

UNIVERSITY OF COPENHAGEN  
CENTRE FOR MILITARY STUDIES



# Defence and climate change

Challenges and opportunities for Danish defence  
and security policy

Jens Wenzel Kristoffersen · April 2022

This Background Paper is a part of the Centre for Military Studies' policy research services for the Danish Ministry of Defence and the political parties to the Danish Defence Agreement. The Background Paper describes climate change and how climate change affects the conditions for Danish defence and security policy.

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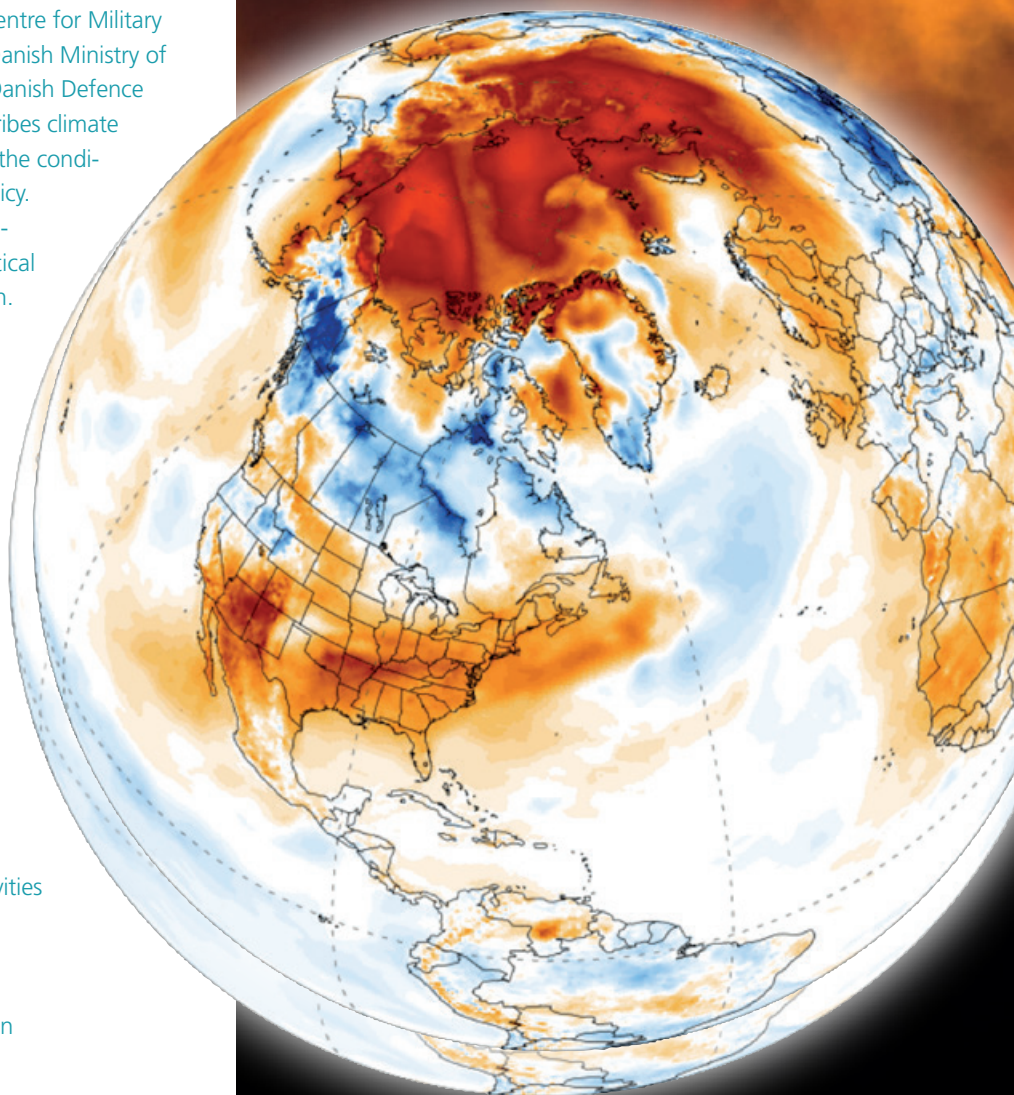
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*Temperature fluctuations on a random day, 21 November 2020, relative to average temperature 1979-2000. Red indicates warmer than normal, blue colder than normal (above)*

*Forest fire in Sweden (to the right)*

# Defence and climate change

Challenges and opportunities for  
Danish defence and security policy

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# Introduction

Climate change affects us all and is an unavoidable part of the political agenda, both today and in the future.

The Arctic ice cap is melting at an unprecedented rate.

Here in Denmark, we are experiencing more frequent and violent cloudbursts and flooding, such as the incidents at the Citadel in Copenhagen in 2011 and again in 2014.

In Sweden and Norway, forest fires are worse than ever before.

Also in Africa and the Middle East, extreme natural disasters are more frequent than previously, with droughts, drifting sand, and sudden flooding being attributed to climate change.

