CLIMATE SECURITY

ASP American Security Project

PART ONE: CLIMATE CHANGE & SECURITY

Climate change is real: we see its impacts every day, around the world. A melting Arctic, unprecedented droughts across the world, extreme examples of flooding, and uncontrollable wildfires are all examples of the changing climate.

These present a greater challenge than just new and different weather patterns: it will challenge the world's security architecture to prepare for and adapt to new security challenges, like disaster response, food security, and water availability.

In Brief

- The climate influences people's everyday lives, from what they eat to where they live.
- Changes in the climate are becoming more identifiable every year: the Earth is warming at a faster rate than ever before and humans have played a major role in the change
- Although there are political arguments questioning the science, they do not hold up under close examination.
- Climate change will affect different regions in different ways.
- Environmental threats blur traditional notion of national security: secure states do not automatically mean secure peoples and climate change is proving that.
- Climate change, food security, water security and communicable diseases are examples of such non-traditional threats that require non-traditional responses.
- The U.S. must be resilient to potential large-scale variations in weather that will affect not only our country but our economic and physical security.
- Climate change is a risk to global security because it increases vulnerability in infrastructure, agriculture, energy and other economic factors.

The Facts about Climate Change

Climate influences people's everyday lives, from what they eat to where they live.

It impacts food production, changes water resources, influences both energy use and production, and affects disease transmission and public health.[1]

While a hospitable climate allows human societies to flourish, changes in climate can negatively impact societies.

Various extreme climate fluctuations throughout history caused entire civilizations to collapse[2] and there are numerous instances of climate change leading to political upheaval. For example, scholars attribute the movement of nomadic tribes like the Huns and the Mongols – who defeated great civilizations in battle – to changes in the climate of the Eurasian steppes.[3]

With the advent of modern technology and scientific study, **changes in our climate are increasingly identifiable.**

Over the past few decades, the international and national research communities have developed a clearer understanding of how and why the Earth's climate is changing. The Earth is currently in a period of warming, which scientists note is very different from previous periods of fluctuation, over thousands of years of climate variability.

What differentiates this period is the fact that **the Earth is warming at a faster rate than ever before and humans have played a major role in the change.**[4]

In order to effectively respond to the changes that are occurring, it is first necessary to understand what is happening and what we as humans have done to cause it.

"America and the world face unprecedented, complex and interconnected 21st Century challenges. Environmental issues will continue to have unpredictable and destabilizing affects on developing and developed countries alike."

Senator Chuck Hagel
ASP Board Member

Climate change is settled scientific fact.

Over the past century, the average mean global temperature has risen about 1.4˚F (0.8˚C) and is projected to rise at least another 2-11˚F (1.1-6.4˚C) in the next century.[5] In comparison to daily or seasonal fluctuation, this may seem trivial.

However, across the globe, an increase of 1.4˚F over a century is a significant change – and the projected increase of up to 11˚F over the next century would dramatically alter the stable climate in which human civilization developed. Consider that the difference between today's climate and the ice age, when massive glaciers covered the northern hemisphere, was a mere 5˚C (9˚F).[6]

While carbon dioxide (CO2) levels have varied over time, there is compelling evidence that the current trends are both unprecedented and man-made.

