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CANADIAN FORCES COLLEGE / COLLÈGE DES FORCES CANADIENNES  
JCSP 34 / PCEMI n° 34

EXERCISE/EXERCICE NEW HORIZONS

**GLOBAL WARMING IN MILITARY DIMENSIONS**

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During the last few decades, some of the world's leading climate scientists, business leaders and others studying climate change repeatedly cite global environmental issues as key to national security. Some view their work through the lens of their military experience as warfighters, planners and leaders. This paper discusses related environmental factors and military concerns. It reviews global warming and its impact on military operations today or in the long-term future. Moving beyond the arguments of cause and effect of global warming, the paper argues that it is important for militaries to begin planning to address potentially devastating effects of global warming in the military sphere. The consequences of climate change can affect the organization, training, equipping, and planning of the military services. Military scientists and leaders should determine today the potential impacts of climate change on the ability to execute missions in support of national security objectives – that is the main point that encourages militaries of the entire world and the author of this essay.

“Global warming” has been introduced by the scientific community and the media as the term that encompasses all potential changes in climate that result from higher average global temperatures. “Global warming is the increase in the average temperature of the Earth's near-surface air and oceans since the mid-twentieth century and its projected continuation.”<sup>1</sup> According to some scientists global warming can be defined more precisely: it is the gradual increase in temperature caused by increased production of carbon dioxide (CO<sub>2</sub>) that has occurred during the post-industrialized age. The increased CO<sub>2</sub> emissions are a result of an increasing population that has been burning vast amounts of coal and fuel for most of last and this century. Hundreds of scientists from many different countries are working to understand global warming and have come to a consensus on several important aspects. In general, Global warming will produce far more profound climatic changes than simply a rise in global temperature. Probably, at this point, we are all extremely concerned about the threat of climate change. But is global warming a military issue? This paper analyzes current global warming factors and its impact on related military operations, and consequently argues that militaries should study this issue now, be prepared today and not overwhelmed by the required scope of our response tomorrow, or when the time comes.

Throughout its history, the earth has experienced oscillations between warm and cool periods. These shifts in climate have been attributed to a variety of factors, known as “climate forcings,” that include orbital variations, solar fluctuations, landmass distribution, volcanic activity, and the atmosphere’s concentration of greenhouse gases,

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<sup>1</sup> Wikipedia, the free online encyclopedia, s.v. “global warming”  
[http://en.wikipedia.org/wiki/Global\\_warming](http://en.wikipedia.org/wiki/Global_warming); Internet; accessed 16 March 2008.

such as carbon dioxide, methane, and water vapor. The changes we see today are occurring at a more rapid rate than is explainable by known natural cycles.

Throughout the earth's past, temperature and greenhouse gas concentration have been closely linked through the planet's natural greenhouse effect; i.e. greenhouse gases trap heat in the atmosphere and thereby warm the earth. Throughout Earth's previous four glacial and warming cycles, atmospheric CO<sub>2</sub> concentration, and temperature show a high degree of correlation. Other greenhouse gases, such as methane, also show a similar relationship with temperature.<sup>2</sup>

In April, 2007, global warming was also called security threat. It was the Center for Naval Analyses, a US government-financed research group of retired US generals and admirals of the Military Advisory Board to report: "Climate change is a national security issue,"<sup>3</sup> said retired General Gordon R. Sullivan, chairman of the Military Advisory Board and former Army chief of staff. "We found that climate instability will lead to instability in geopolitics and impact military operations around the world."<sup>4</sup> British Foreign Secretary Margaret Beckett, who presided over the first UN meeting on the global warming issue, posed the question "What makes wars start?" The answer was: "Fights over water. Changing patterns of rainfall. Fights over food production, land use. There are few greater potential threats to our economies ... but also to peace and security itself."<sup>5</sup> "... issues usually associated with the environment - like rising ocean levels,

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<sup>2</sup> Hansen, J. Climate Science Overview: *The Threat Posed by Global Warming*. Briefing to the Military Advisory Board of the Study of the Impacts of Global Climate Change on National Security, 2006.

<sup>3</sup> ArmyTimes – online resource for everything Army, "Report: climate change a major military issue," [http://www.armytimes.com/news/2007/04/military\\_global\\_warming\\_070416/](http://www.armytimes.com/news/2007/04/military_global_warming_070416/); Internet; accessed 10 March 2008.

