

# Military capabilities affected by climate change

An analysis of China, Russia and  
the United States

Adája Stoetman  
Dick Zandee  
Ties Dams  
Niels Drost  
Louise van Schaik

Clingendael Report



**Clingendael**

Netherlands Institute of International Relations



# Clingendael

Netherlands Institute of International Relations

## **Military capabilities affected by climate change**

An analysis of China, Russia and  
the United States

Adája Stoetman  
Dick Zandee  
Ties Dams  
Niels Drost  
Louise van Schaik

Clingendael Report  
January 2023

**Disclaimer:** The research for and production of this report have been conducted within the PROGRESS research framework agreement. Responsibility for the contents and for the opinions expressed, rests solely with the authors and does not constitute, nor should be construed as, an endorsement by the Netherlands Ministries of Foreign Affairs and Defense.

**January 2023**

© Netherlands Institute of International Relations 'Clingendael'.

Cover photo © The National Guard/Flickr

Unauthorized use of any materials violates copyright, trademark and / or other laws. Should a user download material from the website or any other source related to the Netherlands Institute of International Relations 'Clingendael', or the Clingendael Institute, for personal or non-commercial use, the user must retain all copyright, trademark or other similar notices contained in the original material or on any copies of this material.

Material on the website of the Clingendael Institute may be reproduced or publicly displayed, distributed or used for any public and non-commercial purposes, but only by mentioning the Clingendael Institute as its source. Permission is required to use the logo of the Clingendael Institute. This can be obtained by contacting the Communication desk of the Clingendael Institute ([press@clingendael.org](mailto:press@clingendael.org)).

The following web link activities are prohibited by the Clingendael Institute and may present trademark and copyright infringement issues: links that involve unauthorized use of our logo, framing, inline links, or metatags, as well as hyperlinks or a form of link disguising the URL.

## About the Clingendael Institute

The Netherlands Institute of International Relations 'Clingendael' is a leading think tank and academy on international affairs. Through our analyses, training and public platform activities we aim to inspire and equip governments, businesses, and civil society to contribute to a secure, sustainable and just world.

The Clingendael Institute  
P.O. Box 93080  
2509 AB The Hague  
The Netherlands

Follow us on social media

-  [@clingendaelorg](https://twitter.com/clingendaelorg)
-  [The Clingendael Institute](https://www.linkedin.com/company/the-clingendael-institute/)
-  [The Clingendael Institute](https://www.facebook.com/theclingendaelinstitute/)
-  [clingendael\\_institute](https://www.instagram.com/clingendael_institute/)
-  [Clingendael Institute](https://www.youtube.com/channel/UCv3YU091uXt1UgR8U8311g)

Email: [info@clingendael.org](mailto:info@clingendael.org)  
Website: [www.clingendael.org](http://www.clingendael.org)

## About the authors

**Adája Stoetman** is Research Fellow at the Security Unit of the Clingendael Institute. Her research focuses on security and defence issues as well as strategic foresight. Her area of expertise is European defence cooperation.

**Dick Zandee** is Head of the Security Unit at the Clingendael Institute. His research focuses on European security and defence issues, EU-NATO, military forces and capability development, defence industry and other security topics.

**Ties Dams** is Research Fellow at the Clingendael China Centre. His research focuses on China's geopolitical strategy and European foreign policy formation.

**Niels Drost** is Junior Researcher at the Clingendael Russia & Eastern Europe Centre and the EU & Global Affairs Unit. His research focuses on contemporary politics and security issues in Eastern Europe, the Caucasus and Central Asia.

**Louise van Schaik** is Head of Unit EU & Global Affairs at the Clingendael Institute. She also coordinates the research on climate change and is specialized in EU external action, European energy & climate policy, climate-security and global health.

# Contents

|  |                    |
|--|--------------------|
| <a href="#">Executive Summary</a>  | 1                  |
| Global powers' militaries and climate change: comparing China, Russia and the US                     | 3                  |
| Opportunities and threats for Europe and the Netherlands   | 5                  |
| Recommendations  | 6                  |
| <br>   |                    |
| <a href="#">1 Introduction: the climate-security nexus and the changing role of the armed forces</a> | <a href="#">8</a>  |
| The climate change-security nexus  | 9                  |
| The politicisation and securitisation of climate change  | 11                 |
| Climate change and the armed forces  | 13                 |
| <br>   |                    |
| <a href="#">2 China: deliberately not talking about climate impacts on military capabilities?</a>    | <a href="#">17</a> |
| The climate change-security nexus in PRC climate and defence strategies                              | 17                 |
| The implications of climate change for the PRC's armed forces  | 23                 |
| Conclusions  | 25                 |
| <br>   |                    |
| <a href="#">3 Russia: Arctic dreams and fossil realities</a>   | <a href="#">27</a> |
| The climate change-security nexus in Russian strategy documents                                      | 27                 |
| Climate change: threats and opportunities  | 30                 |
| Threats stemming from climate change   | 30                 |
| Opportunities arising from climate change  | 32                 |
| The consequences of climate change for the armed forces  | 34                 |
| Russia's contribution to 'green' defence   | 36                 |
| Conclusions  | 37                 |
| <br>   |                    |
| <a href="#">4 United States taking climate security risks to the military very serious</a>           | <a href="#">38</a> |
| The climate change-security nexus in national strategy documents                                     | 38                 |
| General consequences for the US Armed Forces   | 40                 |
| 'Greener' US Armed Forces  | 44                 |
| Conclusions  | 46                 |

