ASIAN JOURNAL OF CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT
: Law, Economics and Politics

April 2013 Volume 2 Number 1

CENTER FOR CLIMATE AND SUSTAINABLE DEVELOPMENT LAW AND POLICY

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Note from the Director

Recent attack of Typhoon Haiyan in Philippines has raised a fundamental question again of whether the global community has adequately worked together to prevent serious environmental problems such as climate change. Although there have been serious efforts in building global, regional and national institutions to cope with these challenges, they apparently are not sufficient, if not useless. Here, another question arises: how to enhance the effectiveness of international efforts to address the issues of climate change and sustainable development. One of the possible answers to this question will be to securitize the issues including climate change so that we can better mobilize global recourses to fight against those environmental challenges.

Furthermore, it is time for the global society to develop effective global governance in areas such as climate change and other environmental issues in order to better address those challenges. In case of climate change, past discussions at the global level have focused mainly on issues related to United Nations Convention on Climate Change. However, considering the limited results of the efforts made during the past two decades of UNFCCC regime as well as creations of new global organizations such as Global Green Growth Institute and Green Climate Fund, more attention should be given to enhance coordination among the relevant organizations and institutions.

In particular, those which emphasize the role of markets and technologies, such as the Major Economies Forum, will need to be better incorporated into the framework of global climate change governance since market-based approaches has become increasingly important as a way of tackling global climate change and other environmental matters. Moreover, the addressing of other issues such as climate-induced migration in dealing with climate change and sustainable development should be integrated into the process of building an effective climate change regime.

In the context of building strong governance regarding issues of climate

change and sustainable development, a so-called bottom-up approach is gaining more and more importance. As the global society is still fragmented, there are limitations in implementing policies at the local level as well as securing resources to deal with new challenges. In this sense, it is worth noting that how to engage various stakeholders during the process of addressing global warming and other environmental issues have become inevitable.

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Conflicting Narratives in Climate Change Security

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Abstract

From its inception stages, the emerging field of climate change security has been riddled with conflicting narratives which continue to hinder the development of a coherent strategy in dealing with the phenomenon of climate change. The principal root of discontent stems from the definition of the security threat which traditionally is linked to human agency. The lack of reliable models to prove the connection between the production of greenhouse gases and climate change and the dissociation of the experts in the field with the larger historical context when severe changes in weather patterns have led to catastrophic events in the past set the perception and response to the real danger of climate change on a narrow, conflicting and unproductive path. This self-limiting approach reflects negatively in the support of climate change policies outside the epistemic community. Analyzing the evolution, narratives, and alternative explanations for climate change, this paper argues that the threat assessment should be addressed as an integrated approach that factors in both extraneous and anthropogenic causes in order to produce viable and enduring solutions for the consequences of climate change.

Keywords:
Climate change, security, global warming, consensus, controversy

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1. Introduction

Climate change security constitutes an emerging field of study that has its roots in environmental security. It refers the security threats caused by climate change as the current scientific model postulates that the rise in global temperature is responsible for sea level rising, severe weather events, massive flooding, extended droughts and other damaging climate related outcomes. The basic threat assessment includes the conclusion that climate change can impact water supplies, food production, energy use, economic development and critical infrastructure, the natural habitat and marginal environments and therefore endanger national and international security by causing significant resource allocations, population displacement and migrations, instability, violent conflicts, and spread of infectious pathogens.

Unlike its parent field – environmental security – climate change security raises a serious question on what constitutes its causal agency. The proponents of climate change thesis opine based on various research methodologies that the climate change is the result of anthropogenic activities as the greenhouse gases emitted by human industries including agricultural production lead to global warming which causes the climate to change. A secondary question refers to the referent object when dealing with climate change. Unlike environmental security which identifies its referent object as the planet's natural biophysical systems and processes,[1)] climate change is concerned primarily with the preservation of life standards and welfare of human population. Identifying the cause and the referent object as human beings brings climate change security in the range of traditional security and explains the rapid internalization of the threat by security institutions such as the Pentagon or the Central Intelligence Agency or various governments around the world.

