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Global Warming and the Combatant Commander: Engaging the Arctic Region

by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: _____

23 October 2006

Abstract

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The National Military Strategy (NMS) describes how the U.S. Joint Force will support the National Security Strategy (NSS) and National Defense Strategy (NDS) through the establishment and execution of three military objectives. “Protect, Prevent, Prevail” is a condensed summation of the principles behind this guidance. U.S. forward posture and presence in the global maritime environment are essential in meeting these objectives, particularly in preventing conflict and surprise attack. In describing some key aspects of a future security setting, the NMS predicts potential battle spaces far different from any in which U.S. forces currently train. The Arctic region is not specifically addressed in current versions of the NSS, NDS, or NMS. This battle space of Cold War significance, however, fits the Chairman of the Joint Chiefs of Staff’s description and is reemerging as a potential theater of operations because of changes brought forth by the phenomenon known as global warming. A characteristic that clearly distinguishes the Arctic from other U.S. geographic combatant commander (GCC) areas of responsibility is that its landscape is literally changing in physical composition. This reality brings with it many significant and far reaching security implications. GCCs and their twenty-first century successors will need to broaden their appreciation of the Arctic beyond its historical significance and prepare for complex security threats that could rival those of the previous century’s bi-polar strategic environment. GCC engagement in the region, a challenge in today’s theater-strategic continuum, is necessary in order to prepare tomorrow’s joint force for the challenges and opportunities that lie in the Arctic’s not so distant future. There is an assortment of theater-strategic matters pertaining to the Arctic’s future that warrant GCC attention. This paper focuses on a short list: increased maritime access, territorial disputes, and oil exploration. The security implications of these future realities are far reaching and not simply the problem of just one GCC.

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INTRODUCTION

The National Military Strategy (NMS) describes how the U.S. Joint Force will support the National Security Strategy (NSS) and National Defense Strategy (NDS) through the establishment and execution of three military objectives. “Protect, Prevent, Prevail” is a condensed summation of the principles behind this guidance.¹ U.S. forward posture and presence in the global maritime environment are essential in meeting these objectives, particularly in preventing conflict and surprise attack. In describing some key aspects of a future security setting, the NMS predicts potential battle spaces far different from any in which U.S. forces currently train. Emphasis is placed on the fact that ensured strategic access and sea lines of communication (SLOC) will remain vital to U.S. national security and economic prosperity. The NMS asserts, “The United States will conduct operations in widely diverse locations – from densely populated urban areas located in littoral regions to remote, inhospitable and austere locations.”² The Arctic region, defined by the area north of the Arctic Circle’s 66° 33’N latitude line, is not specifically addressed in current versions of the NSS, NDS, or NMS. This battle space of Cold War significance, however, fits the Chairman of the Joint Chiefs of Staff’s description and is reemerging as a potential theater of operations because of changes brought forth by the phenomenon known as global warming.

The Arctic region has many unique characteristics. One that clearly distinguishes it from other U.S. geographic combatant commander (GCC) areas of responsibility (AOR) is that its landscape is literally changing in physical composition. Today, as U.S. strategic focus, Department of Defense (DoD) spending, and resource allocation remain centered on the Middle East and the muddled challenges of the Global War on Terrorism (GWOT,) the Arctic’s receding icepack is slowly giving way to a new maritime frontier. This reality

brings with it many significant and far reaching security implications. GCCs and their twenty-first century successors will need to broaden their appreciation of the Arctic beyond its historical significance and prepare for complex security threats that could rival those of the previous century's bi-polar strategic environment.