|   |  |    |
|---|--|----|
| 5 | Comparing China, Russia and the United States            | 48 |
|   | Climate change-security nexus in strategy documents      | 48 |
|   | Consequences for the armed forces                        | 49 |
|   | Efforts towards 'green defence'                          | 51 |
| 6 | Conclusions: implications for Europe and the Netherlands | 53 |
|   | Opportunities  | 54 |
|   | Threats  | 56 |
|   | Recommendations  | 57 |

# Executive Summary

Climate change is one of the most pressing challenges of the present and the future. Rising temperatures and sea levels, as well as extreme weather events are manifestations of climate change that also influence military capabilities. Increased attention for the climate change-security nexus is visible both at the national and the international level: nationally through the incorporation of climate change in security strategies and internationally through incorporation in important strategic documents such as the EU's Strategic Compass and NATO's Strategic Concept.

Given its transnational nature, governments around the world have a shared responsibility to face climate change. A particular role is laid down for the global powers, China, Russia and the United States, given their position in the world. It is, however, questionable whether the global powers' interests align. They differ in their approaches to address climate change, and even more so in their views on how it affects the armed forces. China and particularly Russia are more reluctant towards depicting climate change as a matter of international security. This is for example visible in international forums, such as the UN Security Council. In contrast, in the US, support for climate action is subject to political preferences, but climate related security risks are widely recognised within the defence establishment.

This report reviews various aspects of the relationship between climate and security, with a particular focus on the military. It discusses the role of climate change in a country's security and defence strategy and, vice versa, the changing tasks and deployment of the armed forces in response to climate change, the effects of climate change on military infrastructure, and measures to realise a greener defence sector.

## **China**

China has acknowledged that climate change may have security implications. This specifically applies at the national level, where climate change is depicted as potentially having far-reaching consequences. But little is known as to how the Chinese government perceives the effects of climate change on its military capabilities. The country seems to actively pursue a strategy of resisting to explicitly connect the two issues. This dynamic may be explained by a number



of factors: 1) the deep ties between China's People's Liberation Army and the Chinese fossil industries; 2) relevant Chinese policymakers, especially within the military establishment, may view climate change through the lens of Sino-US competition, thereby putting emphasis on the "conspiracy attitude"; and 3) a fear of revealing strategic weaknesses because of the effects of climate change on military capabilities and infrastructure.

Although climate change may very well severely affect China's military infrastructure, including the Hainan and Jiangsu coastal naval bases, little is publicly known about how China takes this issue into consideration. Therefore, more research and intelligence are needed. This applies particularly to specific climate security issues that China will have to deal with from now until 2035 and beyond. In this regard, four priority areas can be identified: rising sea levels threaten coastal cities and naval bases, extreme weather events will strain the capacity of the PLA, melting permafrost puts military capacity at risk, and China has power over the water resources of its neighbours.

## **Russia**

Russia is well aware of the potential security implications of climate change, as acknowledged in various strategy documents. This awareness applies both to possible threats to national security, in particular with respect to the living conditions of the Russian population, as well as the consequences for the Russian armed forces and in particular to the military infrastructure as a result of thawing permafrost. Despite this acknowledgement, Moscow is not eager to securitise the issue internationally. The Kremlin rather chooses to adapt to these problems as they occur on a national level. Furthermore, the country tends to focus more on dealing with the matter when it materialises, instead of adopting a more preventative approach to climate change manifestations.

Perhaps more interestingly, Moscow prefers to emphasise the opportunities that climate change, and in particular global warming, may bring about. Hence, climate change action is particularly perceived as an issue that might bring economic benefits. As a result, the country barely prescribes a role for the armed forces in addressing matters of climate change. There is, however, one exception: the Arctic, where Russia has doubled down on its militarisation in the wake of melting ice leading to new sea lanes and natural resources becoming available. Despite Russia's reluctant attitude and inaction towards the security dimension of climate change, there is no doubt that the country will face the consequences thereof, including the effects on its armed forces.