Functional as it may be, this approach eschews any consistent explanation for the past significant changes and alternative arguments for the causes of climate change while assigning blame and demanding impositions on human activities that are vital to large economic and social sectors. A second limitation to the human induced climate change approach comes from the possibility that once the human carbon emissions

1) Michael Sheehan, International Security (2005), p.101

are reduced to the desired number and an alternative energy production system based on wind, solar or hydro sources is put in place, the problem persists and the alternative energy system which is highly contingent on weather patterns implodes with dire consequences.

This paper follows a constructivist approach as it analyzes how the concept of climate change security came to be and how its fundamental assertions are built in order to generate a consensus that would result in national and international policies and institutions. By understanding its constitutive narratives, researchers, scientists and security experts involved in preventing and mitigating the effects of climate change can avoid the pitfalls of a narrow and self-limiting agenda in their efforts to produce viable policies for dealing with the consequences of climate change.

2. The origins and evolution of climate change security

The origins of climate change as a result of the influences of human activities can be traced to the 19th century when scientists discovered the concept of ice ages and began theorizing about the causes of such major temperature shifts. Thus, in the late 19th century, a member of the Swedish Academy of Science, Svante Arrhenius, theorized that the ice ages were caused mainly by carbon dioxide resulted from volcanic eruptions and that the human input of carbon dioxide produced by human activities could hypothetically affect the climate over a long period of time.[2)]

The issue remained largely unexplored until the 1970s when the scientific community began to uncover evidence of greenhouse gases on climate changes. A secretive group of elite physicists working for the US military out of public view in the Defense Advanced Research Projects Agency (DARPA) and the Department of Energy, who called themselves "the Jasons," were among the first to study the long-term impact of atmospheric carbon dioxide on climate change and predicted a warming

2) Weart R. Spencer, "A National Security Issue? How People Tried to Frame Global Warming"(2008), p.24

of a few degrees Celsius by the middle of the 21st century and a sea-level rise with serious consequences for the world's food supply as well as large scale displacing of populations.[3)]

The scientific concerns over the changes in climate the potential consequences found their ways in the press as revealed by a 1975 *Newsweek* article which warned that "there are ominous signs that the Earth's weather patterns have begun to change dramatically and that these changes may portend a drastic decline in food production - with serious political implications for just about every nation on Earth."[4)]

Throughout the 1980s "global warming" as it was known at the time remained an issue of peripheral concern to be dealt with by environment ministries until began to reenter the public consciousness as members of the environmentalist movement pushed forward with their agenda of rising awareness about the consequences of human activities and the need for national policies. A *New York Times* article from 1988 shows how global warming caused by industrial pollutants is "likely to shrink forests, destroy most coastal wetlands, reduce water quality and quantity in many areas, and otherwise cause extensive environmental destruction in the United States over the next century."[5)]

In 1990, as the end of Cold War gave way to the widening of the security agenda and the strategic threats of communism and nuclear war disappeared from the radar of security experts, members of the United States Senate Armed Services Committee (Al Gore, the future US vice-president and Noble price recipient for his role in fighting global warming, among them) seized the opportunity to bring the environment into their deliberations and irreversibly linked climate change with national security when they declared that environmental destruction, including global warming among other problems, was "a growing national security threat."[6)]

At international level, the problem of climate change saw its first recognition as an independent subject of discussion and security concern in 1992 when the United Nations Conference on Environment and Development held in Rio de Janeiro adopted

3) Ibid. p.33
4) Newsweek Magazine, April 28, 1975
5) "Draft Report on Global Warming Foresees Environmental Havoc in U.S.," New York Times, October 20, 1988
6) Carolyn Pumphrey, Global Climate Change: National Security Implications (2008), p.1

the United Nations Framework Convention on Climate Change (UNFCCC), a non-binding treaty which aimed at stabilizing "the greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." [7)]