<sup>4</sup> Environment news service, "Military Panel: Climate Change Threatens U.S. National Security," <http://www.ens-newswire.com/ens/apr2007/2007-04-16-05.asp>; Internet; accessed 22 March 2008.

<sup>5</sup> The Christian science monitor, "Could Global Warming Cause War," <http://www.csmonitor.com/2007/0419/p02s01-usgn.html>; Internet; accessed 20 March 2008.

droughts and violent weather caused by global warming - were also national security concerns".<sup>6</sup>

Global warming is not a myth. 1900's have been the warmest century in the past 600 years. Until recently, researchers were uncertain whether climate developments reflected natural variations in the Earth, or whether in fact human activities contributed to the warming. The latest observed data reveals some striking trends:

The global mean temperature averaged over land and ocean surfaces warmed by  $0.76^{\circ}\text{C} \pm 0.19^{\circ}\text{C}$  between the first 50 years of the instrumental record (1850–1899) and the last 5 years (2001–2005). The rate of warming over the last 50 years is almost double that over the last 100 years ( $0.13^{\circ}\text{C} \pm 0.03^{\circ}\text{C}$  vs  $0.07^{\circ}\text{C} \pm 0.02^{\circ}\text{C}$  per decade).<sup>7</sup>

This is consistent with predictions of global warming due to an enhanced greenhouse effect and increased aerosols. Yet, it could also be within acceptable limits for natural temperature variation. This lends support to the assumption that the Earth's climate is warming. However, it may take another decade of continued increases in global temperatures to provide conclusive evidence that the world's climate is warming as a result of the enhanced greenhouse effect.

For the first time ever, the scientists concluded that the observed increase in global average temperature over the last century is unlikely to be entirely natural in origin and that the balance of evidence suggests that there is a discernible human influence on global climate.<sup>8</sup>

A 1.3°F in average global surface temperature over the last century may seem like an insignificant change, but in fact it has had a marked impact on many of the earth's

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<sup>6</sup> Andrew Rewkin and Timothy Williams, "Global warming Called a Security threat," *The New York Times*, April, 2007, 15.

<sup>7</sup> Hegerl, Gabriele C. "Understanding and Attributing Climate Change," [http://ipcc-wg1.ucar.edu/wg1/Report/AR4WG1\\_Print\\_Ch09.pdf](http://ipcc-wg1.ucar.edu/wg1/Report/AR4WG1_Print_Ch09.pdf); Internet; accessed 17 March 2008.

<sup>8</sup> Ibid.

natural systems. The objectives of this climate change are: air temperature, changes in ocean climate, atmospheric circulation, precipitation, the cryosphere and sea level.<sup>9</sup> Since 1950, cold days and nights and frost days have become less frequent, while hot days and nights and heat waves have become more frequent.<sup>10</sup>

The increase in heavy precipitation events is consistent with the general increase in temperatures and the commensurate increase in atmospheric water vapor content. Also, droughts have become more intense, particularly in the tropics and subtropics, because of higher temperatures, more frequent heat waves, and changes in precipitation patterns.<sup>11</sup>

The combination of increasing atmospheric temperatures and increased sea surface temperatures can increase the energy of tropical storms.<sup>12</sup>

The oceans have an enormous capacity to hold heat; because of their volume and heat capacity they require extremely large inputs of heat to change their temperatures. Nevertheless, the global mean sea surface temperature increased 0.9°F globally in the twentieth century.<sup>13</sup> Ocean temperature is important to sea level rise because as temperatures increase, water expands, causing sea levels to rise. Because of the thermal inertia of the oceans, once sea level begins to rise because of thermal expansion, it will continue to do so for centuries regardless of any mitigative actions. Sea levels are also raised by the melting of landbased ice and snow because of the direct transfer of water into the sea. Sea-based ice, however, does not raise sea levels as it melts. According to the Intergovernmental Panel on Climate Change,

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<sup>9</sup> Ibid.

<sup>10</sup> Intergovernmental Panel on Climate Change, "Fourth Assessment Report, 2007," [http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4\\_syr.pdf](http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf); Internet; accessed 17 March 2008.

<sup>11</sup> Ibid.

<sup>12</sup> Emanuel, K. "Hurricanes: Tempests in a Greenhouse," *Physics Today*, August 2006, 74-75.

<sup>13</sup> National Oceanic and Atmospheric Administration, National Climatic Data Center. "Observed Trends and Variability in Land and Ocean Surface Temperatures," <http://lwf.ncdc.noaa.gov/oa/climate/research/trends.html>; Internet; accessed 08 March 2008.