## **United States**

Out of the three case studies, the US has the most proactive approach towards addressing the security dimension of climate change, both nationally and internationally. The awareness of the challenges resulting from climate change are structurally embedded in the US' strategy, policies and actions. The American military has a very consistent approach in assessing the impact of climate change and the measures that are required to address it. This proactive approach is the result of the practical experiences of the US military. For example, military infrastructure, such as naval ports on the Atlantic coast, is increasingly at risk due to rising sea levels. Furthermore, the US military, in particular the US Army, is actively engaged in the Arctic. Moreover, the call for the deployment of the US Armed Forces for humanitarian assistance and disaster relief operations, both nationally and internationally, is growing.

Thus, the Department of Defense and the US Armed Forces not only recognise the threats of climate change to the security of the US, but they are actively contributing to address these challenges and to increase the military's resilience to climate change. In addition, the US military has the ambition to significantly green its defence sector, albeit subject to the strict condition that it should not come at the cost of operational effectiveness. An important side note, however, is that climate change action, including action taken by the US DOD, remains dependent on the White House's leadership. Attention to climate security is closely associated with general concerns over climate change. There is a huge divide between the democrats and republicans on this topic: democrats do acknowledge the importance and implications of climate change, while republicans are more reluctant to do so. Depending on White House leadership, this may speed up or slow down climate security measures.

## **Global powers' militaries and climate change: comparing China, Russia and the US**

The case studies demonstrate variations in the Chinese, Russian and American approaches to the climate change-security nexus. Table 1 provides an overview of the most important elements of their approaches, which gives insights into the similarities and differences between the three countries.

**Table 1** Climate change and defence – differences and similarities in the global powers’ approaches

|  |   | China            | Russia | United States |
|--|---|------------------|--------|---------------|
| <b>Strategy documents</b>                | Climate change in security strategies               | X                | V      | V             |
|  | Climate change in defence strategies                | V <sup>1</sup>   | X      | V             |
|  | Climate change as a national security threat        | V                | V      | V             |
|  | Climate change as an international security threat  | X/V <sup>2</sup> | X      | V             |
|  | Defence in climate strategies                       | X                | X      | V             |
| <b>Consequences for the armed forces</b> | Effects on military infrastructure                  | V                | V      | V             |
|  | Investment in military capabilities                 | V                | V      | V             |
|  | Adaptation of training and exercises                | X                | V      | V             |
|  | Effects on the deployment of the armed forces       | X                | ?      | V             |
| <b>Green defence</b>                     | Aims for the ‘greenification’ of the defence sector | X                | X      | V             |
|  | Carbon reduction targets for the armed forces       | X                | X      | V             |
|  | Electrification programmes                          | X                | X      | V             |

V = applicable  
X = not applicable  
? = unknown

- 1 Climate change appeared in the PRC’s defence White Papers in 2008 and 2011. In subsequent defence White Papers, climate change was no longer included.
- 2 In general, China is very reluctant to denote climate change as an international security threat, but, in its rhetoric and sometimes even joint statements, such as with the EU, climate change and international security are linked to each other.

## Opportunities and threats for Europe and the Netherlands

The analysis of the three case studies has several implications – opportunities and threats – for Europe, and the Netherlands. The opportunities are primarily related to cooperation with the US, as cooperation efforts with China and Russia are rather difficult at present. The following opportunities for Europe and the Netherlands can be identified:

- Advance and strengthen Europe's information position vis-à-vis China and Russia with respect to the climate change-security nexus. This relates to the higher level of awareness on the effects of climate change on the armed forces, as well as to the Russian and Chinese continuous dependency on fossil fuels.
- As for technological innovation to realise a greener defence sector, Europe needs to consider which low and zero carbon technologies can be shared with countries like China and Russia, were they to embark on a path towards a greener defence sector.
- There are multiple ways in which Europe, including the Netherlands, can learn from the US when it comes to the relationship between climate change and the armed forces.
  - Learn from the US with respect to the embedding of the climate change-security nexus in defence policies.
  - Learn from the US with respect to the incorporation of insights into the climate-security nexus into training and exercises.
- Seek cooperation with the US with regard to humanitarian assistance and disaster relief operations, as both Europe, and in particular countries like France and the Netherlands, and the US have extensive experience in this matter.
- Seek cooperation to realise a greener defence sector, in particular through aligning emission reduction targets and the electrification of the armed forces.

Although there are multiple opportunities for Europe and the Netherlands, there are also important threats that can be identified on the basis of the analysis.

These are the following:

- The Arctic is one of the principal regions affected by climate change. All three global powers have expressed their interest in the region, ranging from economic interests to political and even military interests. Considering that these interests may not align with each other, this brings about a risk of escalating pre-existing geopolitical tensions between China, Russia, and the US.