While overall an international effort was brought forward to create a framework to engage the issue of climate change and the potential human induced cause, a connection between climate change and violent conflict that would clearly set global warming as an aggravated security issue had been already occupying the discussion fora of academics, governmental experts and media under the thesis of "water wars." According to this approach, the effects of global warming were seen as a leading cause for water scarcity which in turn was to trigger violent internal and intra-state wars. To the chagrin of the "water wars" hypothesis supporters, the idea that climate change may cause war has ever since been discredited by researchers such as Deudney (1990), Barnett (2001) and detailed analysis by Libiszewski (1997), Lonergan (1997) and Allan (2002) as they correctly concluded that there was no rationale for a conflict over water in the near future.[8)]

Although covering a wide spectrum of opinions, the issue of global warming aggregated enough substance to lead to the creation of an influential international institution that would be instrumental in advocating the cause of human induced climate change. Established in 1988 by two United Nations organizations, the World Meteorological Organization (WMO) and the United Nations Environment Program (UNEP), and later endorsed by the United Nations General Assembly through Resolution 43/53,[9)] the Intergovernmental Panel on Climate Change (IPCC) after "a fierce night-long debate" among its representatives produced a turning point in the debate on climate change in 2001 when it issued a "scary" but "truly meaningful" consensus statement which read that the "temperature is very likely to increase by 1.4 to 5.8 degrees C by 2100… a rate without precedent during at least the last 10,000

7) Article 2 of the United Nations Framework Convention on Climate Change.
8) Suh-Yong Chung and Ovidiu Chiorean, The Security Implications of Climate Change in the Asia-Pacific Region (2012), p.79
9) IPCC, Wikipedia, http://en.wikipedia.org/wiki/Intergovernmental_Panel_on_Climate_Change (visited August 3, 2013)

years."[10)]

After 9/11, in the apprehensive context generated by the collapse of the towers in the New York City, the propensity for overreaction by the security institutions, and the "scary" consensus produced by the IPCC, the threat of climate change received a new impetus towards securitization as the issue has been enthusiastically recast as a threat to national and international security. Thus in 2003, the "rather notorious" report commissioned by the Pentagon, "An Abrupt Climate Change Scenario and its Implications for United States National Security," provided a worst-case scenario as it concluded that climate change might have a catastrophic impact leading to rioting and nuclear war. The report opened the way for a series doom and gloom stories in the press which announced that "climate change will destroy us" while ranking the threat to the world "greater than terrorism."[11)]

The suddenly acquired danger status by climate change spread quickly with the force of a good meme and in 2004, speaking about the security implications of climate change, the British government's chief scientist, Sir David King declared that "climate change is a far greater threat to the world's stability than international terrorism."[12)] Two years later, in 2006, the World Bank economist Nicholas Stern and author of the 2006 "Stern Report" on the possible economic impact of climate change declared that failing to deal with climate change decisively would lead to "an extended world war."[13)]

Akin to the1990s "water wars" thesis, the conclusions of the 2003 Pentagon report and the subsequent internalization of the climate change threat by authoritative voices, morphed after 9/11 into a larger and more ominous threat known henceforth as "climate wars." One of the outcomes of this thesis predicted − based on "unimpeachable sources" such as NASA scientist James Hanson, Angela Merkel's climate change adviser Hans-Joachim Schellnhuber of the Potsdam Institute for Climate Impact Research, and former CIA head James Woolsey − no less than civil war in China, the collapse of the European Union by 2045 and nuclear strikes between India and Pakistan in 2036.[14)]

10) Weart (2008), p.39
11) Ibid. p.40
12) "Global warming 'biggest threat,'" BBC News, January 9, 2004
13) Quoted in Chung and Chiorean (2012), p.79
14) Gwynne Dyer, Climate Wars (2008)

The framework for the full recognition of climate change as an identifiable security matter and a distinct issue from the larger field of environmental security was set in 2007 when the United States based CNA Corporation brought together a group of generals to draft a report on the impact of climate change on security issues. The four main conclusion points of the report which stand apart as more moderate in scope than the climate wars thesis have ever since set the tone of the climate change security language: 1) climate change poses a serious threat to national security; 2) climate change acts as a threat multiplier; 3) climate change will add to tensions even in stable regions of the world; 3) climate change, national security and energy dependence are a related set of global challenges. [15)]