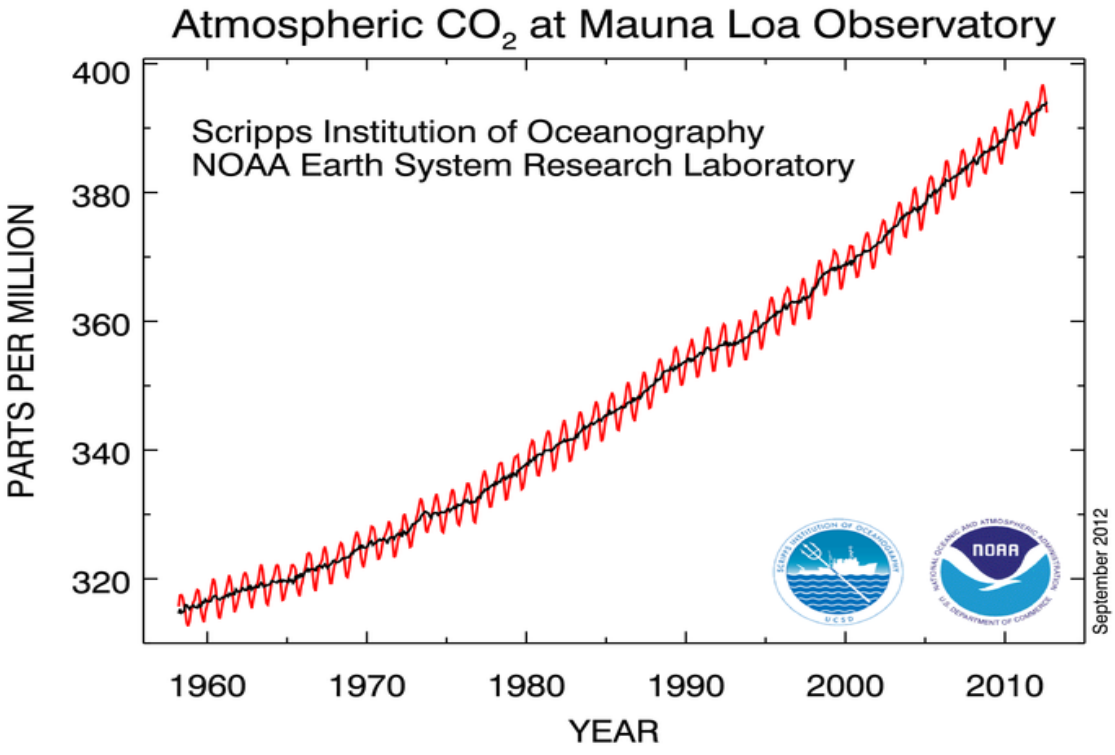


Figure 1: Atmospheric CO2 Concentrations in PPM at Mauna Loa Observatory

The red curve represents the monthly averaged data. The black curve, which represents the monthly averaged data with the seasonal cycle removed, shows a clear upward trend.

SOURCE: NOAA and Scripps Institution of Oceanography

This rise in temperature corresponds directly with a global surge in CO2 emissions since the beginning of the Industrial Revolution. The consequences of the Industrial Revolution have led to the highest levels of carbon dioxide in the atmosphere in 800,000 years. CO2 levels are up almost 40% since the industrial revolution, at over 396 parts per million (ppm) in August 2012 from approximately 285 ppm in the late 1800s.[7] CO2 levels have been rising at an average annual rate of about 2.0 ppm per year over the past decade.[8]

Carbon dioxide is one of multiple greenhouse gases (GHGs) which trap heat in the atmosphere.

These gases are necessary for sustaining life on earth because they trap energy from the sun. The greenhouse effect is the process by which the earth retains heat. Energy from the sun is absorbed by the land and oceans

and is in turn radiated upward in the form of heat. Without greenhouse gases, this heat would escape into space and the planet's average temperature would remain below freezing. If the greenhouse effect did not exist, Earth would look more like Mars than the planet we know.

Greenhouse gases (including carbon dioxide) are necessary to life as we know it; in excess, these gases cause the Earth to become too warm.

As concentrations of heat-trapping gases increase, the natural greenhouse effect is enhanced, causing average global temperatures to increase. The atmospheric concentrations of GHGs have increased over the past two centuries as a result of human activities, particularly through the burning of fossil fuels, but also through land-use changes (clearing forests for farming) and livestock breeding.[9]

The rising levels of greenhouse gases are directly linked to man-made emissions.[10] The National Academies' Board on Atmospheric Sciences and Climate report, *Advancing the Science of Climate Change*, released in 2010, states that there is an additional piece of evidence that makes the human origin of elevated CO2 virtually certain. The report says:

> *"Measurements of the isotopic abundances of the CO_2 molecules in the atmosphere—a chemical property that varies depending on the source of the CO_2—indicate that most of the excess CO_2 in the atmosphere originated from sources that are millions of years old. The only sources of such large amounts of "fossil" carbon are coal, oil, and natural gas."*[11] [National Academies, 2010]

The earth's temperature has been naturally fluctuating over time but it has increased rapidly with the rise in CO2 emissions, specifically after 1970 (see Figure 2).[12]

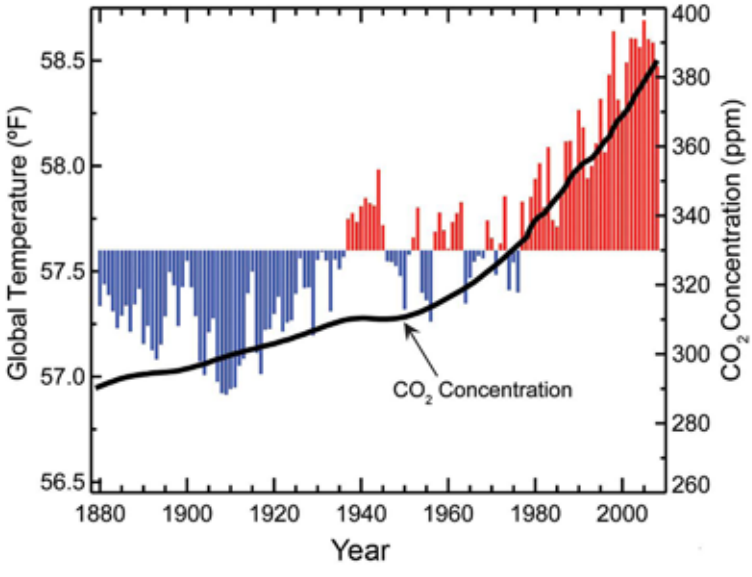


Figure 2: Global Temperature and Carbon Dioxide

SOURCE: U.S. Global Change Research Program

There is a direct connection between the rising CO2 levels and the rise in temperature.

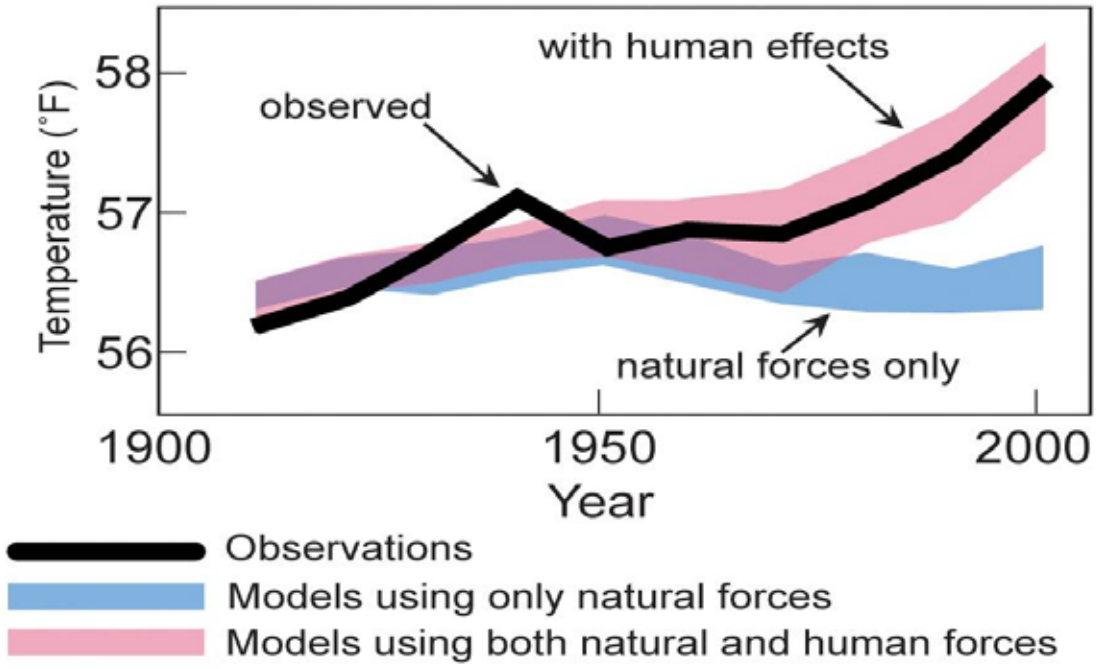


Figure 3: Human and Natural Influences on Climate

As the blue band shows, without human influences, global average temperatures would have cooled slightly over recent decades. With human influences, it has risen strongly (black line), consistent with expectations from climate models (pink band).