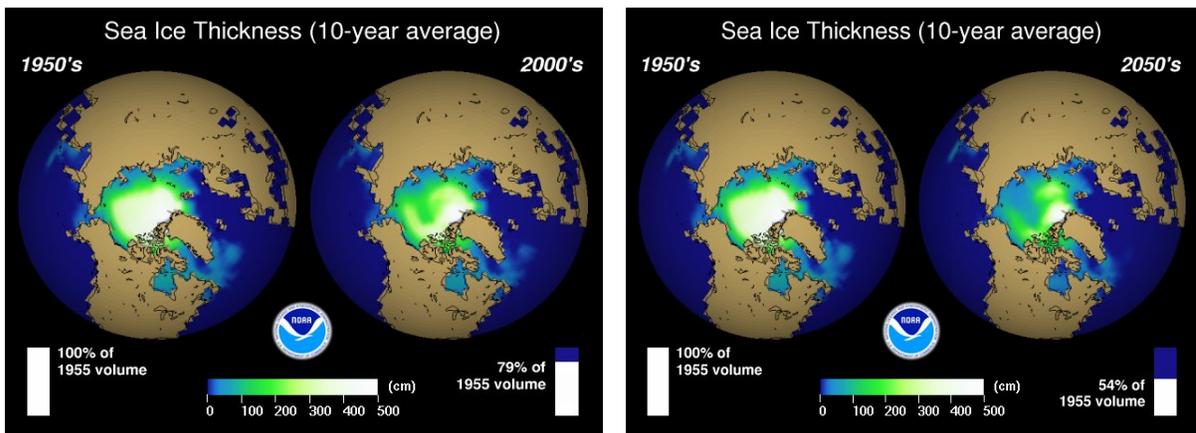
This paper is presented under the assumption that scientific observations, modeling, and predictions of environmental change in the Arctic due to global warming will prove to be true in at least a conservative sense. GCC engagement in the region, a challenge in today's theater-strategic continuum, is necessary in order to prepare tomorrow's joint force for the challenges and opportunities that lie in the Arctic's not so distant future. There is an assortment of theater-strategic matters pertaining to the Arctic's future that warrant GCC attention. This paper will focus on a short list: increased maritime access, territorial disputes, and oil exploration. The security implications of these future realities are far reaching and not simply the problem of just one GCC.

Global Warming: Reasonable Concern or Exaggerated Threat?

Earth is warming at its highest rate in the last 10,000 years.³ Supported by scientific observation, the Arctic region has fallen victim to the effects of this remarkable trend. In the last century alone, the deep layers of the Arctic Ocean became warmer, soil temperatures in Alaska rose from 2° to 5° Celsius (C,) and, in just the last 30 years, National Oceanic and Atmospheric Administration observation of nine stations north of the Arctic Circle showed a 5.5° C increase in average surface temperature.⁴ During this same period, satellite data from NASA's Goddard Space Flight Center revealed northerly retreating ice rates of 9.6% per decade, and it is believed that the Arctic's ice extent is at its lowest reach in the last few centuries.⁵ In a 2006 *United States Naval Institute Proceedings* article, Magda Hanna of the

Naval Ice Center reiterates further evidence of the warming effect on Arctic ice. She states, “Four decades of U.S. submarine Arctic transits and under-ice surveys confirm that ice thinned by 40% in just the last 20 years.”⁶

Just as disturbing to scientists are the current data trends and projected outcomes for the future. Model predictions show that average global temperatures will increase 3° to 4° C (6° to 8° Fahrenheit) during the 21st century.⁷ Additionally, Arctic ice volume and thickness could diminish by up to 40% and 30%, respectively.⁸ Figure 1 illustrates a typical model prediction through mid-century. These outlooks reveal the likelihood of Arctic ice completely disappearing during the summer months in various regions which would result in more navigable waters to non-icebreaking ships.⁹



(Source: Geophysical Fluid Dynamics Laboratory, Princeton, NJ)

Figure 1: Arctic Sea Ice, 1950-2050

Global warming in and of itself is not a cause for concern. Its necessity is summarized in a 2004 *Monthly Review* article titled “The Pentagon and Climate Change:”

A natural greenhouse effect is crucial to the earth’s atmosphere. As carbon dioxide, methane, and other greenhouse gases accumulate in the atmosphere they trap heat that would otherwise radiate off into space. This natural greenhouse effect along with proximity to the sun serves to warm the earth making it habitable to diverse species.¹⁰

A commonly shared view among scientists is that increased world dependence on fossil fuels has negatively affected Earth's natural greenhouse heating mechanism. Most believe the distributed excess of heat-trapping carbon dioxide emissions into the atmosphere has accelerated the gradual occurrence of global warming.