Echoing the conclusions of the CNA corporation report, albeit in a more alarmist manner, Thomas Homer-Dixon - who helped launch the debate about the consequences of the climate change on national security with a pair of articles in *International Security* in 1991 and 1994 - assessed the gravity of the challenge posed by climate change to international security in a 2007 *New York Times* open editorial as being "just as dangerous" and "more intractable" than the arms race between "the United States and the Soviet Union during the Cold War or the proliferation of nuclear weapons among rogue states today" and announced that it was time to "put climate change on the world's security agenda."[16)] Dixon's request materialized in 2009 when the security implications of climate change entered the agenda of the highest international security forum, the UN Security Council, which passed a resolution on Climate Change and Security. The resolution focused on the climate change implications in regions affected by sea level rise and the potential disappearance of small island states which could cause conflict through the population displacement of their inhabitants.

As of 2010, climate change has officially entered the US political agenda as a potential threat to national security. The 2010 Quadrennial Defense Review and the 2010 National Security Strategy both identify climate change as likely to trigger outcomes that will threaten US security. Following up on this developments, in March 2013, America's top military officer in charge of monitoring North Korea and China, Navy Admiral Samuel J. Locklear III, declared climate change as the biggest long-

15) Military Advisory Board, National Security and the Threat of Climate Change, (2007),p. 44-45
16) Chung and Chiorean (2012), p.80

term security threat in the Pacific region largely as it is going to "cripple the security environment" and the real potential in the "not so distant future of nations displaced by rising sea level" and urged that I was imperative to get "military capabilities aligned" for the time when the effects of climate change begin to impact "massive populations" in the range of "thousands or millions of people displaced" and the "security will crumble pretty quickly."[17] In the same line of thought, President Obama's National Security Adviser, Tom Donilon, quoting the National Security Strategy declared in April 2013 that "the danger from climate change is real, urgent, and severe" as he described the dire consequences of the "planet warming" which will materialize in "new conflicts over refugees and resources; new suffering from drought and famine; catastrophic natural disasters; and the degradation of land across the globe."[18]

3. Conflicting narratives

3.1 Controversy

As an offshoot of environmental security and a developing field, climate change raises significant questions in relation to its larger denomination. If in the case of environmental issues, a clear agency for the causality of environmental degradation or loss of biodiversity can accurately be identified in human activity and its massive production of pollutants, climate change considerably lacks this precise causal recognition. Therefore the efforts to link climate change and security is built on the traditional approach that claims "human agency as fundamental to the definition of a security threat" on the logic that if too much is securitized the "process will not be politically effective."[19] This approach brings climate change security in the hot waters of controversy as it cannot consistently support the evidence the human agency is solely responsible for climate change and, secondly, it generates a considerable backlash in the process of producing a consensus by denying alternative explanations and narrowing the range of potential solutions to the problem. Paraphrasing a Hollywood

17)"Chief of US Pacific forces calls climate biggest worry," The Boston Globe, March 9, 2013
18) "Remarks by Tom Donilon, National Security Advisor to the President At the Launch of Columbia University's Center on Global Energy Policy," The White House April 24, 2013
19) Sheehan (2005), p.59

movie line, climate change is real but the cause is still a choice.

Despite the common perception, the epistemic community responsible for the science of climate change does not benefit from the substantial and solid base as other academic disciplines. Moreover, the attempts to bring the issue and the gravity of the threat to the attention of the general public often lead to regrettable missteps of the "cutting corners" type by compelling scientists to adjust the data in their research to fit the predicted results. One such example is the case known as the 2009 "Climategate" when the publication of more than 1000 e-mails to and from scientists at the Climatic Research Unit (CRU) of the University of East Anglia dating back to 1996 led "climate change skeptics" to claim that "efforts had been made to manipulate data to exaggerate the threat of global warming."[20] Although an independent investigation led by Sir Muir Russel later exonerated the scientists as it found no evidence to question their "rigor and honesty," the finding of "a consistent pattern of failing to display the proper degree of openness"[21] and the echoes of the incident in the press increased the skepticism about the case for global warming just weeks before met to discuss a global deal at the United Nations' climate change conference in Copenhagen December, 2009.