Sea level has risen approximately 30 cm (1 foot) along most of the U.S. Atlantic and Gulf coasts in the last century. By the end of the 21st century, global average sea level is likely to be rising 1.5–9.7 mm/yr even if polar ice sheets do not begin to disintegrate. Additional contributions from the Greenland and Antarctic ice sheets could be negligible or add as much as 4 mm/yr. Because of regional subsidence, sea level has risen, and almost certainly will continue to rise, 1–2 mm/yr more rapidly than the global average along the mid-Atlantic Coast. Thus, by 2100, sea level could be rising 3–16 mm/yr. Over the next century sea level is expected to rise 30 to 90 cm (1 to 3 feet) along the mid-Atlantic coast.<sup>14</sup>

Also, oceanographers have observed dramatic changes in salinity levels in the oceans. Oceans in the midland high latitudes have shown evidence of freshening, while those in tropical regions have increased in salinity.<sup>15</sup>

For those concerned about national security, stability is a primary goal.

Maintaining stability within and among nations is often a means of avoiding full-scale military conflicts.

Conversely, instability in key areas can threaten our security. For these reasons, a great deal of national security efforts in the post-World War II era has been focused on protecting stability where it exists and trying to instill it where it does not.<sup>16</sup>

This brings us to the connection between climate change and national security. As noted before, climate change involves much more than temperature increases. It can bring with it many of the kinds of changes in natural systems that have introduced instability among nations throughout the centuries and in the near future.

Some nations may have impaired access to food and water. Violent weather, and perhaps land loss due to rising sea levels and increased storm surges, can damage infrastructure and uproot large numbers of people. These changes, and others, may create

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<sup>14</sup> J.G. Titus and E.M. Strange, Background Documents Supporting Climate Change Science Program. “Synthesis and Assessment Product 4.1: Coastal Elevations and Sensitivity to Sea Level Rise,” [http://epa.gov/climatechange/effects/downloads/background\\_report.pdf](http://epa.gov/climatechange/effects/downloads/background_report.pdf); Internet; accessed 18 march 2008.

<sup>15</sup> Intergovernmental Panel on Climate Change, “Fourth Assessment Report, 2007,” [http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4\\_syr.pdf](http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf); Internet; accessed 17 March 2008.

<sup>16</sup> Ibid.



large number of migrants. When people cross borders in search of resources, tensions can arise. Many governments, even some that look stable today, may be unable to deal with these new stresses. When governments are ineffective, extremism can gain a foothold. Adequate supplies of fresh water for drinking, irrigation, and sanitation are the most basic prerequisite for human habitation. Changes in rainfall, snowfall, snowmelt, and glacial melt have significant effects on fresh water supplies, and climate change is likely to affect all of those things. In some areas of the Middle East, tensions over water already exist. While the developed world will be far better equipped to deal with the effects of climate change, some of the poorest regions may be affected most. This gap can potentially provide an avenue for extremist ideologies and create the conditions for terrorism, which is, in turn, the security threat #1 in the world now. But regarding to nowadays threats for security and military environment, we should stress our intention on some particular questions.

About two-thirds of the world's population lives near coastlines, where critically important civilian and military facilities and infrastructure, such as transportation routes, industrial facilities, port facilities and naval bases, energy production and distribution facilities are located. A rise in sea level means potential loss of land and displacement of large numbers of people and personnel. Storm surges will also take a greater toll on coastal communities and infrastructure as sea levels rise. According to a Pacific Institute study, "... a six-inch rise in the water level of San Francisco Bay would mean a fairly routine one-in-ten-year storm would wreak as much damage as a far more serious

“hundred-year storm” would have caused before the sea level rise”.<sup>17</sup> Admiral Donald Pilling, USN (Ret.), former vice chief of naval operations, was able to talk about this issue and the operational planning challenges it might offer, especially in the western hemisphere. He enumerated a list of operational impacts, starting with the assumption that there would be increased instances of large migrations – people fleeing homelands that have felt the impacts of climate changes. “This is key because it’s easy to see how our allies can be consumed by this,”<sup>18</sup> Admiral Pilling said. “They won’t have time to participate in exercises at sea because all of their assets will be focused on protecting the border and beaches. There is potential for fracturing some very strong alliances based on migrations and the lack of control over borders. A conservative current estimate is that flooding due to rising sea level will threaten 92 million people by the year 2100 if global warming is not halted. Open seas at the Arctic means you have another side of this continent exposed. Between the Canadians and us, there are a handful of ships oriented for the northernmost latitudes. But there is not much flexibility or depth there.”<sup>19</sup> He said that an increase in the frequency or intensity of hurricanes could have a destabilizing effect on maintenance and the stability of ships and fleets. “It may cause you to move ships north to avoid hurricanes. If a ship’s captain thinks he’s in the middle of hurricane season, he’s going to go out – get away from port.”<sup>20</sup> “It impacts maintenance schedules and impacts operational structures. And that doesn’t factor in the damage that hurricanes can do to our ports and maintenance facilities. We spent a few billion to restore

