

# BRIEFER

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## A Security Analysis of the New IPCC Report: Prevent 2°C, Prepare for 1.5°, and Do So Responsibly

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### Topline security takeaways

- Our 1°C world is already facing security challenges driven by climate change. The 1.5°C and 2°C worlds the IPCC envisions will magnify those risks significantly.
- Unstable regions will face even greater challenges under these scenarios, and we have already seen that these local risks have global security implications.
- Sea level rise will be a major security problem for both populations and militaries.
- Arctic melt will create a new and uncertain security environment, including for great powers.
- Risks to food, water and health security will likely increase state fragility and conflict risk in strategically-significant regions.
- Keeping the world below 2°C may drive the deployment of “negative emissions technologies” (or “geoengineering”) for which there is currently no international governance, and could pose security risks if not adequately managed.

### Topline security recommendation

- Prevent the difficult-to-manage security future of a 2.0°C world and robustly prepare for the likely unavoidable 1.5°C world, doing both in a way that either improves or does no harm to security.

## INTRODUCTION

Representatives of the world's governments met recently in South Korea to approve the final text of a [new special report](#) from the Intergovernmental Panel on Climate Change (IPCC). The report examines the differences between the impacts of a 1.5°Celsius/2.7° Fahrenheit above pre-industrial levels world and a 2° Celsius/3.4° Fahrenheit world.

The backdrop for the report is a world that has already warmed by 1°C/1.8°F in the last 115 years, is already being impacted by this warming, and at the current rate will reach 1.5°C/2.7°F by as early as 2030, with warming that will persist for centuries to millennia and impacts that could be irreversible.

As we have noted in the past, the world is contending with significant climate-driven security challenges today, with only the 1°C/1.8°F increase we have already endured. These security risks will be amplified significantly by increases to a 1.5°C/2.7°F and a 2°C/3.4°F world, with increasing severity as the temperature rises. While the IPCC report does not focus on security concerns, it highlights the increasing challenges the world will face as it increases from a 1.5°C/2.7°F world to a 2°C/3.4°F one.

The report also implies that there is an increasingly narrowing window of time to reduce the significant risks of a 2°C/3.4°F scenario. This is true across a broad range of risks, including to national, regional and international security. Overall, a security-focused read of this report suggests that the serious security risks we face will only become more serious as the global temperature increases. This informs our top-line recommendation: prevent a difficult-to-manage security future of a 2.0°C/ 3.4°F world and robustly prepare for the likely unavoidable 1.5°C/ 2.7°F world, doing both in a way that either improves or does no harm to security.

## IMPLICATIONS FOR SECURITY

Although the ‘Special Report on 1.5°C’ does not explicitly focus on the security impacts of climate change, the IPCC’s latest assessment is important for understanding the changing climate security risk picture, both in terms of how such impacts can contribute to security challenges, and in mapping the security implications of the steps governments may take to limit climate change. (The Summary for Policy-makers of the new report is [here](#)).

The report underscores that the impacts of a warming world will *increase the risk of state fragility and instability*. As global temperatures rise, more frequent and extreme heat events, decreasing availability of freshwater in many regions of the world, more strain on food production, and intensifying impacts like extreme weather and sea level rise could displace more people. These impacts generally scale with temperature rise, although some will materialize in non-linear or unexpected ways; which is to say, preventing an increase in temperature rise has clear security benefits.

Here are six topline takeaways from the report that are of special relevance to the security community:

**1. Our 1°C world is already facing security challenges driven by climate change. The 1.5°C and 2°C worlds the IPCC envisions will magnify those risks significantly.** We are already experiencing the security impacts of climate change. Climate change-exacerbated droughts, sea level rise and extreme storms, for example, are [contributing](#) to instability and conflict in key regions, and [impacting the readiness](#) of security forces. This report is based on the premise that while the international community has largely been focused on keeping temperature increases below 2°C/3.4°F, long defined as the climate “guard rail” to avoid runaway climate change, even lower warming scenarios have significant implications for quality of life on earth. The report also outlines the ways in which there are differences between a 1.5°C and 2°C degree world, in terms of impacts on both the natural and human environment. The report makes clear that the implications of a 2°C world would be severe in a number of ways, despite offering primarily low-end impact scenarios, as is consistent with past consensus documents from the IPCC. From a security perspective, we are already dealing with significant climate driven challenges in a 1°C world, but this is the tip of the iceberg. The challenges posed by 1.5°C and 2°C worlds will certainly be

more difficult to manage and will have greater implications for international stability. We explore some of these implications below.