As the world's third largest oil producer, the United States recognizes the fact that it is also its largest consumer. The 2006 NSS outlines initiatives that address this reality, "The key to ensuring security is diversity in the regions from which energy resources come and in the types of energy resources on which we rely."¹¹ The NSS expands on the issue by describing an optimistic plan to work with other countries to: increase transparency, develop advanced nuclear and transformational technologies, and domestically invest in alternative sources of energy.¹² Stewardship is vital in protecting the environment, but slowing the momentum of the current warming trend's effect appears to be an insurmountable task. As Earth continues to warm, energy demand and fossil fuel consumption around the globe are simultaneously rising at alarming levels, particularly among developing nations. Thomas Friedman, in his book *The World is Flat*, discloses some remarkable details about China's growing dependence on oil:

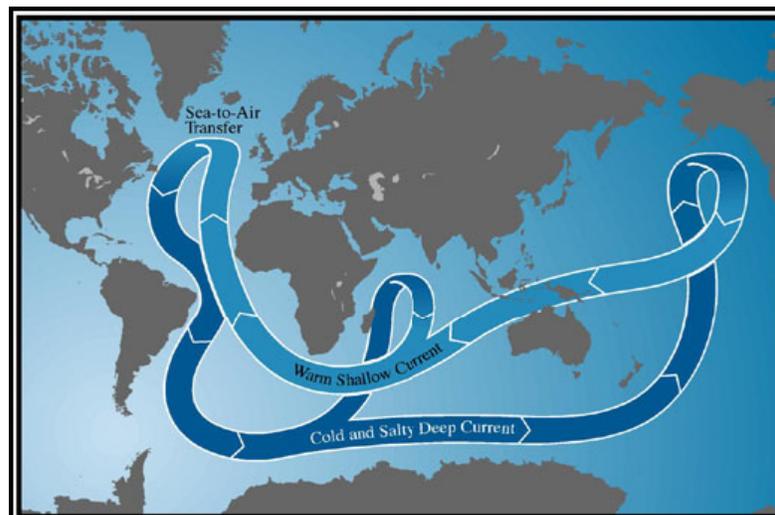
According to one speaker at the conference, some thirty thousand new cars were being added to the roads in Beijing *every month* – one thousand more new cars a day! . . . According to the World Bank, sixteen of the twenty most polluted cities in the world are in China. . . . China's overall energy consumption is up 65 percent just from 2002 to 2005, and it has not even begun to reach its capacity for industrialization.¹³

Addressing its rising oil consumption he further states, "If current trends hold, China will go from importing seven million barrels of oil today to fourteen million a day by 2012."¹⁴

The suspected effect of increased world oil consumption on Earth's natural heating apparatus has led some experts to believe society is running the risk of triggering an abrupt

climate change or the crossing of an environmental threshold.¹⁵ If crossed, they feel that gradual warming trends will accelerate in both time and magnitude of effect. Dramatic changes to the Earth's climate patterns; effects on agriculture and natural resources; large population movements; and increased conflict and military tension around the globe, are all debatable possibilities.¹⁶

The ocean's thermohaline circulation is depicted in Figure 2. Its significance is that, as a global oceanographic conveyor that moves high saline tropical waters north before looping back to the south, it creates milder winters in the higher latitudes because of the



(Source: USGCRP 1999)

Figure 2: Thermohaline Circulation

heat it releases into the atmosphere.¹⁷ It is powered by differences in density and salinity of cooler northern waters and those of warmer southern waters.¹⁸ A consistent rise in Earth's temperature will further melt Arctic glaciers, increase precipitation, and intensify river runoff totals. As a result, more freshwater will be distributed to the northern oceans' waters. As the salinity of the conveyor's waters decreases over time, its circulation could slow to the point of complete collapse and result in an abrupt climate change.¹⁹

The tipping point of an abrupt climate change rests in the ocean conveyor's capacity to withstand increased amounts of freshwater, a limitation that is unknown with absolute certainty. Whether or not its circulation will shut down, or whether or not an abrupt climate change will occur, is uncertain. Scientists do agree that such a "low probability, high impact" event is possible and recent data trends support this assessment.²⁰ Regardless, the phenomenon of global warming is a reality. Its magnitude of effect can not be determined with complete accuracy, but to say that it may be too late to halt or reverse its momentum is a sound conclusion. Global warming is taking its toll on the Arctic region, melting its icepack and making it more accessible to maritime traffic. As a result, theater-strategic challenges will likely present themselves in the future and GCCs will need to proactively prepare for them.