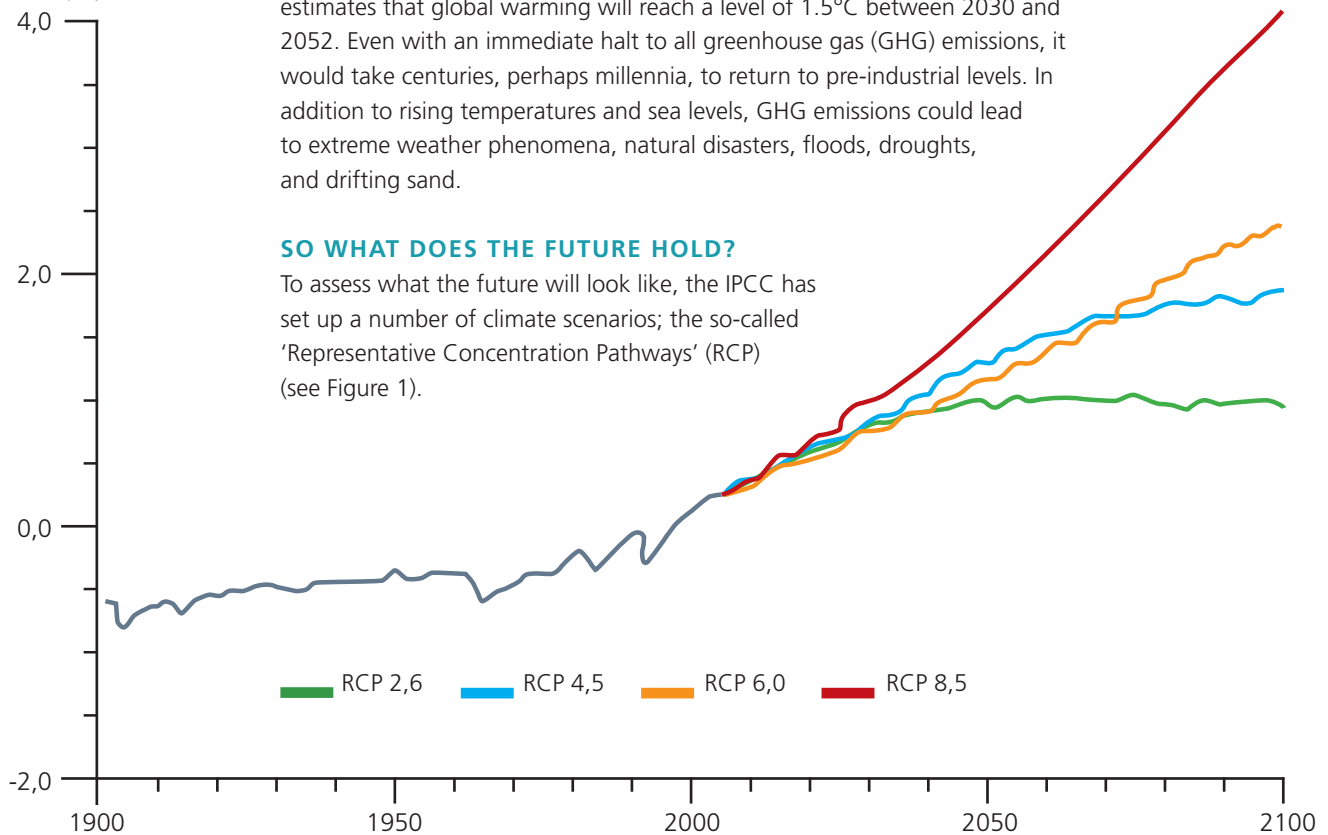


**This CMS Background Paper** examines, first, how the climate will develop and the global political significance of climate change. The Background Paper describes the defence and security policy initiatives of other countries and international organizations, and how climate change is addressed in strategic and operational terms. The Background Paper then addresses the implications of climate change in the Arctic, in Africa, and in the Middle East,

and it discusses whether conflict and migration are related to climate change. Next, the focus is on the significance of climate change for Danish defence and military operations, and how climate change could affect a future political agreement in the area of defence. In conclusion, the Background Paper outlines a number of policy initiatives that can help equip the Danish Armed Forces to counter the challenges of climate change – both at home and abroad.

# Climate change – in brief

Global mean surface  
temperature change  
(°C)



**The United Nations Intergovernmental Panel on Climate Change (IPCC)** has estimated that human activity has caused global warming of approximately  $1.0^{\circ}\text{C} \pm 0.2^{\circ}\text{C}$  since the pre-industrial period (1850). Since roughly 1990 alone, the global temperature has increased by well over  $0.8^{\circ}\text{C}$ . If warming continues at the current rate, the IPCC estimates that global warming will reach a level of  $1.5^{\circ}\text{C}$  between 2030 and 2052. Even with an immediate halt to all greenhouse gas (GHG) emissions, it would take centuries, perhaps millennia, to return to pre-industrial levels. In addition to rising temperatures and sea levels, GHG emissions could lead to extreme weather phenomena, natural disasters, floods, droughts, and drifting sand.

## SO WHAT DOES THE FUTURE HOLD?

To assess what the future will look like, the IPCC has set up a number of climate scenarios; the so-called 'Representative Concentration Pathways' (RCP) (see Figure 1).