**2. Unstable regions will face even greater challenges under these scenarios, and we have already seen that these local risks have global security implications.** The report reinforced findings that the impacts of a warming world will not be evenly distributed regionally or sub-regionally, under either scenario. It found that “regions at disproportionately higher risk include Arctic ecosystems, dryland regions, small-island developing states, and least developed countries” and within these locations, impacts would be felt most by “disadvantaged and vulnerable populations, some indigenous peoples, and local communities dependent on agricultural or coastal livelihoods.” As [summarized](#) by Carbon Brief:

“Warming of 1.5C will also see weather extremes become more prevalent across the world, the report says. Increases in hot extremes are projected to be largest in central and eastern North America, central and southern Europe, the Mediterranean region, western and central Asia, and southern Africa. Holding warming to 1.5C rather than 2C will see around 420 million fewer people being frequently exposed to extreme heatwaves...High and low extremes in rainfall are also expected to become more frequent...The largest increases in heavy rainfall events are expected in high-latitude regions, such as Alaska, Canada, Greenland, Iceland, northern Europe and northern Asia. Whereas in the Mediterranean region and southern Africa, for example, “increases in drought frequency and magnitude are substantially larger at 2C than at 1.5C.”

This is concerning as fragile regions such as the [Lake Chad Basin](#) are already feeling the effects of a warming world where climate change is acting as a threat multiplier to a tenuous security situation. This is also true in key regions such as the Middle East and North Africa, which is projected to experience [further decreases in precipitation](#) and heat levels that may in some cases render vast swathes of land no longer habitable. In a demonstration of how these issues have already begun affecting the security environment, the UN Security Council last year issued a [resolution](#) on conflict in the Lake Chad Basin that included reference to climate change risks and the need for risk management strategies for addressing them. A similar resolution was passed on [Somalia](#). Going forward, as climate impacts increase in severity, it is likely the UN Security Council, and other international security institutions, will see climate-related crises on their agendas more frequently. Further, though certain regions are more vulnerable than others, it’s worth noting that these local vulnerabilities can have global implications. This dynamic, sometimes referred to as the “[globalization of hazards](#),” has already been playing out, with [climate-exacerbated droughts and wildfires in Russia and China](#), for example, contributing to dramatic increases in the price of wheat in Egypt. This report warns that such dynamics are likely to increase in frequency and severity. This may have important and difficult-to-predict security consequences at both the 1.5°C and 2.0°C scenarios.

**3. Sea level rise will be a major security problem for both populations and militaries.** Sea level rise is a phenomenon that is already having impacts on coastal communities and military installations around the globe through increased flooding and sea water intrusion. The IPCC report included a wide range of uncertainty for how much sea level rise to expect, but conservatively estimated 1-2 feet of global mean sea level rise by 2100 if we hold to 1.5°C. If the temperature rises to 2°C, the report conservatively estimates that sea level would rise by another 25-40% (4 inches), potentially affecting 10 million more people than at 1.5°C. More worrying is the plausible catastrophic scenario of multi-meter sea level rise due to marine ice sheet instability in Antarctica and/or *irreversible* loss of the Greenland ice sheet. These instabilities, the report notes, “could be triggered around 1.5°C to 2°C of global warming.” The report also found that sea level will continue to rise well beyond 2100 even if warming is limited to the 1.5°C/2.7°F

degrees, but the magnitude and rate of this rise depends on future emission pathways. The report specifically calls out the implications for small islands, and low-lying coastal areas and deltas including heavily populated, low-lying cities like New York, Mumbai, and Jakarta which will be at risk from disastrous flooding, increased saltwater intrusion, and damage to infrastructure. The report states very clearly: “Risks associated with sea level rise are higher at 2°C compared to 1.5°C.” Under both scenarios, however, the security risks are clear - including risks to militaries and key strategic assets located at or near coastlines (see the 2nd edition of our [Military Expert Panel Report](#)), potentially [existential risks to low-lying island states](#) that will likely lead to regional security disruptions, and threats to the world’s [growing coastal megacities](#) - critical urban spaces whose fragility could drive mass displacement and conflict (see chapters 3 and 6 of our [Epicenters of Climate and Security](#) report for more). In short, sea level rise is already presenting security risks to both populations and militaries around the world, and the plausible emissions trajectories explored in this report are likely to exacerbate those risks in very significant ways.