Theater-Strategic Impact: Access, Territory, and Oil Exploration

The United States and seven other countries (Russia, Canada, Denmark, Norway, Iceland, Sweden, and Finland,) known as the Arctic Council, possess territory in the Arctic region.²¹ The region is populated by various native groups that form its population, primarily the Inuit people. The Inuit population consists of the indigenous people of Alaska, Russia, Greenland, and the provinces of Canada; these people rely heavily on the sea for their livelihood.²² As challenges blossom in the Arctic as a result of global warming, the United States will need to engage fellow Arctic Council members to foster common objectives for the region. In doing so, U.S. leadership will need to consider the spectrum of interests and sensitivities dispersed throughout the region to ensure shared peace and cooperative security. The GCC, with U.S. interests and strategic guidance in mind, will need to critically analyze this evolving theater because of the unique capabilities and resources their commands can

provide in securing it. Certainties of increased access, emerging sovereignty and territorial disputes, and broadened oil and natural gas exploration will demand GCC visibility in order to preserve U.S. national security interests in the Arctic region.

The ability to transit and maneuver in the Arctic will continue to improve as its icepack diminishes. General illustrations of two established Arctic commercial shipping routes, the Northwest Passage (north of Canada) and the Northeast Passage (north of Russia), are depicted in Figure 3. These routes have become more enticing to commercial shipping companies for two reasons. First, both routes are becoming increasingly clear of the

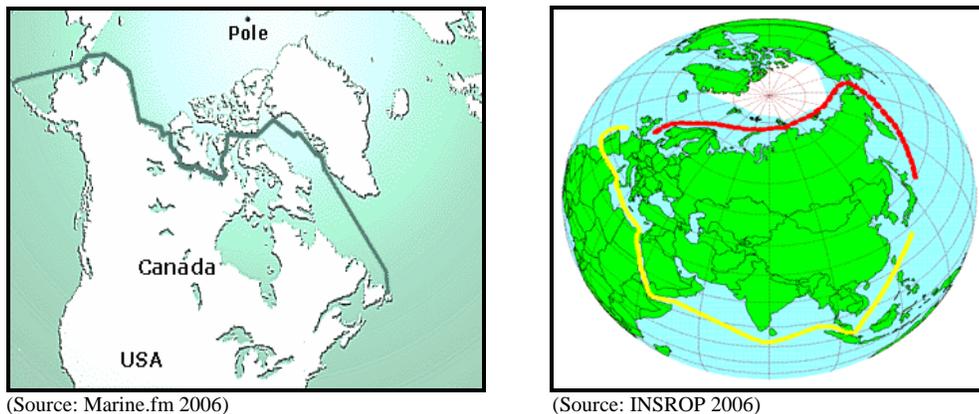


Figure 3: Northwest Passage and Northeast Passage

navigational hazard of ice for extended periods during the year. Second, their use can yield time and cost savings in movement of cargo between the Atlantic and Pacific Oceans. “An open Northwest passage would cut 5,000 nautical miles from shipping routes between Europe and Asia,” says Levon Sevunts in a 2005 *Washington Times* article.²³ Savings can be even greater for ships that have to use the route around southern Africa because of size limitations and inability to transit routes that take them through either the Suez or Panama Canals. Time and distance reductions in these cases are nearly 7,000 miles and up to 20 days.²⁴ There are, however, opposing arguments that refute the assessments of commercial accessibility and the anticipated influx of shipping through these waterways. Risks of

sending non-ice-strengthened ships into waters subject to unfavorable turns in icing conditions, coupled with insurance costs two to three times higher than the open water rate, could deter shipping companies from seizing the opportunities provided by these passages.²⁵ Despite risk levels and shipping company decisions to increase their use of these routes, continued global warming and diminishing ice will alter future risk assessments and increase the probability of higher transpolar shipping volume in the Arctic archipelago by way of the Northwest and Northeast Passages.