- Technology sharing brings a risk if the companies which are sharing the technology are unaware of the potential dual-use application. Sharing technology also runs the risk of losing a strategic advantage vis-à-vis China and Russia.
- Multiple rhetorical and political threats. Russia, and to a lesser extent China, oppose the Western perspective regarding the climate change-security nexus, thereby providing a hurdle to act on the agenda at the international level. Moreover, due to rising tensions between the three global powers, there is a risk of the absence of political dialogue on the need to also decarbonise the defence sector as part of the overall effort to combat climate change or risks related to geoengineering.
- Changing White House leadership offers a potential threat if this leadership is no longer as adamant and proactive on addressing climate change as the current administration. This might provide roadblocks for the climate change agenda at the international level.

## Recommendations

Based upon the overview of the most important opportunities and threats, the following recommendations can be made:

- **The Dutch government could learn from the US' approach regarding climate security. It should strive to, just like the US, structurally embed climate change dynamics into its security and defence strategies as well as into planning systems for the armed forces.** In this regard, it is also important to continue to seek cooperation with the private sector, as they will remain a critical partner with respect to innovation technologies to achieve a greener defence sector.
- **In a related vein, the US fulfils a leading position when it comes to assessing the implications of climate change for its military, including for military infrastructure.** Because of the existing knowledge and expertise, the US will be able to make a better educated guess as to the potential consequences of climate change for our potential adversaries. This will allow us **to make a considered estimation of how climate change might potentially weaken our adversaries' capabilities.** A particular role can be laid down here for the NATO Climate Change and Security Centre of Excellence (CCASCOE). **The Netherlands should emphasise the potential role of the NATO CCASCOE.**
- Information sharing between European countries and the US can help to structurally embed the climate change-security nexus into policies and

subsequently policy output. **The Netherlands can offer to operate as a knowledge broker on this matter, both within the EU as well as within NATO.** With respect to the latter, this is particularly relevant considering the establishment of the NATO CCASCOE.

- **As the Arctic area might be a future theatre of great power conflict, the region should remain high on the political agenda of the Netherlands, the EU and NATO.** The potentially severe security implications of a geopolitical conflict in the region should not be overlooked but rather anticipated.
- **The Netherlands should act as a driving force behind strengthening the strategic knowledge and technological position of Europe vis-à-vis China and Russia. This particularly applies to the strategic technological position of Europe with respect to the effects of climate change on the military infrastructure of states.** Considering that the Netherlands has a strong knowledge base and extensive expertise in, for example, hydraulic engineering and the delta works for coastline protection, it is well equipped to take on this role.
- **More extensive information gathering on the vulnerabilities of China and Russia with respect to their military infrastructure is necessary. This can be done through organising scenario exercises and simulations with relevant stakeholders.** Such exercises should also include countries from the region and countries that would potentially be affected by China's and Russia's inability to address these vulnerabilities.

# 1 Introduction: the climate-security nexus and the changing role of the armed forces

Security actors, including the armed forces, are increasingly confronted with extreme weather events that lead to calls for assistance both at home and abroad. Their military assets and ability to operate are affected by changing weather patterns, rising sea levels and other climate impacts. Some militaries have started to recognise that climate change may indirectly accelerate conflict risks by it posing additional pressures on already conflict-prone territories. Attention is rising too with regard to the contribution of the military to climate change with the sector allegedly being responsible for considerable shares of greenhouse gas emissions. In short, there are various ways through which militaries are affected by climate change and this is also likely to affect their military capabilities.

Consequently, security actors will have to be involved in responding to climate change and in relation to their own emissions they also have a contributing responsibility to mitigating climate change. However, their involvement is not automatic and the security dimension of climate change is not universally accepted. Whereas, the EU, NATO and the UN, have recognised climate change as threat multiplier<sup>3</sup>, how exactly climate and security are related and what this means for the realm of hard security is still subject to debate. Hence it is not automatic that climate change is included in a country's security and defence strategy, the tasks and deployment of the armed forces (including in training and exercises), their structure and measures to achieve a greener defence sector.

---

3 The EU Strategic Compass mentions climate change as a phenomenon affecting our security landscape. NATO's Strategic Concept refers to climate change as a defining challenge, a crisis and a threat multiplier. Moreover, the climate change-security nexus also features on the UN Security Council's agenda, although a draft resolution on the topic was rejected in December 2021.