Figure 1: Average values for the global average temperature increase in the different scenarios compared to the period 1986-2005 – Source: IPCC (2014)

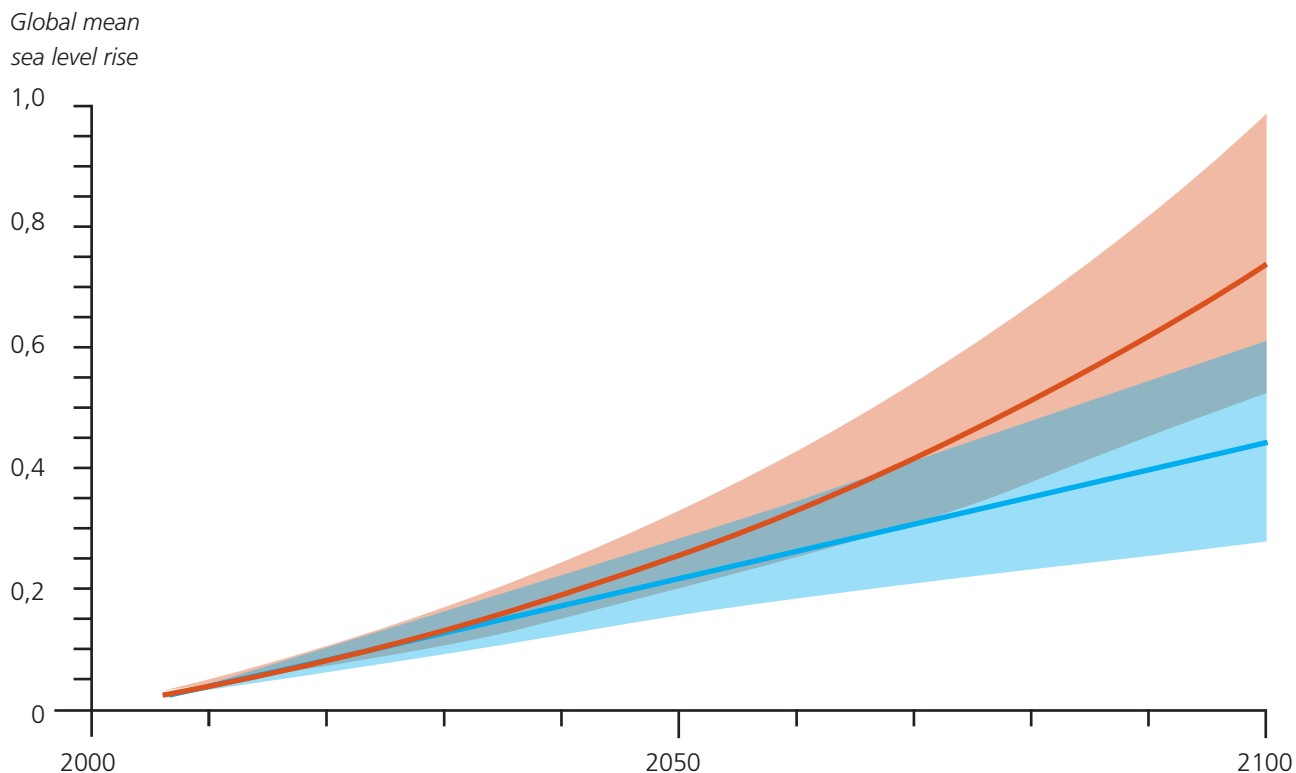


Figure 2: Average global sea level increase (compared to 1986-2005) – Source IPCC (2014)

The green curve in Figure 1 represents the best case scenario (RCP 2.6), which is the scenario where temperature increases are most likely to be kept below 1.5°C and the global consequences will be the least. The red curve in the figure (RCP 8.5) represents very high GHG emissions, where temperature increases of up to 3.7-4.8°C are predicted, which will lead to extremely serious global consequences with extreme climatic change and large areas of the earth rendered uninhabitable.

Similarly, the IPCC has developed scenarios showing the global consequences of climate change for rising sea levels (see Figure 2).

For Denmark, climate change can result in rising sea levels of up to 0.9 meter at the turn of the century.

The consequences of climate change will have an ever-increasing impact on millions of people around the world, possibly with radically changed living conditions as a result.

At the same time, climate change has been ascending the international political agenda. The question now becomes what significance the climate agenda will have in an international order that is more marked by great power rivalry – and the security and defence policy consequences this will have.

# Climate change

**Climate change** and increased great power rivalry mean that the great powers must navigate a competitive situation marked by uncertainties and tension while at the same time actively and often jointly trying to deal with the consequences of climate change.

The climate is among U.S. President Joe Biden's top-3 priorities for his presidency. At the same time, the American return to the Paris Agreement indicates that the US sees internationally binding cooperation as an important tool in meeting the climate challenges. Moreover, the US has announced that defence investment in climate resilience and clean energy must be a priority.<sup>1</sup>

Correspondingly, Chinese President Xi Jinping has announced that China will meet the Paris Agreement targets, and that China will reach its peak emissions by 2030, with the country aiming for GHG-neutrality by 2060. This indicates how, despite its very high current GHG emissions, China is now also taking the climate agenda seriously.

Similarly, Russian President Vladimir Putin has declared that the country's GHG emissions must be reduced by 30% by 2030 compared to 1990 levels, but that this must be achieved while taking economic developments into account. Russia is thus joining ranks with the US and China in the fight to reduce GHG emissions and to fulfil the Paris Agreement.

The above statements clarify the weight attributed to climate change and how it has become part of the larger political game. This leads to a kind of competition to appear to be the politically most climate-responsible actor with respect to meeting the Paris Agreement 2050 targets.

At the same time, the White House is among those mentioning the climate as a possible area for US-China cooperation.<sup>2</sup> The climate agenda can thus simultaneously





# and great power rivalry

be both the subject of cooperation and contribute to what is hopefully a positive development between the two great powers.