The theater-strategic importance of this likelihood is not the amount of commercial shipping that may ultimately transit the Arctic, it is the associated economic and security implications of the assessment. Preservation of freedom of the seas and securing strategic maritime oil transits around the globe are traditional elements of U.S. national security strategy. The economic stability that secured movement of oil brings to the world economy is vital to peace and security. Unfortunately, improved access applies to all actors, both state and non-state. Rising regional powers, hostile or rogue states, and trans-national terrorists groups all have an interest in access. The disruption of a stabilized global economy will undoubtedly remain a goal for some of these actors, particularly trans-national terrorist organizations. Just as cooperative peace-seeking state actors will adapt to the challenges and opportunities of increased Arctic access, so too will non-state actors.

GCCs will need to plan and prepare for their role in securing Arctic approaches to the United States against a full spectrum of potential threats to security and regional stability: threatening conventional military capabilities, illegal immigration, illicit human and drug trafficking, piracy, weapons of mass destruction and illegal arms proliferation, and terrorist attack. China, for example, allegedly feels threatened in the sense that should a conflict arise

between the two countries, the United States could easily disrupt Chinese oil imports through the Straits of Malacca where 80% of its incoming oil passes.²⁶ In a 2005 *Energy Bulletin* article, Bill Ridley provides details of an internal report to U.S. Secretary of Defense Donald Rumsfeld that said, “China is building strategic relationships along the sea lanes from the Middle East to the South China Sea in ways that suggest defensive and offensive positioning to protect China’s energy interests, but also to serve broad security objectives.”²⁷ The report also cited China’s known build up of sea-lane control weapon systems such as submarines, warships with long range ballistic missiles, undersea mines, aircraft, optical satellites, and unmanned aerial vehicles for use in the maritime environment.²⁸ With this knowledge, it can be reasonably assumed that China will pursue enhanced Arctic capability at some point in the future, not simply for time and cost saving reasons, but for more suitable theater-strategic reasons. Specifically, China may attempt to exploit the opportunity of increased Arctic access so it can keep the United States at bay by taking advantage of known U.S. limitations in Arctic monitoring capability and lack of formidable presence in the region. The most opportune and rational way the United States can counter this and other potential maritime threats is through joint or combined multi-lateral efforts to patrol these waters. The United States will need to develop, possess, and show a means to operate in the polar Arctic environment. Otherwise, it is at a disadvantage because of an apparent exploitable seam in its security capability. It is with this particular issue that the GCC should be concerned, because at the present time the United States does not appear to have the initiative in Arctic focus, much less capability.

Future challenges and theater-strategic implications associated with improved access will exacerbate if the United States does not give more priority to future operations in the

Arctic. China's investment in the development and deployment of ice breaking technology is an indicator of its vision for the future. In 1999, a Chinese icebreaking vessel made an unannounced visit to Tuktoyaktuk in Northern Canada.²⁹ Russia has the most robust post-Cold War capability for operating in the polar north. With an eye on future economic opportunities in the region, it has a contract with a Finnish shipbuilder to construct 20 ice-strengthened oil and gas tankers.³⁰ More demanding of the GCC's attention, however, should be Russia's 2006 series of ballistic missile tests conducted in the heart of the Arctic Ocean. On 11 September 2006, a Delta IV-class nuclear submarine, the *Ekaterinburg* (K-84), successfully conducted a submerged test launch of the 8,300 kilometer SS-N-23 Skiff missile near the North Pole, the first Russian test of this kind in 11 years.³¹

DoD's shift in strategic focus, from the Cold War to technologically driven transformation in the midst of GWOT, has further marginalized its vision, funding, and capacity to pose any viable Arctic presence. The once robust under-ice capability of U.S. submarines is fading away as is funding for formal polar research programs like those conducted by the Office of Naval Research.³² The U.S. Navy has no ice-strengthened hull ships and the U.S. Coast Guard has only three, the light icebreaker USCGC *Healy* (WAGB-20) and two heavy Polar-class icebreakers USCGC *Polar Sea* (WAGB-10) and USCGC *Polar Star* (WAGB-11).³³ Focused more on the near term threats to national security, the United States seems to have turned a blind eye to a region that is being intently considered by commercial shipping companies, rising regional powers, and with all likelihood, hostile non-state actors.

