinking critically about environmental security in the Arctic also entails exploring prospective policy options that may contribute to environmental sustainability even if they challenge existing institutions. This entails imagining, and working towards, distinct futures for the Arctic and its people based on emerging and possible configurations of factors in the social, political, and social realms, what Frank Sejersen (2015: 192) refers to as directing analytical attention 'towards the question of how humans, groups and communities navigate in and create life-worlds of socially informed choices and possibilities.' By definition, the process of imagining alternative futures inclines towards questioning existing structures, and envisioning how they might change or be changed. Such imagined futures include envisioning how the Arctic Council might evolve as an institution responsible for protecting the regional environment and providing security to Arctic inhabitants (Wilson 2016), and asking whether non-renewable resource extraction can provide for the future well-being of Arctic communities (Sejersen 2015). The significant transformations in indigenous politics in the circumpolar region may herald the emergence of new, transnational and indigenised forms of sovereignty and political organisation (Wilson 2007; Ejesiak 2013; Shadian 2014), including possibilities for decolonised forms of political community that reflect indigenous priorities and dispositions towards culture, resources, and sustainability. Reimagining Arctic futures invites questioning whether state-driven Arctic security policies that prioritise militarism and resource extraction can actually sustain the regional ecology or support the wellbeing of Arctic inhabitants (Broadhead 2010; Smith 2010; Greaves 2012; Nickels 2013; Harrington and Lecavalier 2014). In their place, we might imagine an Arctic in which extractive activities most responsible for damaging the Arctic ecology through climate change and local contamination are replaced with economic activities that support the priorities and traditions of Arctic inhabitants themselves. Such visions reflect more critical and environmentally sustainable conceptions of security in and for the Arctic region, and demonstrate attempts 'to open up the study of environmental security by thinking critically about existing approaches, and beginning to think alternative possibilities' (Barnett 2001: 156).

One pertinent example for illustrating a critical approach to security, the environment in general and the Arctic environment in particular is examining 'energy security', one of the most common and conflicted contemporary invocations of (in)security (Ciûta 2010; Sovacool 2011). Many Arctic communities are considered energy insecure because they rely on expensive imported

https://doi.org/10.1017/S0032247416000218 Published online by Cambridge University Press

diesel and experience periodic shortages of essential fuel for heating and transportation, but such community-level issues are omitted within state-centric conceptions and policy frameworks for energy security that prioritise expanded extraction of fossil fuels, including in ecologically sensitive Arctic marine areas (Kolisnek 2008; Johnston 2012). Though pursuing offshore hydrocarbons might create valuable new jobs and taxation revenues, it also generates new threats related to point source pollution, risk of local environmental contamination, and furthering reliance on fossil fuels causing global climate change. Providing security in an age of ecological crisis thus entails trade-offs between competing social objectives, such as environmental preservation and economic growth, or expansion of waged labour and maintenance of cultural identity. However, since the well-being of state and non-state actors in the Arctic depends upon certain environmental conditions, the maintenance of a functioning environment remains the essential condition for providing security in the Arctic.

In this light, dominant accounts of Arctic security are pathological in nature. Elsewhere, I have argued that dominant conceptions of Arctic security experience three distinct pathologies: (re)militarisation in the absence of a military threat; constrained inclusion of indigenous peoples in regional governance; and hydrocarbon extraction in the context of the Anthropocene (Chater and Greaves 2014). Of these, the third pathology has the gravest implications for local, regional, and global (in)security, because the fact that climate change is enabling access to offshore Arctic hydrocarbons is itself a positive feedback that will only exacerbate climate change. By pursuing hydrocarbon resource extraction under the guise of energy security, Arctic states are committing themselves to an apocalyptic development strategy that will further destabilise the Arctic environment and exacerbate the pace and severity of global climate change. By contrast, a critical approach to environmental security would heed the scientific assessment 'that all Arctic [energy] resources should be classified as unburnable,' and must remain unexploited if the planet is to avoid global temperature increase of more than 2° C (McGlade and Ekins 2015). Indeed, a critical perspective might question the target set by states under the UN Framework Convention on Climate Change (UNFCCC 1992) to limit increased warming to below 2° C. Already, the effects of climate change pose extraordinary challenges worldwide, yet the current international regime dedicated to 'solving' the problem of climate change accepts and enables twice as much global warming as occurred over the 20th century. In so far as they presuppose a degree of warming that will entirely reorganise the ecologies and societies of the circumpolar region, multilateral climate negotiations have little to offer future prospects for sustainable conditions of Arctic environmental security.

By pursuing policies that will contribute to climate change, circumpolar governments contribute to present and future insecurity for their citizens and everyone else. Despite calls for and claims of sustainable development, there is no official acknowledgement of the incompatibility of hydrocarbon extraction, transportation, and consumption with the maintenance of a stable Arctic environment. The roadmap to an Arctic resource boom is thus, in actual fact, a path towards global ecological breakdown. The extraction and consumption of hydrocarbon resources will further exacerbate climate change, which will expand access to such resources while undermining the capacity of vulnerable ecosystems in the Arctic and elsewhere to sustain established modes of human life. The pursuit of Arctic hydrocarbons, like the continuation of other industrial and consumer processes driving climate change, represents a pathological approach to security rooted in the tension between catastrophic climate change and perpetuation of the activities that are causing that change to occur. It is inherently unsustainable, and *ceteris paribus* cannot be reconciled with a critical conception of environmental security.

Conclusion

Environmental changes in the Arctic, including human-caused climate change and other forms of ecological degradation, are driving complex social and physical processes that place circumpolar states and peoples on the front line of global environmental insecurity. The collective magnitude of these hazards requires a critical approach to environmental security. Employing Coxian critical theory allows insecurity in the Arctic to be conceptually linked to global processes of production and consumption, as well as to the very practices, such as militarisation and hydrocarbon extraction, commonly mobilised in the name of 'Arctic security.' Due to its distinct ecological, social, and political situation, the Arctic forms a distinct regional environmental security complex, but it is not an island isolated from the rest of the globe. Environmental change poses significant challenges for the circumpolar region, but the Arctic's crucial role in global climate systems means it is also linked to global ecological sustainability. Thus, this article argues that the adoption of a critical conception of environmental security is vital because it links state and human security issues in a changing Arctic environment with the broader global systems driving this transformation. Mitigating environmentally damaging human activities is thus essential for addressing environmental (in)security, because the Arctic is the harbinger of environmental instability that will affect people, states, and regions around the globe.

In these ways, climate change in the Arctic is a powerful manifestation of the ecological moment at which humanity stands. Environmental insecurities are inherent to our current civilisation that relies upon economic activities powered by fossil fuels. These insecurities are increasingly apparent, and draw greater attention from scholars and policymakers with each passing year, and

https://doi.org/10.1017/S0032247416000218 Published online by Cambridge University Press

with each failed attempt to negotiate a new global climate governance framework. They pose profound normative and policymaking questions around the world, but most especially in those countries that bear historical responsibility for climate change. In a region that is being transformed by human-caused climate change, policies that rely on hydrocarbon development make a mockery of sustainability. Collectively, we must acknowledge the dilemma we face in the Arctic and around the world. Sustainable security depends on it.

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https://doi.org/10.1017/S0032247416000218 Published online by Cambridge University Press