Russia's invasion of Ukraine and the imposed economic sanctions of the West have dramatically changed world politics and the prospect of cooperation with Russia. While the Russian isolation and deteriorating economy make it unlikely for Russia to meet its apparent climate ambitions, the war on the other hand seems to be a catalyst for Europe and the West to become independent of Russian fossil fuels and speed-up the transition to renewable energy.



# Climate change

**The military forces** of all Western countries are strategically responding to climate change. Across a broad spectrum, strategic documents recognize the importance of climate change. Some countries are doing more than others, however, and few countries have integrated climate change into their operational planning. Among those doing the most, the US is leading the way in terms of systematically incorporating climate change into its operational planning.

The US recognized early on the impact of climate change on how American troops can operate.<sup>3</sup> This applies in the United States as well as in the six geographical defence regions (combatant commands) that the US uses to structure its defence policy around the world, all of which have been required to think about and include climate change in their operational planning.

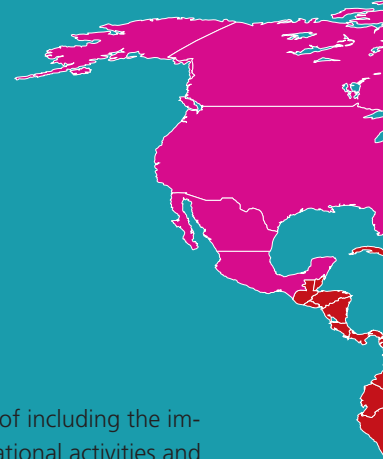
“Climate change is impacting stability in areas of the world where our troops are operating today. It is appropriate for the Combatant Commands to incorporate drivers of instability that impact the security environment in their areas into their planning.”

*James Mattis, then U.S. Secretary of Defense, 18 January 2019*

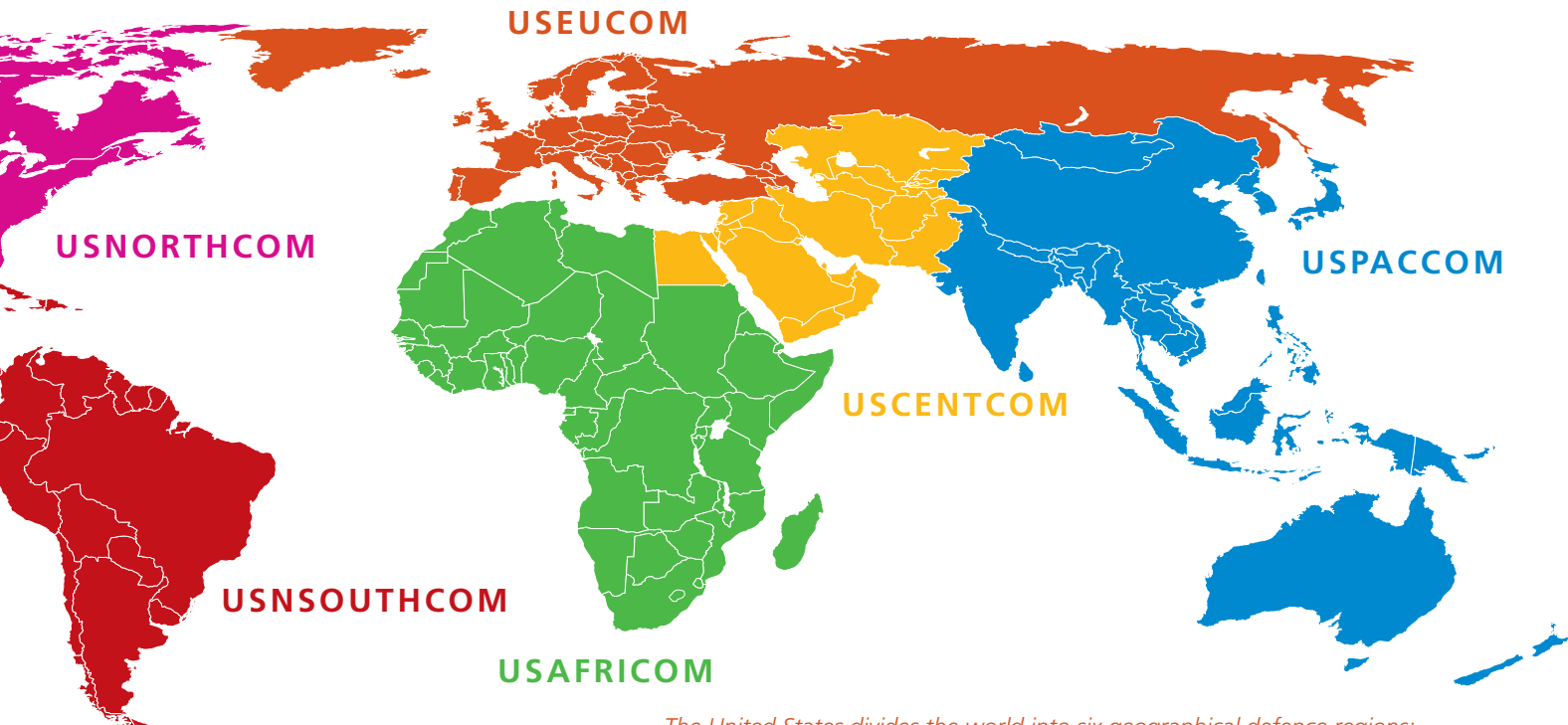
The US is therefore far ahead in terms of including the importance of climate change in its operational activities and investing in and developing materiel.