The prospect of improved access in the Arctic is accompanied by more than the physical emergence and presence of critical commercial shipping and potential adversaries.

Seasonally navigable Northwest and Northeast Passages will likely spur existing economic and political tensions in the region, disagreements with theater-strategic implications should they develop into military confrontation. Nation-state sovereignty and emerging territorial disputes over oil and natural gas exploration rights are two cascading implications caused by improved access.

Today, the United States and Canada disagree over the international status of the waterways that make up the Northwest Passage. Although the dispute is not a headlining news story, it is likely to render more attention as global warming continues to open the passage to higher volumes of maritime traffic. Canada asserts its position of sovereignty over the passage and has claimed it as an internal waterway, which fundamentally means that consent is required for use by foreign ships. According to Canada, its 1986 establishment of straight baselines around the perimeter of its archipelago meets the criteria established by the 1982 United Nations Convention on the Law of the Sea (UNCLOS.)³⁴ The United States, along with the European Union and Japan, dispute the claim and regard the Northwest Passage as an international strait in which freedom of navigation applies. In view of U.S.-Canadian inability to agree on the matter, Franklyn Griffiths, Professor Emeritus of Political Science at the University of Toronto contends:

As well, it seemed to me that altered U.S. and Canadian continental security interests after 9/11 could make for wider cooperation than before on Arctic waters issues with prejudice to the opposed claims of the two states in international law. Indeed, I thought we should ask Washington to consider whether its homeland security interests might now be better served by a regime that treated the Northwest Passage not as an international strait, but as internal Canadian waters subject to Canadian law and law enforcement.³⁵

With no immediate decree in sight, the rationale behind Griffith's opinion seems valid from a Canadian perspective, albeit influenced by the pressures of increased Arctic activity on

Canada's claimed sovereignty. Unless the United States and Canada can come to agreement, this point of contention could quickly develop into a hindrance for future cooperative efforts to protect bi-lateral U.S.-Canadian interests in national security.

The United States also disputes Russia's excessive claims regarding the straits running west and east in the Karsky Sea along the Northeast Passage, a route where the right of innocent passage applies to transiting ships.³⁶ These straits are well within Russia's territorial seas, but have not been classified as international straits. Because of these circumstances, Russia claims a right to impose restrictions on innocent passage, particularly the suspension of passage for national security reasons. Additionally, Russian legislation grants discretion and control over the passage of warships, including U.S. Coast Guard icebreakers, through its territorial waters.³⁷ Similar to the circumstantial implications of U.S.-Canadian disagreements over excessive claims, this dispute presents another point of contention that could undermine future cooperative efforts to address the security challenges of improved Arctic access.

Along with improved access and territorial claim disputes is the politically sensitive issue of Arctic oil and natural gas exploration. The Arctic region may hold as much as 25% of the world's oil and natural gas reserves beneath its ice covered waters.³⁸ U.S. interest in these resources can be traced back to the height of the Cold War. In 1983, President Ronald Reagan issued *National Security Decision Directive 90* which outlined U.S. Arctic policy. The directive stated, "It is clear that the United States has unique and critical interests in the Arctic region related directly to national defense, resource and energy development, scientific inquiry, and environmental protection."³⁹ Today, with rising demands for limited energy resources and major advances in oil exploration technology, the Arctic region's

untapped oil and natural gas are even more desirable and obtainable than they were 25 years ago. As the polar icepack diminishes, tensions over Arctic oil and natural gas reserve claims will certainly intensify. The United States, Canada, Russia, Denmark, and Norway have all staked contradicting claims. Most disputes stem from Article 76 of the UNCLOS over continental shelf claims beyond the 200-mile economic exclusion zone.⁴⁰ As the volume of energy companies and infrastructure migrating to the region increases over time, the region will likely host increased political tensions over a range of issues. Environmental damage, wildlife displacement, and opposition from native groups like the Inuits are likely issues because of the disruptive imposition broadened exploration could present.