A similarly compromising situation emerged in 2010 when as a result of incorporating data in the IPCC Fourth Assessment Report which cited the case of Himalayan glaciers as receding faster than in any other part of the world with the likelihood of disappearing by the year 2035, the IPCC was obligated to retract the information due "to poorly substantiated estimates of rate of recession and date for the disappearance of Himalayan glaciers."[22]

A third case of controversy that undermines the confidence in the current scientific models came about in October 2012 when new data was made available by the British government's Met Office and the Climate Research Unit at the University of East Anglia according to which global warming stopped 16 years ago as from the beginning of 1997 until August 2012 there was no discernible rise in aggregate global temperatures. [23] This new data questions the general agreement that the planet

20) "Q&A: 'Climategate' explained," CNN, July 7, 2010
21) Muir Russel et al., The Independent Climate Change E-mails Review, July 2010
22) "IPCC statement on the melting of Himalayan glaciers," IPCC, January 20, 2010
23) "Global warming stopped 16 years ago, reveals Met Office report quietly released and here is the chart to prove it," Mail Online, October 13, 2012.

will continue to warm up as has been observed since 1880, when worldwide reliable statistics were first collected on a global scale, until 1997 when the world's climate has increased by 0.75 degrees Celsius.

If the global warming resumes, an increase of more than 2°C is generally cited as having catastrophic consequences for human habitat as it leads to the melting of ice in the Arctic region and subsequent sea level rise. Contradicting the general pessimistic studies such as the one produced by US National Oceanic and Atmospheric Administration (NOAA) which projected a sea level rise of up to 2 meters by 2100, the Ice2sea project, an aggregate of 24 European research institutions, found that sea levels would rise by between 16.5 and 69 cm under a scenario of moderate global warming this century.[24] The slowdown in global warming exposes the gaps in the science behind the climate change as the phenomenon defies the rise in global greenhouse emissions and leads supporters of the climate change model like Bjorn Lomborg, the author of "The Skeptical Environmentalist" to conclude that "the climate system is not quite so simple as people thought."[25]

3.2 Building consensus

The lack of clear and reliable models to support the human caused climate change hypothesis forces the epistemic community into a "vigorously disputed" debate with the large but widely unacknowledged body of critics who reject the human agency thesis of climate change.[26] For an outside observer who benefits from the advantage of non-involvement, the persuasive effort of scientists and politicians who endorse the anthropogenic thesis can appear at times as an attempt to manufacture consensus. As the struggle for consensus reaches alarmingly high proportions for a scientific undertaking, this negative feedback does not seem to discourage its most inveterate supporters from marching on with their discourse. An eloquent example can be seen in President Obama's June 2013 speech on climate change in which he declared that 97 percent of all scientists involved with climate change are behind the consensus that

24) "Ice melt, sea level rise, to be less severe than feared: study," Reuters, May 14, 2013
25)"Climate scientists struggle to explain warming slowdown," Reuters, April 16, 2013
26) World Bank, Towards a climate change strategy: South Asia region (2009), p.44

"the planet is warming and human activity is contributing to it" and vouched to enlist United States as a "global leader in the fight against climate change."[27)]

The overly optimistic consensus mentioned in the presidential speech is based on a research led by John Cook of the University of Queensland who analyzed the evolution of the scientific consensus on anthropogenic global warming in the peer-reviewed scientific literature. Unlike the presidential wording which leaves room for interpretation clearly stating that "human activity is contributing" to global warming, Cook's study explicitly concludes that among the scientists acknowledging global warming, 97.1% endorsed the consensus position that humans are causing global warming.[28)]

The high figure of scientists agreeing over the causes of climate change does not find equivalence in the public perception. Opinion polls around the globe confirm a common belief in general population that scientists disagree about whether climate change is caused by human activities or the planet's natural cycle or external factors such as solar activity. A survey by the US Pew Research Center published in October 2012 found 45 percent of Americans said "Yes" when asked if scientists agree Earth is getting warmer because of human activity?" whereas 43 percent said "No."[29)] Another survey by the Pew Research Center conducted in 39 countries from March to May 2013 found that the public concern about climate change is set globally to an average of 54 percent with the lowest number in the United States, 40 percent, and the highest in South Korea, 85 percent. Regionally, the public concern with global climate change is set at 54 percent in Europe, 42 percent in the Middle East, 56 percent in Asia Pacific, 65 percent in Latin America and 54 percent in Africa.[30)]