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<sup>17</sup> Gleick, P. and E. Maurer. “Assessing the Costs of Adapting to Sea Level Rise: A Case Study of San Francisco Bay,” *Pacific Institute for Studies in Development, Environment, and Security*, April 1990, 18.

<sup>18</sup> Energy bulletin by Center for Naval Analysis, <http://www.energybulletin.net/28744.html>; Internet; accessed 08 March 2008.

<sup>19</sup> Intergovernmental Panel on Climate Change, “Fourth Assessment Report, 2007,” [http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4\\_syr.pdf](http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf); Internet; accessed 17 March 2008.

<sup>20</sup> Ibid.

Pascagoula after Hurricane Katrina – and we’re not done yet. But at least that’s an impact you can see. People can get their hands around that.”<sup>21</sup> Over time, some of the operational issues related to climate change would be increasingly difficult to resolve. “At headquarters, they would need to be much more thoughtful about investment decisions. Why invest significant resources in bases that are in low-lying regions? Why invest in bases that may continue to be flooded? Those are tough questions to ask, but I would ask them.”<sup>22</sup>

Mentioned by the admiral, “open seas at the Arctic” seems to be a big issue to point out. The Arctic is a region of particular concern. There will be little to no sea ice in the Arctic’s summers toward the end of this century.<sup>23</sup>

Glacial ice and snow cover are disappearing in many regions around the world. The Arctic region, in particular, is one of the areas being affected most by rising temperatures. As a result of temperatures that have increased at nearly twice the global average rate, Arctic sea ice is thinning and shrinking in extent, glaciers are melting throughout the region, and the snow season has shortened. Alaskan glaciers have retreated at a rapid pace; in fact, the amount of glacial mass lost in Alaska alone represents half of the estimated worldwide total.<sup>24</sup>

The melting of ice cover is an important positive feedback that reinforces heating, because of ice’s contribution to the reflectivity of the earth. As ice melts, it exposes either land or water, depending on its location. Because land and water both reflect less solar radiation than ice, they reinforce rising temperatures, which in turn melts more ice. Once such loops begin, predicting their stopping point is difficult.

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<sup>21</sup> Ibid.

<sup>22</sup> Ibid.

<sup>23</sup> Intergovernmental Panel on Climate Change, “Fourth Assessment Report, 2007,” [http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4\\_syr.pdf](http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf); Internet; accessed 17 March 2008.

<sup>24</sup> Arctic Climate Impact Assessment (ACIA). “Impacts of a Warming Arctic: Arctic Climate Impact Assessment,” Cambridge University Press, <http://www.acia.uaf.edu>; Internet; accessed 19 March 2008.

A warming Arctic holds great implications for military operations. The highest levels of planetary warming observed to date have occurred in the Arctic, and projections show the high northern latitudes warming more than any other part of the earth over the coming century. The U.S. Navy is concerned about the retreat and thinning of the ice canopy and its implications for naval operations. A 2001 Navy study concluded that an ice-free Arctic will require an “increased scope of naval operations”.<sup>25</sup> That increased scope of operations will require the Navy to consider weapon system effectiveness and various other factors associated with operating in this environment. Additionally, an Arctic with less sea ice could bring more competition for resources, as well as more commercial and military activity that could further threaten an already fragile ecosystem.

The Arctic pack ice prevents regular marine shipping throughout the year, but due to climate change, the pack ice is being reduced and this Arctic shrinkage may eventually make the waterways more navigable. According to the European Space Agency (ESA), 200 satellite images from the Danish National Space Center (DNSC) indicate that the Arctic ice levels are at an all time low, since the first images taken in 1978<sup>26</sup>, and as a result, the Northwest Passage has completely opened up for the first time since humans began to record history. The images have shown the melting of the ice has "dramatically increased" more than previously thought and that by 2030, all of the summer ice could be gone with the region being completely ice free by 2070. Researchers call it an "extreme" situation and say that the ice is now shrinking at a level of about three million square kilometers a year, up from one million square kilometers per year in 2005. “The strong

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<sup>25</sup> U.S. Navy, Office of Naval Research, Naval Ice Center, “Naval Operations in an Ice-Free Arctic,” <http://www.natice.noaa.gov/icefree/FinalArcticReport.pdf>; Internet; accessed 22 March 2008.