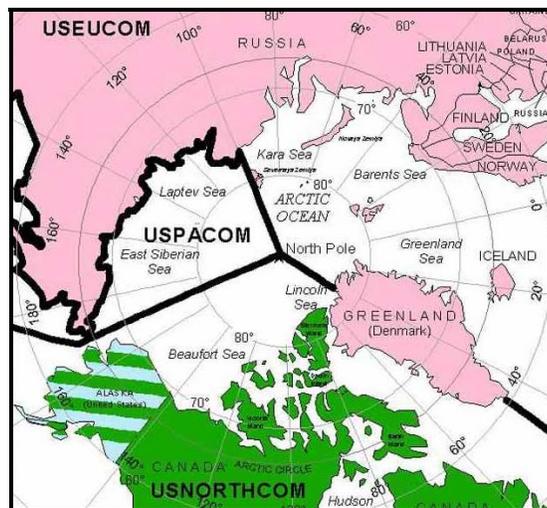
Counter Views

The effects of global warming on the Arctic's icecap, the wide range of implications stemming from its occurrence, and U.S. response to these consequences are likely to generate varying counter views and opinions. Probably more debatable are the possible theater-strategic implications on U.S. national security and the priority the United States should place upon them. The notion that DoD should plan and invest now in procuring equipment and capability to operate in the Arctic is probably an irrational idea to U.S. leadership deeply involved in "real time" higher priority budgetary issues related to GWOT. Opponents are less likely to back decisions to commit constrained resources to projected, vice known, possibilities nearly half a century away and well outside of current budget planning cycle timelines. Some may also argue that although rising regional powers like China are giving more attention to the Arctic region, it is impractical to conclude these nations will be able to operationally exploit the opportunities provided by improved access in the Arctic before it reaches near-annual ice free status. Finally, some optimists may take comfort in believing

that economic growth and advances in technological innovation will outpace the negative effects of climate change on the global community.

These arguments are all valid to some extent. In order to sway U.S. public focus, Congressional support, and DoD acquisition efforts in the direction of future Arctic scenarios today, it will likely take an incident with regional or international security implications to occur there before serious attention is given to the region. Regardless, theater-strategic implications will be present as the Arctic becomes more accessible. GCCs would be better served by proactively planning for these possible outcomes, rather than waiting to react to them with limited knowledge and capability.

Whose Problem is It?



(Source: Wikipedia 2006)

Figure 4: Unified Command Plan's Division of the Arctic

As depicted in Figure 4, the Unified Command Plan (UCP) divides the Arctic among three GCCs: U.S. Pacific Command (PACOM,) Northern Command (NORTHCOM,) and European Command (EUCOM.)⁴¹ Analysis of the implications stemming from access, territorial disputes, and energy exploration shows that the consequences of global warming on the Arctic cannot, in most cases, be adopted by a single GCC. Examples ranging from

China (PACOM,) to homeland security threats (NORTHCOM,) to Russian missile tests (EUCOM,) to territorial claims and geo-political issues among and across all Arctic Council nations highlight this fact.

GCCs of the Arctic region are not the only combatant commands affected by these consequences either. There are potential cascading effects of improved maritime access in the Arctic on U.S. Southern Command (SOUTHCOM) and Central Command (CENTCOM). China could capitalize on its growing capability to navigate Arctic waters by coupling it with its influential ownership of port facilities on both the Atlantic and Pacific sides of the Panama Canal to close it down should tensions ever escalate to that level. Not only would such an event impact the SOUTHCOM AOR, it could cripple global economic stability. Should the Arctic's oil and gas reserves become fully accessible, the world's dependence and demand on Middle Eastern oil could potentially diminish, increasing tensions and violence in the CENTCOM AOR.

These hypothetical examples, whether likely or not, are simply meant to expand on the observation that consequences stemming from global warming's effect on the Arctic should not be viewed as isolated regional issues affecting only one GCC. Expanded analysis would likely reveal that functional combatant commanders would be affected too. The point is that future security implications of diminishing ice in the Arctic vary in scope and magnitude, with none being exactly the same or affecting a particular GCC in the same manner. So whose problem is it? It is beyond this paper's scope to analyze all scenarios and subsequent responsibilities, but it is fair to assess that each, if not all, combatant commanders will play an important role in coordinating existing seams and in meeting the myriad challenges ahead.