Comparing the public perception in regard to climate change, it is noteworthy that in the United States the number of people rating climate change as serious security threat has remained almost the same compared to 2006 when a Pew study found that only 41 percent of Americans thought that global warming was a serious threat.[31)] In

27) Barack Obama, "Remarks by the President on Climate Change," June 25, 2013
28) John Cook et al, Quantifying the consensus on anthropogenic global warming in the scientific literature," (2013)
29) "Scientists say united on global warming, at odds with public view," Reuters, May 15, 2013
30) Pew Research Global Attitudes Project, "Climate Change and Financial Instability Seen as Top Global Threats," June 24, 2013
31) Pumphrey (2008), p.9

the light of public perception on climate change, the scientific consensus appears still unconvincing for the general population and requires obvious adjustments to lead to the necessary support for reliable policies.

The second attempt of building a consensus on climate change is centered on the threat's effects. When talking about climate change, scenarios vary from the "totally catastrophic to the mildly disruptive but ultimately survivable."[32] In the past two decades since climate change security emerged on the world's stage, the threat narratives have seen a number of changes. If in the 1990s the "water wars" were the norm as the most possible outcome, after 9/11 the narrative switched to a wider menace known as the "climate wars." In 2011 in yet another case of trying to frame the threat, the Defense Science Board Report concluded that climate change is "more likely to be an exacerbating factor for failure to meet basic human needs and for conflict, rather than the root cause."[33]

The framing of the threat posed by climate change is essential as environmental threats are generally set for a delayed crisis point which could take place years or decades. As Michael Sheehan points out in his *International Security*, "mobilizing public opinion against such threats using a traditional vocabulary may be counterproductive, because the public's attention span and commitment (and perhaps the government as well) will wane well before the critical time period is entered."[34] Sheehan's observation about the fleeting character of general public and governments' attention span can be seen at work in the case of the sudden shutdown of CIA's Center on Climate Change and National Security in 2012. Open in 2009 with great fanfare after a number of reports linking climate change and national security caught the attention of US Congressmen seeking political action on climate change, the center studied the national security implications of climate change with a mandate to "be aggressive in outreach to academics and think tanks working the issue." Three years later, skeptical of the science behind climate change, members of the US Senate justified the closing of the center as a necessity for the CIA to "focus its resources on

32) Ibid. p.7
33) Defense Science Board Report, Trends and Implications of Climate Change for National and International Security (2011), p. xi
34) Sheehan (2005), p.60

preventing terrorism."[35]

3.3 Inconvenient evidence

One of the major hurdles in providing a coherent narrative for climate change comes from the facile discarding of the historical evidence about climate change. Selling global warming as a new phenomenon that occurred only after the industrial age began constitutes a fallacy with considerable repercussions. The issue becomes all the more serious when authorities on climate change such as Michael McElroy, Gilbert Butler Professor of Environmental Studies at Harvard University and co-author of the 2012 *Climate Extremes: Recent Trends with Implications for National Security,* blatantly state that "lessons from the past are no longer of great value as a guide to the future."[36]

Recent academic research into the past implications of climate change reveals that the Maya civilization has disappeared as a result of dramatic changes in the weather patterns around the turn of the first millennium. A second case example showcasing the impact of climate change prior to the advent of the industrial age is represented by the abandonment of Greenland by Viking settlers in the 15 century. In regard to the thesis that extreme weather events in the recent years qualify as clear evidence of the impact of greenhouse cases on the climate, historical evidence shows that sever cases of extreme weather have regularly occurred in the past such as in the little known fact that the Niagara Falls has frozen twice prior to industrial and population boom after World War II.