The major European countries – the UK, France, and Germany – also share a strategic focus on the importance of climate change for operations, security of infrastructure, security of supply, logistics, personnel, equipment, training, interoperability, and more.

This is also reflected in the many initiatives in strategic documents, where countries recognize the importance of including climate change in operational planning. In relation to new tasks, great value is placed on the armed forces' support for civil society.



# and defence and security policy initiatives



*The United States divides the world into six geographical defence regions:  
'Global Combatant Command Areas of Responsibility'*

The third area in which virtually all nations, large and small, have launched initiatives is in how their armed forces must also reduce their own GHG emissions and contribute to meet the targets set by their governments. The same applies to Denmark and its neighbours.

It is not only in the individual countries that climate change is taken more seriously. This is also happening in the international organizations in the defence and security policy area.

*"We have to restructure our armed forces so that they become resilient and able to react to the consequences of climate change."*

*Annegret Kramp-Karrenbauer,  
German Minister of Defence,  
6 October 2020*



# International organizations



**In contrast to** many states, international organizations such as the UN, NATO, EU, OSCE, AU, and others have clearly recognized the need to operationalize strategic declarations of intent in the context of operational planning. The UN in particular considers climate change when planning and carrying out operations. At the same time, the UN wants to strengthen the multilateral cooperation between organizations.

Among the international organizations, there is agreement that climate change must be understood as a threat multiplier in relation to security issues in the world's climatic focal points. The organizations do not consider climate change in itself to be the direct cause of conflict, but as an *amplifying factor* in connection with already existing or potential conflicts.

In UN missions in particular, climate change is included as a factor in operational planning, including logistics and the security of supply for deployed UN forces, and how this plays into a local context.<sup>4</sup>

For NATO, the focus is on making Allied forces more resilient to climate change and the operations in which they are involved.

Likewise, NATO wants to be seen as an organization that



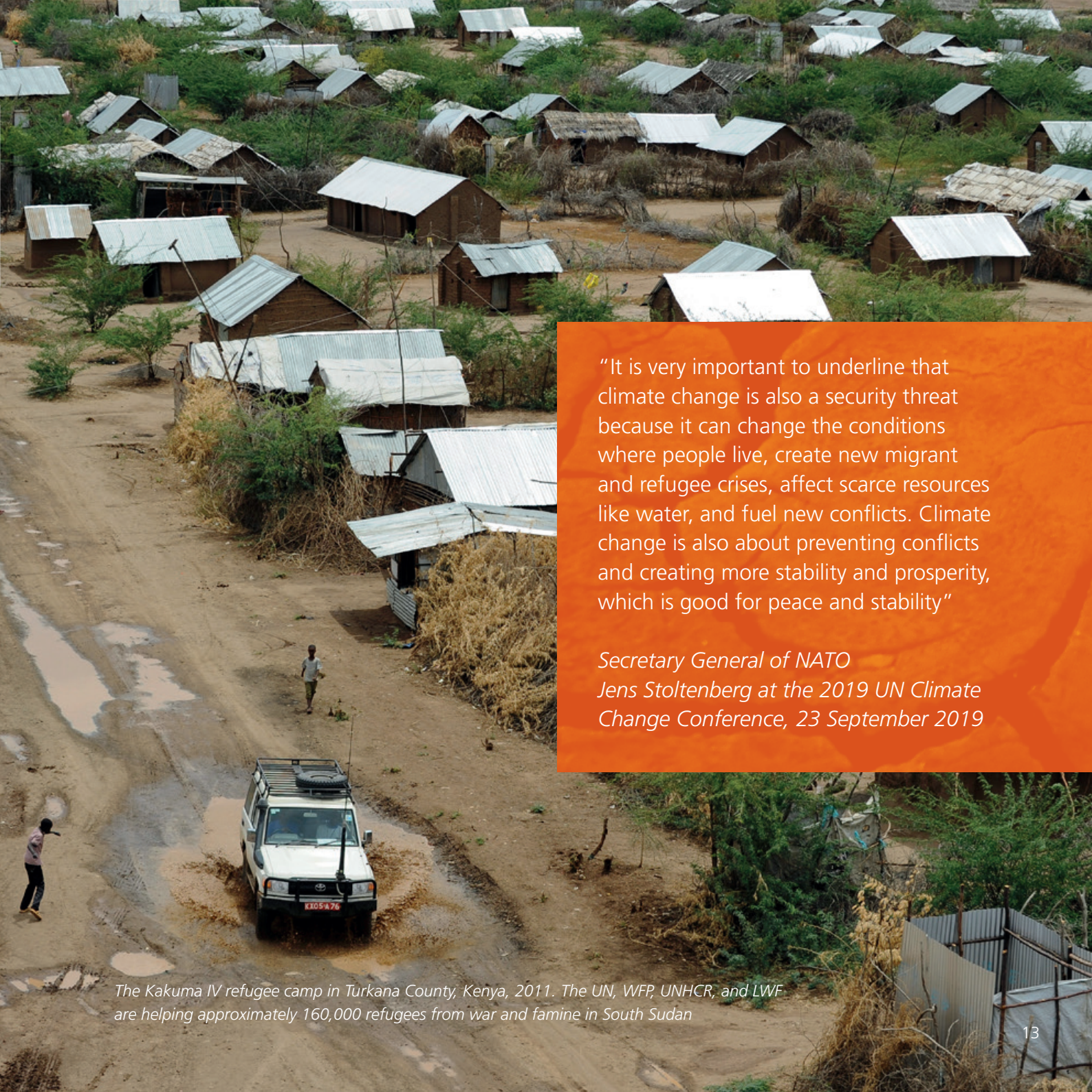
contributes to reducing GHG emissions through a focused environmental effort and a 'greening' of NATO forces.