SOURCE: U.S. Global Change Research Program

Without the human influences, global average temperature would have decreased slightly over the past few decades. With the increased emissions, the temperature has risen sharply, consistent with expectations from climate models (see Figure 3).[13] Recent studies also suggest that the rate at which CO2 is removed from the atmosphere by ocean and land sinks may be declining, which leads to an increase in atmospheric concentration of CO2.[14]

Although there are political arguments questioning the science, they do not hold up under close examination.

The best way to test the scientific theory that the rise in temperature is due to human activity is to look at potential alternative explanations. Since the sun's output has a strong influence on the Earth's temperature, scientists have looked at the solar activity over the past 30 years to determine if increased output may be to blame. However, satellite readings from 1979 until today have found no net increase in solar output in the past 30 years, the time in which CO2 emissions and temperatures have been increasing faster than they had previously.

Furthermore, many have argued that the change in climate is just part of a trend, such as El Niño or La Niña. Both El Niño and La Niña are climate patterns that occur approximately every 5 years and refer to variations

in the temperatures of the surface of the tropical eastern Pacific Ocean. Temperatures are higher during El Niño events and lower during La Niña. **Despite these fluctuations, scientists found that these events are short-term fluctuations in a longer warming trend**.[15]

In the end, the changes we are seeing today can largely be attributed to human activities and the burning of fossil fuels. Although skeptics argue against such conclusions, 96.2% of climate specialists and scientists believe that the global temperature has risen over the past century and that human activity is a significant factor in that change.[16]

Climate change will affect different regions in different ways.

Global temperatures are rising but this does not mean that every region is affected in the same way. This rise in temperature also does not mean that global warming and climate change are synonymous. Some regions of the world are experiencing extreme heat and droughts while others may be experiencing unseasonably cold weather.

The Intergovernmental Panel on Climate Change (IPCC) 2012 special report Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation points to the high probability of increased fluctuation of extreme weather as well as sea level rise,[17] which has tremendous economic and social repercussions for everyone.

The term 'global warming' is somewhat misleading because it fails to account for the variability of weather patterns and the range of changes the world is dealing with. Though this term is still often used interchangeably with climate change, it does not give a clear picture of the issues at hand and it causes public misunderstanding as to what is occurring.

Temperature change is not the most severe aspect of climate change.

It is causing the ice to melt in the Arctic, droughts in the Sahel (south of the Sahara) and concerns of energy shortage in the United States. According to the National Academies Board on Atmospheric Sciences and Climate, scientific research will never completely eliminate uncertainties about climate change and its risks. However, it provides useful information to decision makers who must make choices in the face of risks.[18]

The U.S. must be resilient to potential large-scale variations in weather that will affect not only our country, but our economic and physical security.

The Link Between Climate Change and Security

Climate change affects national and global security.

In the past century, the primary security discourse has been state-centric, aiming to protect the nation's territorial integrity from an outside military threat.

Today, the state-centric security paradigm is too narrow to prevent against all external threats to states. "Security" is too interdependent an issue to be defined purely in military terms[19] and the U.S. faces a myriad of transnational security threats.

Climate change, food security, water security and communicable diseases are examples of such non-traditional threats that require non-traditional responses.

An environmental threat is a type of internal insecurity that blurs the traditional notion of national security.

A broad and long-term threat like climate change makes the response much more difficult to address. What is clear is that military responses and nation-centered politics alone are not capable of delivering solutions to new threats.[20]

The multi-faceted nature of 21st Century security threats requires a "fresh take on security,"[21] which allows the U.S. to be better prepared for contingencies related to climate change.