3.3.1 Climate change and the end of Maya Civilization

Writing in the journal Science in November 2012, a team of archeologists and climate researchers led by Kenneth Douglas published their conclusions about the study of high resolution climate records spanning over 2000 years which show

35) E&E, Amid budget scrutiny, CIA shutters climate center," November 19, 2012,
36) PHYS.ORG, New Harvard report probes security risks of extreme weather and climate change, Feb. 11, 2013

how Maya political systems developed and disintegrated due to climate change. By reconstructing rainfall records from stalagmite samples from Yok Balum Caves in Belizez and comparing their finding with political histories carved on stone monuments in the region, the researchers theorize that high rainfall favored unprecedented population expansion and the proliferation of political centers between 440 and 660 C.E. This period of socio-economical development was followed by a drying trend between 660 and 1000 C.E. which triggered the balkanization of polities, increased warfare, and the asynchronous disintegration of polities that led to population collapse in the context of an extended drought between 1020 and 1100 C.E.[37)]

Speaking about the research, Douglas points out that the Mayan archaeological and historical records provide an opportunity to examine the long-term effects of climate change for both the development and disintegration of complex sociopolitical systems like the contemporary one. Unlike the narrow point of view expressed by the Harvard based Gilbert Butler in regard to past experiences related to climate change, Douglas contends that "the effects of climate change are complex and play out over multiple time scales" which shows that "abrupt climate change is only part of the story."[38)]

3.3.2 Climate change and the end of the Viking settlements in Greenland

According to a research study from Brown University which appears in *Proceedings of the National Academy of Sciences*, climate change played a significant role in the lives of Greenland's Viking settlers. By analyzing the quantitative temperature record of 5,600 years of climate history from lakes near the Norse settlement in western Greenland the researchers mapped out the evolution of the climate beginning with the arrival of the Vikings in the 980s' which coincided with a relatively mild weather similar to the present one and the subsequent 4 degrees Celsius drop in temperature from around the year 1100 which gradually set in motion the end of the Greenland Norse by inducing shorter crop-growing seasons, less available food

37) Douglas J. Kenneth et al., Development and Disintegration of Maya Political Systems in Response to Climate Change (2012), pp. 788-791

38) Science Daily, "Climate Change and the Political, Human Impacts Among Ancient Maya," November 8, 2012

for livestock and more sea ice that impeded navigation and trade.[39)]

The cooling period culminated with an extended cold snap known as the Little Ice Age which gripped Greenland in the 1400s and is generally credited as a major cause of the Vikings disappearance from Greenland. Yongsong Huang, professor of geological sciences at Brown and co-author of the study makes a similar point with Kenneth Douglas when speaks about the relevance of considering "how rapid climate change may have impacted past societies, particularly in light of the rapid changes taking place today."[40)]

3.3.3 Extreme weather events – Niagara Falls

Virtually any paper on climate change mentions an increase in the frequency of extreme weather events and their connection with the greenhouse gases induced global warming. Given their potential as security threats, a growing number of studies such as the Harvard produced and CIA sponsored "Climate Extremes: Recent Trends with Implications for National Security" argue that the "early ramifications of climate extremes resulting from climate change are already upon us and will continue to be felt over the next decade, directly impacting US national security interests."[41)] Yet the argument of the increment in extreme weather events in recent years as a result of climate change can be easily refuted as an exaggeration by simply review evidence of extreme weather events such as the freezing of the Niagara Falls in 1911 and 1932.[42)]

The little known fact that the Niagara Falls froze twice prior to the massive increase in greenhouse emissions that follow the economic and population boom after World War II raises significant questions in regard to the cause of extreme weather events and their frequency and warrants an increment in the level of attention given to the study of past effects and implications of climate change as exemplified by the Maya and Greenland Vikings cases.