In November 2020, the EU launched its *Climate Change and Defence Roadmap*.<sup>5</sup> Concrete initiatives are taken within three main areas: 1) operational dimension, 2) capability development, and 3) strengthening multilateralism and partnerships within a short (2020-21), intermediate (2022-24), and longer (2025) time horizon. The EU is thus also paying attention to the operational area in relation to climate change.

Until now, this background paper has dealt with how climate and security play together on the international stage, where many actors play a role.

States and international actors alike recognize the importance of climate change in defence and security policy. Among the state actors, the US is at the forefront, while the UN is the leading organization. One region where climate change is having increasing political significance is the Arctic.





“It is very important to underline that climate change is also a security threat because it can change the conditions where people live, create new migrant and refugee crises, affect scarce resources like water, and fuel new conflicts. Climate change is also about preventing conflicts and creating more stability and prosperity, which is good for peace and stability”

*Secretary General of NATO  
Jens Stoltenberg at the 2019 UN Climate  
Change Conference, 23 September 2019*

*The Kakuma IV refugee camp in Turkana County, Kenya, 2011. The UN, WFP, UNHCR, and LWF are helping approximately 160,000 refugees from war and famine in South Sudan*

# Climate change in the Arctic: Increased great power interest



*Above: Launch of the Ivan Papanin icebreaker at Admiralty Shipyard in St. Petersburg, October 2019*

*Top right: Xue Long 2 in port at Shekou Cruise Center in Shenzhen in southern China, October 2019*

- Northwest Passage
- The Transpolar Route
- Northeast Passage



**The Arctic** offers visible evidence of how rising temperatures are changing a region. An unprecedented melting of the Arctic ice cap together with the thawing of areas with permafrost is further contributing to warmer Arctic temperatures. This is leading to the opening of sailing routes such as the Northeast and Northwest Passages for larger parts of the year together with plans for a 'Transpolar Sea Route'. This means better opportunities for both military and commercial exploitation of the region. Climate change is contributing to increased political, economic, research, and military interest and activity in the Arctic. This is creating security policy uncertainties, and the climate-driven changes are leading to new defence requirements and needs.

Russia's newest dual-use Arctic patrol ship, *Ivan Papanin*, offers an example of these new needs for military presence: in addition to being designed to navigate ice-filled waters, it is also a warship equipped with various weapons systems.

An example of research activity and its political significance is seen in the picture, where China's newest icebreaker and research ship, *Xue Long 2*, is displayed in Shanghai prior to departure for the Arctic.

Regardless of the fact that climate change in itself constitutes a defence and security policy risk, the derived effects of the regional significance of climate change – and the international situation in which they are embedded –

will become increasingly important for Danish defence and security policy.

The consequences are great demands for a carefully thought-out Danish Arctic policy within and outside the Kingdom of Denmark. This will require a carefully measured and adapted – but increased – Danish military presence, while increased economic, political, and military great power interests in the Arctic and in the territory of the Kingdom of Denmark must also be handled. At the same time, there is strong interest in the Kingdom of Denmark for peaceful development in the Arctic – as a low-militarized region – for the benefit of all Arctic states and actors.



*A symbol of the will to cooperate within the Kingdom of Denmark. The three flags of the Kingdom of Denmark on the Prime Minister's windowsill during her 2020/21 New Year's speech*

*IS is responsible for a series of arson attacks on wheat fields in Kurdistan.  
Here, on Qarachogh Mountain in Makhmour, Erbil Province, 2020*





# Climate change in the south: Is conflict related to climate change?

**It is difficult** to prove a direct link between climate change and conflict.

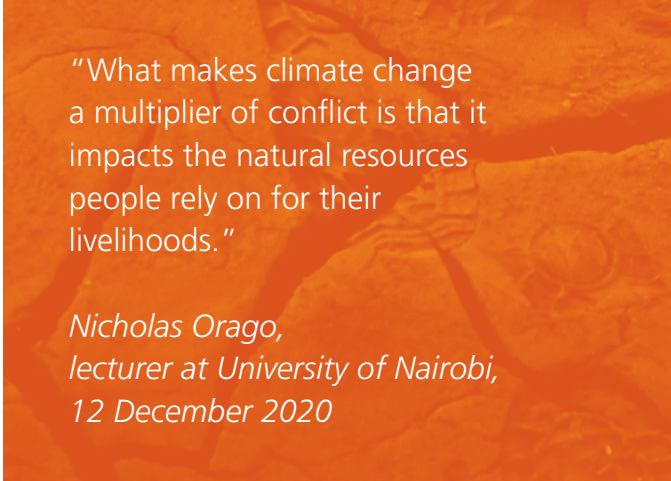
Conversely, there are many examples of climate change leading to a lack of natural resources, such as food, water, and arable land. Especially in the south, climate change can thus be an indirect cause of conflict,<sup>6</sup> and climate change can affect, accelerate, and exacerbate already known causes of conflicts.<sup>7</sup>

Likewise, the handling of disputes and conflicts by local authorities in connection with the struggle for scarce resources is decisive for whether they lead to armed conflict or not.