This report will look at how the global powers, notably China, Russia and the United States (US), take into consideration climate change in their defence policies. Do these three countries have the same interests and approaches to address climate change and how do their armed forces incorporate it? The main research question is how climate change will affect the future military capabilities, strengths and postures of the three global powers towards 2035. This report will try to shed light on that question by performing comparative case studies of the three global powers. In addition, it will look at how this might affect European security interests: will it pose threats, or will it offer opportunities?

Before entering the case studies this chapter will first discuss in greater depth how the climate-security nexus is considered in the political and academic discourse, and why the securitisation lens is politically sensitive. It will also describe how the (deployment of) armed forces can be affected by climate change dynamics. Subsequently, the report will continue with a discussion of the three case studies, in alphabetical order: China, Russia, and the United States. Afterwards, a comparative analysis of the three case studies is provided, shedding light on where the three countries align and where they differ. The concluding chapter offers insights into how this might affect European security interests, and whether it offers threats or opportunities for European countries.

The methodology applied to this report consists of an extensive desk review of the state of the art of academic and think-tank literature. In addition, the relevant strategy and policy documents of China, Russia and the US are analysed in their original language.<sup>4</sup> Through a structured focused comparison, it will provide an insight into how climate change affects China's, Russia's and the US' future military capabilities, strengths and postures.

## **The climate change-security nexus**

Climate change is one of the main challenges that the world is currently facing and has severe security implications. For example, rising sea levels pose serious problems. The Maldives is expected to be one of the first countries to

---

4 The authors are grateful to Vera Kranenburg and Renze de Keiser for their valuable contribution to the analysis of the Chinese and American strategy and policy documents in their original language.



become uninhabitable<sup>5</sup>, whereas the Netherlands is at risk of coastal flooding. In the United States such floods jeopardise one of the most important military bases, Naval Station Norfolk.<sup>6</sup> Moreover, rising temperatures also pose a serious challenge: extreme droughts can lead to an increased risk of wildfires<sup>7</sup>, the melting of Arctic ice sheets, and the melting of runways of (military) airports – as has already occurred in the United Kingdom.<sup>8</sup> Simultaneously, rising temperatures contribute to the scarcity of natural resources. These are merely a few examples of the implications of climate change.

It was not until the 1980s that the climate change–security nexus gained traction. The emergence of ‘environmental security’ in international discussions commenced with the publication of ‘Our common future’ by the World Commission on Environment and Development in 1987.<sup>9</sup> Ever since then, more attention has been directed at the relationship between climate change and security.

This has primarily become visible in the incorporation of climate change into national security strategies. For example, in the Netherlands climate change is described as one of the developments that may generate national security risks.<sup>10</sup> In the US’ National Security Strategy of October 2022, climate change is denoted as being “the existential challenge of our time”.<sup>11</sup> Even Russia’s 2021 national security strategy states that climate change is a security threat that requires prevention and adaptation.<sup>12</sup>

Climate change has also gained prominence on the international agenda. For example, the EU Strategic Compass mentions that “climate change, environmental degradation and natural disasters will impact our security landscape over the next decades and are proven drivers for instability and

---

5 Adam Voiland, [Preparing for Rising Seas in the Maldives](#), Earth Observatory, 19 February 2020.

6 C. Todd Lopez, [DOD, Navy Confront Climate Change Challenges in Southern Virginia](#), U.S. Department of Defense News, 21 July 2021.

7 Guillermo Martinez, [“Climate change affects everyone”: Europe battles wildfires in intense heat](#), Reuters, 18 July 2022.

8 Reuters Staff, [UK Royal Air Force halts flights at Brize Norton base due to heatwave](#), Reuters, 18 July 2022.

9 Maria Julia Trombetta, [“Environmental security and climate change: analysing the discourse”](#), in: *Cambridge Review of International Affairs*, Vol. 21(4), December 2008, p. 585.

10 NCTV, [National Security Strategy](#), Ministry of Justice and Security, 19 September 2019, p. 19.

11 The White House, [National Security Strategy](#), October 2022, p. 27.

12 The Russian Federation, [О Стратегии национальной безопасности Российской Федерации](#), 3 July 2021.

conflict around the globe”<sup>13</sup>. Moreover, NATO’s Strategic Concept also states that “climate change is a defining challenge of our time, with a profound impact on Allied security. It is a crisis and threat multiplier”<sup>14</sup>. In addition, the United Nations Environmental Programme describes climate change as “the ultimate threat multiplier worsen[ing] existing social, economic and environmental risks that can fuel unrest and potentially result in violent conflict”<sup>15</sup>. These examples indicate that climate change is also being dealt with as a security matter at the international level.

## The politicisation and securitisation of climate change

Climate change has become increasingly politicised over the years, meaning that “the issue is part of public policy, requiring government decision and resource allocations”<sup>16</sup>. The politicisation of climate change is not necessarily problematic, as it implies that the highest political levels pay attention to the matter, something that is crucial when it comes to addressing (the effects of) climate change.