Secure states do not automatically mean secure peoples and climate change is proving that.[22]

Just because a nation's territory is secure from outside attack does not necessarily mean the people within the country are safe from instability.

This became very clear during the Russian wildfires in 2010, which broke out due to record high temperatures and drought. Russian President Dmitry Medvedev declared a state of emergency in 7 regions for the wildfires, while 28 other regions were under a state of emergency for crop failures caused by the drought.[23]

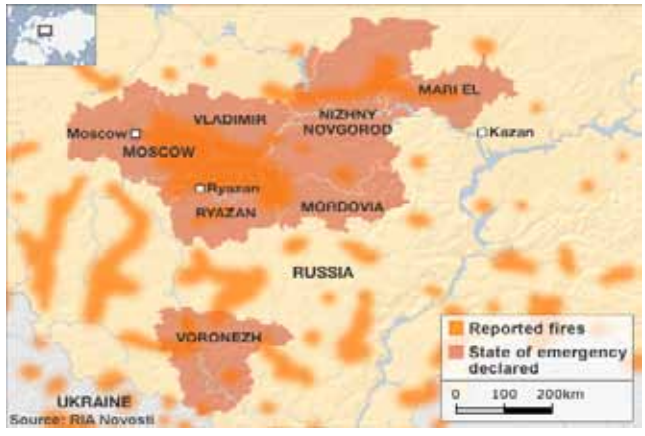
The Centre for Research on the Epidemiology of Disasters (CRED) reported that 55,736 people were killed by the extreme weather in Russia in 2010 (from the heat wave, wildfires and related smog). An even higher number were affected by Russia's temporary grain export ban, which caused food price shocks around the world.[24]

This is just one example of how natural disasters can create instability within a seemingly secure state; widespread drought and wildfires destroyed crops, which deeply affected food security and the economy both within Russia and globally.

A depressed economy puts pressure on the government's ability to run smoothly and respond to widespread disaster. The Russian wildfires also put Russian military assets at risk; artillery rockets housed at a base 45 miles from Moscow had to be moved to safer ground and a nuclear base which houses Russia's sophisticated nuclear laboratories came close to being destroyed by fire.[25]

As threats become more diverse, state security interests are no longer independent, but shared. Former Senator Gary Hart noted in a June, 2012 article for The Hill, *"Traditional national security is giving way to international security."*[26]

We must move towards incorporating broader collective security issues (like climate change and food security) into our national security paradigm. These security threats may precipitate large-scale disruption that local public health, law enforcement and emergency response teams cannot contain.[27]



These disruptions are domestic emergencies that will require the diversion of military resources from abroad as well as requiring significant financial resources to cover damages.

The Russian wildfires and drought alone caused more than $15 million in damage, destroyed just under 2.5 million acres of forests (1 million hectares)[28] and required assistance from at least 19 countries, including the U.S., France and China.[29]

Future predicted extreme weather events may be the same or worse than the 2010 Russian wildfires, pushing human welfare and economic pressures to the forefront of the security dialogue.

Climate change is a risk to global security because it increases vulnerability in infrastructure, agriculture, energy and other economic factors.

While all nations are greatly affected by the effects of climate change, developed nations have the resources to bounce back more quickly from large-scale disruptions; developing countries will struggle much more deeply to adapt.

They have less capacity to prepare for and adapt to these changes and large-scale disruption such as a flood or wildfire is more likely to cause government instability and unrest. Risk-reduction and preparedness policies including adaptation and mitigation (reducing greenhouse gas emissions) will increase resiliency. However, the traditional tools of security may need to be deployed in response to large disruptions.

In an age of great change, combining the traditional notions of security with aspects of collective security allows the U.S. and other countries at risk of the effects of climate change to limit vulnerability and remain flexible for the wide range of contingencies that lie ahead.

Security is not one-dimensional but multifaceted, and climate change must be incorporated into the security dialogue in order to prepare for the multifarious threats we face as a nation.

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