These conflicts often have their origins in natural nomadic migrations that have been taking place for thousands of years, especially in Africa, where the struggle for resources manifests in local tensions that occasionally develop into actual armed conflict.<sup>8</sup>

A third conflict factor associated with natural resources, particularly in Africa, is a shift from traditional, pastoral lifestyles to more *agropastoralized* and agriculturally focused production, where the struggle is for scarce resources, such as crops and grazing areas.

Conversely, pastoral nomads sometimes also migrate transnationally to other areas where more fertile grazing areas are available after other areas are grazed. The struggle for control over and access to such lands can also lead to conflict.



“What makes climate change a multiplier of conflict is that it impacts the natural resources people rely on for their livelihoods.”

*Nicholas Orago,  
lecturer at University of Nairobi,  
12 December 2020*

# Climate change in the south: Is migration related to climate change?

**In the southern** and eastern parts of the world (especially in Africa and Asia), changes in the living conditions of millions of people have often led to migration, both national and transnational. In addition to changes in living conditions, the reasons for this are often manifold – from drought, famine, flooding, and lack of clean water to war and displacement. The causes of migration may be linked to climate change, but it is very difficult to establish a causal link between climate change and migration despite the fact that countless studies<sup>9</sup> and reports have attempted to demonstrate such a relationship.

At the same time, there is an ongoing global population development, which is putting further pressure on already fragile social structures in many of the countries in the south and leads to migration across national borders and continents in some cases. And again, with this type of migration, it is not possible to show a clear connection to climate change, as there are often other causes, which can be very different from country to country. For example, migration from Syria and across the Mediterranean will be rooted in a wide variety of causes. Syria serves here as

an example of how climate change, with long periods of drought, declining crops, and food shortages, has led large populations to move towards cities, which exacerbates existing problems such as political instability, poverty, and scarce resources. In the Syrian case, this was a factor that contributed to the ongoing civil war.

In other parts of the Mediterranean region (e.g., Libya), there are other causes driving migration from large parts of the Sahel. Here, rather than climate change, the causes are more political instability and an interest in better living conditions.

Migration from the south, especially to Europe, is clearly a problem which, among other things, is handled by the EU agency Frontex. The problem is political, regarding integration, institutions, the guarding of borders, etc., which entails new requirements for border surveillance, the handling of migrants, saving human lives at sea and much more.



*The Spanish maritime rescue service rescues 334 migrants from six dinghies on the Alboran Sea in 2019. The Spanish Red Cross is ready to receive them in the Port of Malaga*

# Climate change and Danish military operations

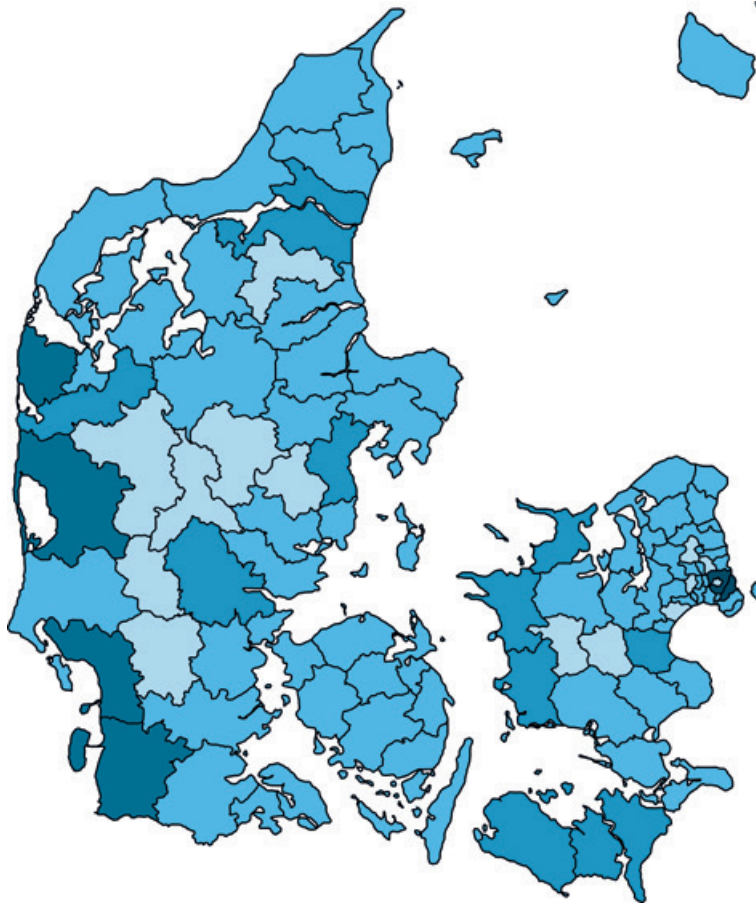
**Climate change** is also leading to changed conditions and perhaps new tasks for the Danish Armed Forces – nationally and internationally. As climate change affects the operational areas, new requirements are set for activities and operations.

The Arctic is acquiring increased strategic importance as a result of climate change, which calls for a rethinking of the Arctic as an operational area. New shipping routes are opening, the operational area is growing as ice-free areas expand and remain ice-free for longer periods, and new areas are becoming available for resource extraction. All of this contributes to Danish forces being deployed in new ways and for a larger part of the year. This can also have an impact on the type of materiel in which investments are

made. Other actors are also attracted to the area, which in turn can lead to an expansion of the complex of tasks to which the Danish defence must attend, including an expansion of the area to be monitored and where sovereignty must be asserted. This increased activity will place demands on bases for both ships and aircraft, which future operational plans must consider.