There is, however, disagreement as to whether climate change has become and should be securitised, implying that the issue is being “presented as an existential threat, requiring emergency measures and justifying actions outside the normal bounds of political procedure”<sup>17</sup>. The process of securitisation is very subjective: some will classify a particular phenomenon as being of critical importance to their security, whereas others would not do so.

Applying this to climate change, many countries have made an explicit link between climate change and security, primarily through incorporating climate change in their national security strategies. In general, a distinction can be made between the supporters and the opponents of the securitisation of climate

---

13 The European External Action Service, [A Strategic Compass for Security and Defence](#), March 2022, p. 22.

14 North Atlantic Treaty Organization, [NATO 2022 Strategic Concept](#), June 2022, p. 6.

15 United Nations Environmental Programme, [Climate Change & Security. Strengthening resilience to climate-fragility risks](#), n.d.

16 Barry Buzan, Ole Wæver & Jaap de Wilde, ‘Security Analysis: Conceptual Apparatus’, in: *Security: a new framework for analysis*, 1998, p. 23.

17 *Ibid.*, p. 23-24.

change. The supporters highlight that it may help in directing attention to the issues that really matter and it could help to better understand vulnerabilities or even conflict and violence.<sup>18</sup> The opponents argue that linking climate change to security is done in order to place climate change higher up on the political agenda.<sup>19</sup>

An additional argument that is put forward is that environmental issues, including climate change, do not belong to the realm of 'high' politics.<sup>20</sup> Explicitly linking climate change and security could lead to the creation of new competencies for the military.<sup>21</sup> Similarly, there is cautiousness about the involvement of the military in dealing with climate change, as their tools might not always be the most adequate ones to deal with the climate change-security nexus and the underlying complex socio-economic and political factors.<sup>22</sup>

This division between the supporters and opponents can also be witnessed at the highest international political levels, such as the UN Security Council (UNSC). Even though climate change has been recognised as conflict risk factor in regional and country-specific resolutions, such as on Lake Chad, opposition persists to acknowledging climate change as generic source of insecurity.

The latest attempt was a UNSC Resolution on climate security brought to the table by Ireland and Nigeria in December 2021. The resolution focussed on "improving the UN's analysis of the links between climate change and instability in countries and regions on the Council's agenda" and requested the UN Secretary-General "to produce a report on these issues by December 2023".<sup>23</sup> While the majority of the UNSC members (12) voted in favour of the resolution,

---

18 Maria Julia Trombetta, ['Environmental security and climate change: analysing the discourse'](#), *Cambridge Review of International Affairs*, Vol. 21(4), December 2008, p. 586.

19 Louise van Schaik, Tobias von Lossow, Maha Yassin & Anouk Schrijver, [Fears for militarization of climate change. Should we be concerned?](#), Clingendael Alert, October 2020, p. 2.

20 Maria Julia Trombetta, ['Environmental security and climate change: analysing the discourse'](#), *Cambridge Review of International Affairs*, Vol. 21(4), December 2008, p. 587.

21 *Ibid.*, p. 586.

22 Louise van Schaik, Tobias von Lossow, Maha Yassin & Anouk Schrijver, [Fears for militarization of climate change. Should we be concerned?](#), Clingendael Alert, October 2020, p. 3.

23 International Crisis Group, [How UN Member States Divided Over Climate Security](#), 22 December 2021.

Russia and India opposed it, while China abstained.<sup>24</sup> Russia and India claimed that the link between climate change and instability cannot be proved.<sup>25</sup> In addition, the Russian ambassador to the UN, Vasily Nebenzya, stated that Russia strongly opposes “creating a new area for the council’s work which establishes a generic, automatic connection between climate change and international security, turning a scientific and socio-economic issue into a politicized question”<sup>26</sup>.

This illustrates that it is not that clear-cut whether climate change, at the international level, is recognised as a security risk and this is also likely to have repercussions on views of it affecting the military. However, in reality we can witness that climate change already impacts the military in multiple ways, even when not openly acknowledged.

## Climate change and the armed forces

As climate change dynamics intensify, it is expected that armed forces across the world will be affected in multiple ways. Firstly, an increase in the deployment of the armed forces can be expected. More extreme weather conditions can lead to an increase in the number of climate-induced disasters. It is likely that the more frequent occurrence of these events will lead to an increase in the deployment of the armed forces for the purpose of humanitarian assistance and disaster relief (HADR).<sup>27</sup> For example, the Netherlands deployed its armed forces in response to the 2021 flooding in the province of Limburg<sup>28</sup> and when hurricane Irma destroyed large parts of Sint Maarten in 2017<sup>29</sup>. In a different vein, climate change may operate as a threat multiplier, in which it exacerbates pre-existing societal and political tensions. If such a situation occurs, there is an increased risk of the

---

24 See also: [‘Russia vetoes UN Security Council resolution linking climate crisis to international peace’](#), *The Guardian*, 13 December 2021.