<sup>26</sup> Hegerl, Gabriele C. “Understanding and Attributing Climate Change,” [http://ipcc-wg1.ucar.edu/wg1/Report/AR4WG1\\_Print\\_Ch09.pdf](http://ipcc-wg1.ucar.edu/wg1/Report/AR4WG1_Print_Ch09.pdf); Internet; accessed 17 March 2008.

reduction in just one year certainly raises flags that the ice may disappear much sooner than expected,” said DNSC spokesman Leif Toudal Pedersen in a statement.<sup>27</sup> It is thought that global warming is likely to open the passage for increasing periods of time, making it attractive as a major shipping route. However, the passage through the Arctic Ocean would require significant investment in escort vessels, new naval patrol ships built, that will be stationed in the passage, and also staging ports. Therefore the Canadian commercial marine transport industry, Canadian Coast Guard and Canadian Navy should anticipate the route as a viable alternative to the Panama Canal in close future.

Also, a big question is direct impact of global warming on military systems, weapons, and then, operations. Operating equipment in extreme environmental conditions increases maintenance requirements and reduces the service life of the equipment. As mentioned before, a stormier northern Atlantic would have implications for naval forces. More storms and rougher seas increase transit times, contribute to equipment fatigue and hamper flight operations. Each time a hurricane approaches the U.S. East Coast; military aircraft move inland and navy ships leave port. Warmer temperatures in the Middle East could make operations there even more difficult than they are today. A Center for Naval Analyses study showed that the rate at which U.S. carriers could launch aircraft was limited by the endurance of the flight deck crew during extremely hot weather.<sup>28</sup>

Looking ahead, General Paul Kern, USA, another member of the military advisory board, discussed wider global trends that the military must address to achieve an optimal state of readiness. He believes “the critical factors for economic and security stability in the twenty-first century are: energy, water, and the environment. These three factors need

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<sup>27</sup> Ibid.

<sup>28</sup> Ibid.

to be balanced for people to achieve a reasonable quality of life. When they are not in balance, people live in poverty, suffer high death rates, or move toward armed conflict. While the military community has not focused on these issues, we often find ourselves responding to a crisis created by the loss of these staples, or by a conflict over claims to one or more of them. In my view, therefore, military planning should view climate change as a threat to the balance of energy access, water supplies, and a healthy environment, and it should require a response.”<sup>29</sup> Severe weather has a direct effect on military readiness. Ships and aircraft operations are made more difficult; military personnel themselves must evacuate or seek shelter. As General Paul Kern explained of his time dealing with hurricanes in the U.S. Southern Command: “A major weather event becomes a distraction from your ability to focus on and execute your military mission.”<sup>30</sup>

Admiral Frank Bowman, USN former national nuclear security administration member notes that today, a raging debate is underway over a potential set of climate-induced global changes that could have a profound impact on national security, and that regardless of the probability of the occurrence, the projected weather-driven global events could be dire and could adversely affect the national security and military options significantly. He therefore argues that the prudent course is to begin planning, as we have in submarine operations, to develop a similar defense in depth that would reduce national security risks even if this is a low probability event, given the potential magnitude of the consequences:

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<sup>29</sup> National Interest Online, “Bad Tidings,” <http://tniprod.nationalinterest.org/Article.aspx?id=16528>; Internet; accessed 11 March 2008.

<sup>30</sup> Council of Foreign relations, a nonpartisan resource for information and analysis, “National Security and The Threat Of Climate Change,” [http://www.cfr.org/publication/13347/national\\_security\\_and\\_the\\_threat\\_of\\_climate\\_change\\_rush\\_transcript\\_federal\\_news\\_service\\_inc.html](http://www.cfr.org/publication/13347/national_security_and_the_threat_of_climate_change_rush_transcript_federal_news_service_inc.html); Internet; accessed 11 march 2008.