#### **4. Arctic melt will create a new and uncertain security environment, including for great powers.**

The report found that warming is two to three times higher in the Arctic than the global average. Even today, at 1.0°C, trade routes are beginning to open through the Arctic. As the temperature rises, the Arctic ice will recede further. The IPCC concludes that the probability of a sea-ice-free Arctic Ocean during the summer is one out of every 100 years at 1.5°C/2.7°F versus one out of every 10 years at 2°C/3.4°F. However, this may not be the most relevant metric. It doesn’t take an ice-free Arctic to have significant implications for great powers and other Arctic states that are competing for influence in the Arctic through expanding trade routes, exploiting seabed resources and widening their military presence. This rapidly-changing domain, which is opening up a new space for competition among powerful nations, creates a global geopolitical uncertainty that could be very dangerous if not appropriately managed. Further, as retired Rear Admiral David Titley and Katarzyna Zysk have [noted](#), “what happens in the Arctic doesn’t stay in the Arctic.” While the Arctic may see the most dramatic physical changes on the globe, those changes will have a significant impact on the rest of the globe, from changing weather patterns to sea level rise, which will have knock-on effects across the entire geostrategic landscape (for more, see [Signal, Noise and Swans in The Arctic](#) in the Center for Climate and Security’s “[Epicenters of Climate and Security](#)”). The report did note that “effects of a temperature overshoot are reversible for Arctic sea ice cover on decadal time scales.”

**5. Risks to food, water and health security will likely increase state fragility and conflict risk in strategically-significant regions.** The report notes that the difference between 1.5°C/2.7°F and 2°C/3.6°F for food and water security for hundreds of millions of people is at stake. It states: “*vulnerability to decreases in water and food availability is reduced at 1.5°C versus 2°C, whilst at 2°C these are expected to be exacerbated, especially in regions such as the African Sahel, the Mediterranean, central Europe, the Amazon, and western and southern Africa*”. In some regions, this could contribute to an increasing “[weaponization of water](#)” as non-state and state actors take advantage of scarce water resources to increase their leverage over adversaries. Furthermore, the report states: “*exposure to multiple and compound climate-related risks increases between 1.5°C and 2°C of global warming, with greater proportions of people both so exposed and susceptible to poverty in Africa and Asia. For global warming from 1.5°C to 2°C, risks across energy, food, and water sectors could overlap spatially and temporally, creating new and exacerbating current hazards, exposures, and vulnerabilities that could affect increasing numbers of people and regions.*” These scenarios are what are sometimes referred to as “cascading disasters,” and will play out across a number of sectors whose vulnerabilities can drive major security problems.

***Impact on agriculture and livestock:*** The report found that there would be much greater net reductions in yields of maize, rice, wheat and potentially other crops as well as reductions in nutritional quality of some crops particularly in sub-Saharan Africa, Southeast Asia, and Central and South America if warming rises to 2°C/3.4°F. The food availability outlook is also measurably worse in a 2°C/3.4°F in the Sahel, southern Africa, the Mediterranean, central Europe, and the Amazon. Changes in feed quality, spread of diseases and water availability will also adversely affect livestock. For more on the potential security implications of these impacts see Femia, Sternberg and Werrell, [Climate Hazards, Security and the Uprisings in Syria and Egypt](#).

***Impact on fisheries:*** The report found that warming at the 1.5°C/2.7°F will shift the ranges of fish into higher latitudes, lead to potentially irreversible damages to ecosystems, reduce fishery and aquaculture productivity, increase ocean acidification, and contribute to coral reef decline by a further 70-90%. Unsurprisingly, the risks of climate-induced impacts are projected to be higher at 2°C/3.4°F. Coral reefs, at 2°C/3.4°F could almost completely disappear (>99%). These dynamics can interact with important geopolitical environments in ways that can exacerbate tensions within and between nations. Indeed, this is already occurring, to a degree, in places like the South China Sea, wherein a warming ocean is helping to drive fish stocks northward into internationally contested waters, thus raising tensions between China, its neighbors and the United States. More of this, particularly in a 2°C/3.4°F scenario, could exacerbate those tensions further and increase the risk of conflict. For additional analysis on this nexus of climate, ocean warming and security, see [Fish, Food Security and Future Conflict Epicenters](#) by Michael Thomas and [Climate Change and Vietnamese Fisheries: Opportunities for Conflict Prevention](#) by Marcus King in [Epicenters of Climate and Security](#).