25 International Crisis Group, [How UN Member States Divided Over Climate Security](#), 22 December 2021.

26 Margaret Besheer, [‘Russia Vetoes UN Resolution on Climate’s Impact on Global Security’](#), *VOANews*, 13 December 2021.

27 Louise van Schaik, Dick Zandee, Tobias von Lossow, Brigitte Dekker, Zola van der Maas & Ahmad Halima, [Ready for take-off? Military responses to climate change](#), Clingendael report, March 2020, p. 38.

28 [‘Wateroverlast Limburg’](#), Ministerie van Defensie.

29 [‘Missieoverzicht: Orkaan Irma’](#), Ministerie van Defensie.

emergence of conflict and violence. Consequently, an increase in the demand for crisis management or stabilisation operations may follow.<sup>30</sup>

Secondly, climate change, and in particular rising temperatures, rising sea levels and extreme weather events, also affect the working environment of the armed forces. This applies both to military infrastructure and capabilities, as well as the environment in which the armed forces have to operate. Some military aspects that might be severely affected by climate change include the military infrastructure and installations, the mental and physical health of military personnel, adequate equipment and clothing, and the performance of e.g. fighter aircraft.<sup>31</sup> For example, extreme weather events can lead to the flooding of military bases. This is already the case in the US with the regular flooding of the Norfolk navy base.<sup>32</sup> But also in China, the rising sea levels pose a potential (long-term) risk to military bases, such as the coastal bases in Hainan and Jiangsu.<sup>33</sup>

Less obvious and more complicated is the impact of climate change on the characteristics of military operations. It is expected that the armed forces will increasingly have to operate in a changing environment, which includes having to deal with “increasing power struggles around resource issues, new conditions of intervention, new types of missions”.<sup>34</sup> A very concrete example of how climate change might affect military operations was put forward by Ben Barry, who highlighted that climate change will alter the salinity of seawater<sup>35</sup>, which in turn will severely affect submarine and anti-submarine operations.<sup>36</sup> Another issue in this regard is the US’ nuclear infrastructure: most nuclear power plants were built

---

30 European External Action Service, [Climate Change and Defence Roadmap](#), Council of the European Union, 12741/20, (Brussels), 9 November 2020.

31 Louise van Schaik, Dick Zandee, Tobias von Lossow, Brigitte Dekker, Zola van der Maas & Ahmad Halima, [Ready for take-off? Military responses to climate change](#), Clingendael report, March 2020, p. 7.

32 C. Todd Lopez, [‘DOD, Navy Confront Climate Change Challenges in Southern Virginia’](#), U.S. Department of Defense News, 21 July 2021.

33 Thomas Corbett & Peter W. Singer, [‘As Climate Change Threatens China, PLA is Missing in Action’](#), *DefenseOne*, 18 January 2022.

34 [Joint Statement on climate change and the armed forces](#), Paris Peace Forum, 6 October 2021.

35 Studies have shown that climate change will alter the salinity of water. Rising sea levels will increase the salinity of both surface and groundwater, making the water denser.

36 Ben Barry, [Green Defence: the defence and military implications of climate change for Europe](#), The International Institute for Strategic Studies, 8 February 2022.

at a time when climate change was not being considered. Thereafter, necessary adjustments were not made, increasing the risk of damage following extreme weather events such as wildfires or floods.<sup>37</sup>

As for the operating environment of the armed forces, it is likely that the armed forces will to an increasing extent be deployed to areas where circumstances are extremely challenging. This can either be to areas with very low temperatures, such as the Arctic region, or regions with very high temperatures, such as in the Middle East and North Africa. Deployment to the Arctic region might become more likely as rapidly melting ice is paving the way for increased economic activity, but also for increased geopolitical and military activity.<sup>38</sup> Deployment to the Middle East and North Africa might be the result of climate change exacerbating existing conflict dynamics, leading to a potential rise in the demand for crisis management and stabilisation operations.<sup>39</sup>

Finally, climate change and the armed forces are associated as the latter actively contribute to the former. The armed forces are among the biggest polluters of the environment. This is primarily the result of the militaries' heavy reliance on fossil fuels, which leads them to be serious emitters of greenhouse gases.<sup>40</sup> For example, a 2019 Watson Institute Report found that the US Department of Defense (DOD) is the world's largest emitter of greenhouse gases, based upon its degree of petroleum consumption<sup>41</sup>, which has resulted in the US military emitting more carbon dioxide than some countries in their entirety (see the case study on the United States for a more extensive discussion).<sup>42</sup>

Paradoxically, however, if the demand for military deployment will increase in the near future, this also implies that military emissions will increase. Therefore, militaries across the world must take the necessary measures to contribute to

---

37 Susan D'Agostino, '[Is the US nuclear community prepared for the extreme weather climate change is bringing?](#)', *Bulletin of Atomic Sciences*, 20 April 2021.