“Our nuclear submarines operate in an unforgiving environment. Our Navy has recognized this environment and has mitigated the risk. We should begin planning for a similar approach in dealing with potential climate change effects on the national security.”<sup>31</sup>

It must be emphasized that extreme weather affects operations and, as result, the outcome of conflict. There are countless historical examples of how weather does it all and we should be able to meet at least the same results in the future:

North Sea gales badly battered the Spanish Armada in 1588 when Sir Francis Drake defeated it, saving England from invasion;

The severe and unpredictable Russian winter has defeated three invading armies: Charles XII of Sweden in 1708, Napoleon in 1812 and Hitler in 1941;

During the American Revolution, George Washington would have been surrounded at the Battle of Long Island had adverse winds not prevented the British from landing and cutting him off;

Hardships from a severe drought in 1788 are thought to be the spark that caused the French Revolution;

Napoleon was defeated at the Battle of Waterloo in large part because a torrential downpour obscured visibility and delayed the French attack;

During World War II, Typhoon Cobra capsized three destroyers, a dozen more ships were seriously damaged and 793 men died. This natural disaster, called the Navy’s worst defeat in open seas in World War II, killed nearly a third as many as in the attack on Pearl Harbor;

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<sup>31</sup> Atoms for peace, Nuclear energy and science for the 21 century, conference report, <http://www.ifpa.org/confwrkshp/archive/doe/www/pdf/DOEFlet.pdf>; Internet; accessed 12 march 2008.

Many know that D-Day awaited the right weather before it began. Many don't know that a freak storm destroyed floating docks shortly beforehand, almost canceling the invasion;

During the 1991 Persian Gulf War, heavy winds prevented Saddam Hussein from launching Scud missiles at Israel and coalition forces;

During the Persian Gulf War and the Iraq war, sandstorms delayed or stopped operations and did tremendous damage to equipment. In March 2003, the entire invasion of Iraq was stalled for three days because of a massive sandstorm.

These and many other examples are not meant to suggest that weather changes will put the operations on the land, sea or in the air at a disadvantage. They, however, help illustrate ways in which climate change can add new layers of complexity to military operations. An increase in extreme weather can make the most demanding of tasks even more challenging.

Global climate change presents a new and very different type of national security challenge. Based on the evidence presented, we could conclude that it is appropriate to focus on the serious consequences to the national security that are likely from unmitigated climate change: extreme weather events, drought, flooding, sea level rise, retreating glaciers, and the rapid spread of life-threatening diseases will themselves have likely effects: increased migrations, further weakened and failed states, expanded ungoverned spaces, exacerbated underlying conditions that terrorist groups seek to exploit, and increased internal conflicts. In developed countries, these conditions threaten to disrupt economic trade and introduce new security challenges, such as increased spread of infectious disease and increased immigration. Unlike most conventional security threats that involve single entity acting in specific ways at different points in time, climate



change has the potential to result in multiple chronic conditions, occurring globally within the same time frame. Economic and environmental conditions in these already fragile areas will further erode as food production declines, diseases increase, clean water becomes increasingly scarce, and populations migrate in search of resources.

Weakened and failing governments foster the conditions for internal conflict and extremism movement toward increased authoritarianism and radical ideologies. Problems of this scope may overwhelm the capacity of local authorities to respond, and may even overtax national militaries, requiring a larger international response. These challenges are not traditional national security concerns, such as the conflict of arms or ideologies. But they can threaten national security. To acknowledging the national security implications of extreme weather and other environmental factors, we should indicate that countries may have to intervene militarily. Regarding these factors and their impact on the operational environment, nations should include appropriate guidance to military planners to assess risks to current and future missions of projected climate change, guidance for updating defense plans based on these assessments, and the capabilities needed to reduce future impacts. This guidance should include appropriate revisions to defense plans, including working with allies and partners, to incorporate climate mitigation strategies, capacity building, and relevant research and development. Changing climate also could lead to increased flooding and fires which will increase the need for humanitarian assistance, often involving the military. The need for new kinds of humanitarian operations could necessitate new training to address these different missions. And the most demanding question of today – climate change will provide the conditions that will extend the war on terror. Yes, in case of global warming we have to act with incomplete information. But “we never have 100% certainty on the battlefield... If you wait until you

have 100 of certainty, something bad is going to happen on the battlefield. We have to act on our intuition sometimes.”<sup>32</sup>

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<sup>32</sup> Environment news service, “Military Panel: Climate Change Threatens U.S. National Security,” <http://www.ens-newswire.com/ens/apr2007/2007-04-16-05.asp>; Internet; accessed 22 March 2008.

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