***Impact on health:*** The report also found that increased warming will have negative consequences on human health. Both risks from heat-related morbidity and mortality and risks from some vector-borne diseases like malaria and dengue fever, which can increase and shift geographical ranges are lower risks at the 1.5°C/2.7°F than at 2°C/3.4°F. Of particular concern were urban heat islands that amplify the impacts of heatwaves in cities. These health risks can also scale up into significant security challenges, including for [military forces and aid personnel](#) that operate in environments where infectious diseases are spreading - particularly as the geographic range of many disease vectors is expanding in a warming world. (For more on this see, [Health & Climate Security: The Interconnected Security Challenges of Climate Change and Infectious Disease](#) by Kaleem Hawa in the Center for Climate and Security's "Epicenters of Climate and Security" [report](#).)

***Impact on species loss and extinction:*** Lastly, the report notes: "On land, impacts on biodiversity and ecosystems, including species loss and extinction, are projected to be lower at 1.5°C of global warming compared to 2°C." How extinction scales to affect broader food security, for example, including through the loss of key pollinators, remains an underexplored and potentially high impact risk whose security consequences could be very significant.

**6. Keeping the world below 2°C may drive the deployment of "negative emissions technologies" (or "geoengineering") for which there is currently no international governance, and could pose security risks if not adequately managed.** Some of the technologies and measures the IPCC says may be necessary to limit climate change could also be disruptive or challenging in security terms, in the absence of effective governance. For example, large-scale reforestation, afforestation, and significant increases in the amount of land used for growing biofuels are all potential options for keeping the globe below 1.5°C/2.7°F that could also increase food insecurity and tensions around land use. Geoengineering, which

the report suggests may be necessary to contain global temperatures, is a new field and there remains an incomplete understanding of its consequences, no coherent means of tracking its use by state and non-state actors, and no established international norms for governing that use (or abuse). The unforeseen implications of such endeavors could have significant security ramifications around the globe, particularly if comprehensive prevention measures are not put in place – and soon. This suggests an urgent need for coordinated intergovernmental efforts, including the security community, to develop broad technological strategies for staying below 2°C, and to do so in a way that will alleviate, rather than exacerbate, global security risks. For more on the complexities of developing geoengineering governance, see [Advancing Public Climate Engineering Disclosure](#) and [Geoengineering the Climate: Science, Governance and Uncertainty](#).

## A RESPONSIBILITY TO PREVENT AND PREPARE

This report is the latest from a group that has been convening and working to map out climate change risks since 1988. In broad strokes, these risks should not be a surprise to anyone. We’ve been warned about them by both scientists and security professionals for many decades (see this 1990 [report](#) from the U.S. Naval War College, for example). While inaction, lack of political will, and general failure to understand the gravity of the risks has limited the scope of opportunities available at this time, in the absence of negative emissions, we still have a better understanding of how these risks are and will continue to manifest in the near and distant future than we have in the past. This knowledge and technological foresight capability provides an important opportunity to prepare for and reduce the risks. In light of this report, our foresight capabilities underscore three responsibilities, from a security perspective.

1. A responsibility to prevent a future where the security implications of climate change become potentially too difficult to manage.
2. A [responsibility to prepare](#) for unavoidable changes in the security landscape driven both by temperature increases that have already occurred and those that most certainly will.
3. A responsibility to do the above in a security-sensitive manner: i.e. ensure that mitigation and adaptation actions (including geoengineering) improve or do no harm to the security environment, rather than deteriorate it, through the development and enforcement of appropriate governance mechanisms.

In the context of this report, these responsibilities practically translate into one topline recommendation: Prevent a difficult-to-manage security future of a 2.0°C/ 3.4°F world and robustly prepare for the likely unavoidable 1.5°C/ 2.7°F world, doing both in a way that either improves or does no harm to security.

In the near-term, the fulfilment of these responsibilities will be tested at a variety of forums. At the Halifax International Security Forum in November 2018, at the 24th Conference of Parties to the UN Framework Convention on Climate Change in Poland on December 2018, at the Munich Security Conference in February 2019, in ongoing UN processes to strengthen global and national climate security governance (such as the UN Security Council), and in national capitals across the globe. We will be watching.

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