39)"Climate helped drive Vikings from Greenland," Brown University, May 30, 2011
40) Ibid.
41) PHYS. ORG, "New Harvard report probes security risks of extreme weather and climate change" Feb. 11, 2013
42) According to http://www.ask.com/question/has-niagra-falls-ever-froze (visited August 5, 2013). A number of photographs to substantiate the claim are available at http://images.search.yahoo.com/search/images?_adv_prop=image&fr=fp-yie9&va=Niagara+falls+frozen+in+1932

4. Alternative explanations

Aside from the historical cases that demonstrate the recurrent character of climate change over long periods of time, the process of building a consensus with its super majority of 97 percent appears to make a consistent effort to ignore alternative explanations for the causal agency behind climate change. Given the limited scope of this paper, two examples are discuss briefly to support the argument that climate change is riddled with conflicting narratives that are detrimental to produce enough support in the general public for viable policies and institutions.

The first example refers to the "Relational Cycle Theory" proposed by John Casey, a former White House space program advisor, NASA Headquarters consultant and the Editor of the Global Climate Status Report, which posits that the Sun is responsible for climate change and that repeating cycles of the Sun can be analyzed to predict climate changes decades in advance.[43] In his book *Cold Sun,* Casey argues against the idea of global warming and the theory of greenhouse gases contending that the process of climate change is progressing towards decades of extreme cold weather due to a "solar hibernation" that manifests through a historic reduction in the energy output of the Sun.[44] Akin to the supporters of the climate wars thesis, Casey predicts worldwide food shortages, political, social and economical upheaval accompanied by significant global loss of life.

The relational cycle theory about the impact of the sun and the cooling of the planet, aside from the Greenland Vikings case and the Little Ice Age, finds supporting evidence in the work of reputed British historian Geoffrey Parker who makes a convincing case about the changes in the weather patterns during the 1640s and 1650s which manifested through longer and harsher winters, and cooler and wetter summers that led to a global crisis which extended from England to Japan, and from the Russian

43) Space and Science Research Corporation, Global Sea Level Rise Is Ending - News Conference, May 5, 2013
44) John Casey, Cold Sun (2011)

Empire to sub-Saharan Africa and North and South America.[45)]

The second example of alternative theory comes from a study by an international research initiative called IceGeoHeat under the direction of GFZ, the German Research Centre for Geosciences, which suggests that the ice in Greenland is melting partly because of the heat from the Earth's mantle. As Greenland's ice sheet is considered an important contributor to future global sea level rise due to amount of ice that could lead to a rise of global sea level by more than seven meters if completely melted, the researchers argue in Nature Geoscience that the effect of the mantle's heat cannot be neglected when putting together data on climate change. Moreover, by coupling models of ice dynamics with thermo-mechanical models of the solid earth allows a more accurate view of the processes that are melting the Greenland ice.[46)]

5. Conclusion

By analyzing the evolution and conflicting narratives of climate change security, a number of conclusions emerge that can clear the way for better approach to the issue. First and the most obvious is that the field of climate change security is relatively young and subject to higher degree of controversy in comparison to environmental security. The second conclusion reveals the fact that the overwhelming consensus about the cause behind the phenomenon of climate change requires additional evidence and transparency in order to translate in public support. Third, the historical evidence for cases of climate change impacting the development of human societies as well as alternative theories to explaining climate change present sufficiently convincing assertions to be incorporated in the "consensus" models that calculated the causality and predict the outcome of climate change. The way forward is therefore to integrate the two agencies, anthropogenic and natural into a coherent, integrated threat assessment model.

45) Geoffrey Parker, Global Crisis: War, Climate Change and Catastrophe in the Seventeenth Century (2013)

46) "Greenland ice sheet is melting but much of the heating is coming from inside the earth," Mail Online, August 12, 2013

Although laudable in its effort of generating responsibility for the effects of human activities, a one sided approach to the issue of climate change can prove more detrimental than helpful to the cause. Disregarding past climatic changes and their underlying causes and focusing too narrowly on impositions on human industries without realistic alternatives simply leads to the exacerbation of the gap between the critics of the anthropogenic model and the rest of the scientific community as well as in the perception of the population about a viable solution to the issue.

A balanced and holistic approach to the still poorly understood phenomenon constitutes the best methodology to make sure, as President Obama mentioned in his June 2013 speech, that the risk assessments under different climate scenarios and the spending will not be a "waste of money" on "building structures that don't withstand the next storm."

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