Recommendations

The following recommendations are for GCCs with a shared stake in the Arctic AOR. The challenges and security risks linked to global warming and reduced Arctic ice coverage have been presented; these proposals are initiatives that could be taken by GCCs in addressing them:

First, the three GCCs with Arctic territory should coordinate their theater strategies for the road ahead in the region. Cohesive GCC engagement of Arctic Council nations through robust Theater Security Cooperation Plans (TSCP) could effectively shape the region for future combined operations. Near-term attention should be focused on Canada and Russia with the aim of resolving today's disagreements over excessive territorial claims to ensure friction-free relationships are in place for the future. The joint U.S-Canadian North American Air Defense Command (NORAD) agreement should be used as a leveraging tool by NORTHCOM in its TSCP plan. EUCOM's TSCP should address its close ties with NATO and Arctic Council countries to gain leverage in resolving issues related to Russia. It is highly unlikely that the United States will acquire the capability to secure the Arctic maritime environment and its SLOCs unilaterally. The region is too vast and U.S. resources are too constrained to do it this way. Hence, multi-lateral cooperation will be vital. Unified effort between GCCs, through robust TSCPs and applicable interagency coordination, is the best remedy for shaping the environment to meet U.S. national interests in the Arctic region.

Second, GCCs should capitalize on their influence in DoD budget plans to solicit the acquirement of required capabilities (e.g., icebreakers, tailored platforms, weapons, C2, and manpower) to operate in the Arctic. Otherwise, extended lead times of military acquisition

and research, development, test and evaluation (RDT&E) will further delay U.S. ability to reduce forthcoming security risks.

Finally, GCCs should encourage component services to analyze requirements, strategies, policies, and programs for potential operations in an ice-diminished Arctic. In 2001, the Office of Naval Research, Arctic Research Commission, and Naval Ice Center held a symposium in Washington, DC to discuss U.S. Naval operations in an ice-free Arctic.⁴² This venue could be used as an example for other services and organizations to follow. Service component analysis would provide valuable insight for the GCC in efforts to acquire required capabilities and plan for future Arctic operations.

Conclusion

The NMS predicts a future security setting with battle spaces far different than any in which U.S. armed forces currently train. The Arctic region, once viewed for its Cold War strategic significance, fits this NMS description and is reemerging as a potential future theater of operations as a result of global warming. According to scientists, the Arctic's icepack will continue to melt during the twenty-first century. They agree that increased consumption of oil and carbon dioxide emissions into the atmosphere will accelerate the effects and magnitude of global warming on the environment. A "low probability, high impact" occurrence of abrupt climate change is not beyond the realm of possibility.

The Arctic's physically changing environment is just one of its many unique characteristics. In addition to the physical challenges and opportunities it presents are the numerous implications associated with its retreating ice coverage. GCCs will undoubtedly be affected by or involved with the theater-strategic implications of increased access, contentious territorial disputes, and expansive oil and natural gas exploration.

The daunting task of planning for the challenges of Arctic operations today will be significant because of constrained resources, dwindling experience, lack of capability, and priority. Regardless, expansion of U.S. layered defenses and the physical presence of its forces in the region to deter its illicit use will be a national necessity. Protection of national interests in the Arctic will heavily rely on U.S. theater-strategic leadership. Unity of effort among Arctic region GCCs will be the key to successful execution. Coordination of highly effective TSCPs that focus on cooperation among Arctic Council countries, institutions and alliances such as NATO, and interagency stakeholders, could serve as the means to shape the region for meeting U.S. strategic and operational objectives. GCCs should optimize their positions of influence in DoD budget planning to ensure timely steps are taken to acquire the required capabilities to conduct missions in the Arctic. Additionally, they should encourage service components to produce detailed analysis on future strategies, missions, and programs tailored for operations in an ice-diminished Arctic. GCCs sharing the Arctic region need to engage it now to meet its twenty-first century challenges.

NOTES

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