Just as climate change plays a role in the Arctic, the same is the case in Africa and the Middle East, where rising temperatures will affect the operating conditions for Danish forces should they in the future be deployed in these areas. For operational areas such as Mali in Africa or Iraq and Afghanistan in the Middle East, climate change is expected to result in temperatures as high as 48°C.<sup>10</sup> The altered operating conditions could also be in the form of more unpredictable climatic events, such as more frequent droughts, sandstorms and increased sand drifting. In other areas, the problem will be greater rainfall, which will result

*An inflatable boat is in the process of moving an iceberg that is about to flow into the frigate Niels Juel in June 2020. Niels Juel was in Greenland to operate under the Arctic Command and contribute to the assertion of sovereignty and monitoring of the waters*



*The darker the blue colour, the greater the risk of flooding.  
Source: TV2 News*



The map below illustrates some of the areas in Denmark with the greatest risk of flooding.

In Denmark (and in the entire Kingdom of Denmark), close co-operation between authorities is at the core of the ability to meet coming climate change. The Danish Armed Forces will therefore be part of an even closer collaboration with the municipalities, the Danish Emergency Management Agency and actors and authorities to be able to operate most effectively as part of an overall national effort.

It will therefore become necessary to consider cross-cutting national contingency plans, including the equipment, materiel, and personnel that are available and can be used in climate-related emergencies.

in increased flooding affecting larger areas, which may increase the chances of conflict and exacerbate existing conflicts.

This will place special demands on the organization of operations and how to handle equipment and logistics in connection with these operations.

In the future, domestic operations will also have to adapt to a changing climate. Climate change will mean that Denmark will most likely be hit by more frequent hurricanes and storms and subsequent flooding, while there will also be dry summers, heatwaves with droughts, and higher temperatures, as has been the case in recent years.



*Rising water levels in Southern Jutland. IGR has been called in to help prevent flooding*

# Climate change



*The solar cell plant at Almegaard Barracks, Bornholm*

# and the coming Danish Defence Agreement

**Climate change** is an indispensable part of the political agenda, which will set the framework for the future defence agreements. From both the political side and the Armed Forces, one could already now consider incorporating climate change in preparation for such Defence Agreement negotiations to better climate-proof the Armed Forces.

In the *operations, running cost and maintenance* areas, an analysis of the current and expected effects of climate change in relation to the undertakings in a given operational area can be carried out in the planning of the Armed Forces' activities. This will contribute to an overview of how 'climate-efficient' the operation in question is or has been and whether the defence can make it more effective in the future.

As regards *materiel and equipment*, analyses can be carried out as to how climate-resistant the current materiel and equipment is, as well as incorporating these considerations in future acquisition processes. Likewise, logistics and security of supply should be considered in relation to how this is ensured most climate-efficiently in the areas of operation.

In a *long-term development perspective*, the Danish Armed Forces should examine how the effects of climate change will likely affect future *operational scenarios* and how the Danish Armed Forces can best adapt. At the same time, the government's 70% GHG reduction target by 2030 (as well as Danish allies' corresponding targets) should be considered in initiatives with significance for the long-term development of the defence.



*EH101 helicopter transports fuel to one of the smaller bases in Mali in a sling operation*

# Challenges and opportunities in Danish defence and security policy

**The significance of climate change** for Danish defence and security policy will grow in the years to come. This will require increasing attention both politically and militarily. In the work to deal with the increasing importance of climate change in defence and security policy, possible recommendations include:

- Establishing a broad-based climate security commission with the participation of politicians and relevant experts who can uncover the defence and security policy aspects of Danish policies in this area.<sup>11</sup>
- Establishing an inter-ministerial group under the leadership of the Ministry of Defence, also involving the participation of representatives from Greenland and the Faroe Islands, who will focus on climate change from a defence and security policy perspective. At the same time, the group must have a mandate to make recommendations on what can be done in the defence area to strengthen the green transition process.
- Developing a climate change strategy for defence and security policy for Denmark and the Kingdom of Denmark, which targets the Danish Armed Forces and associated institutions and clearly states how the Danish forces addresses the climate challenges.
- A climate change strategy for the whole defence-sector could be developed complementing the environment and energy strategy developed by the Danish Ministry of Defence.
- In order for the parties to the Defence Agreement to have opportunity to assess the development in the green transition of the Armed Forces, they should request regular updates from the Armed Forces on progress in the area. This could, for example, be included in a report on the fulfilment of the goals in the environmental and energy strategy, now complemented with a climate strategy.
- In the national and international operational areas, considering how better to include climate change in thoughts on operational planning, including the early involvement of coalition partners, allies, various international and humanitarian organizations, as well as local government structures and others in the individual operational areas.
- Regarding materiel: considering the effects of climate change when making future equipment purchases.
- Carrying out analyses that uncover the effects of climate change on buildings, bases and other defence infrastructure in collaboration with the municipalities, so that these can be kept operational, even under the worst possible climatic scenarios.

In conclusion, it is worth noting that when climate change is prominent on the political agenda, it also becomes part of the broader defence and security policy. It is therefore important to explore the possibilities for how climate change could be a catalyst for more peaceful cooperation in the Arctic and other parts of the world in which Danish forces operate.





*Then Minister of Defence Trine Bramsen greets the frigate Iver Huitfeldt at Naval Base Korsør following its deployment to the Strait of Hormuz*

# Notes

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# Image sources

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*Maja Hastrup Wistesen/The Defence Gallery*