38 Dick Zandee, Kimberley Kruijver & Adája Stoitman, '[The future of Arctic security. The geopolitical pressure cooker and the consequences for the Netherlands](#)', Clingendael Report, April 2020.

39 See: EUISS, '[Climate change, defence and crisis management: from reflection to action](#)', Event Report, December 2020, p. 2.

40 IMCCS, '[Decarbonized defense: The need for clean military in the age of climate change](#)', June 2022.

41 Neta C. Crawford, '[Pentagon Fuel Use, Climate Change, and the Costs of War](#)', Watson Institute, Updated on 13 November 2019.

42 Sonner Kehrt, '[The U.S. Military Emits More Carbon Dioxide Into the Atmosphere Than Entire Countries Like Denmark or Portugal](#)', *Inside Climate News*, 18 January 2022.

reducing (the impact of) climate change, the so-called ‘greenification of the armed forces’<sup>43</sup>. An additional benefit of decreasing the dependency on fossil fuels would be a reduction of the high costs of and the difficulties surrounding the safeguarding of supply lines, of which the current situation as a result of the war in Ukraine is exemplary. Shifting away from fossil fuels towards more renewable sources of energy would thus have advantages beyond the reduction of emissions.

In an attempt to achieve a greener defence sector, various Ministers of Defence<sup>44</sup> signed a declaration in which the ‘Climate Change and the Armed Forces’ initiative was outlined during the Paris Peace Forum in November 2021. The initiative provides a roadmap to reduce, amongst other things, emissions from armed forces. The declaration acknowledges the difficult relation between climate change and the armed forces: it highlights that the armed forces need to adapt to the changing environment, while also mitigating the impact of the armed forces on the environment.<sup>45</sup>

---

43 Louise van Schaik, Dick Zandee, Tobias von Lossow, Brigitte Dekker, Zola van der Maas & Ahmad Halima, [Ready for take-off? Military responses to climate change](#), Clingendael report, March 2020, p. 33.

44 The initiative currently counts 26 co-signatory countries: Albania, Austria, Belgium, Canada, Côte d’Ivoire, Cyprus, Denmark, Estonia, Finland, France, Greece, Hungary, Ireland, Japan, South Korea, Lithuania, Luxembourg, Malta, the Netherlands, New Zealand, Norway, Portugal, Senegal, Slovenia, Spain, and the United States.

45 [Joint Statement on climate change and the armed forces](#), Paris Peace Forum, 6 October 2021.



## 2 China: deliberately not talking about climate impacts on military capabilities?

This chapter reviews what we know about how Chinese defence circles consider climate change in relation to the armed forces. It will also discuss which aspects of Chinese defence might be most vulnerable and why this topic is not any more covered in the open since roughly 2013. It will point to issues that could be investigated to a larger extent.

### **The climate change-security nexus in PRC climate and defence strategies**

The climate security argument has been muffled since 2013. To date, the government of the People's Republic of China (PRC) does not explicitly link security and/or defence with climate change. Defence strategies only address climate issues in a very limited manner, and climate change strategies do not explicate any role for the military. The 14th five-year plan pays lip service to “ecological security”, but never connects the dots between climate change and China's military capabilities.<sup>46</sup>

The implications of climate change for China's national and international security were first addressed in the early 2000s by the State Environmental Protection Agency, particularly by its first and second directors, Qu Geping and Xie Zhenhua, the PRC's current Special Envoy for Climate Change. Already in 2007, a then retired general of the People's Liberation Army (PLA), Xiong Guangkai,

---

46 [Outline of the 14th Five-Year Plan \(2021-2025\) for National Economic and Social Development and Vision 2035 of the People's Republic of China](#), The People's Government of Fujian Province, 8 September 2021.

introduced the term “climate security” (气候安全), but with little or no effect on Chinese military or security circles.<sup>47</sup>

In a 2009 article, Professor Zhang Haibin of Peking University stated that “climate change is undoubtedly a national security issue for China”<sup>48</sup>. And rightfully so, as the reasons for supporting this statement are plentiful. Rising sea levels reduce China’s land area and threaten the country’s major coastal cities and sea areas, including coastal naval bases. Climate change also affects China’s already dangerously dry northern and western areas, puts the country’s water resources and food production under strain and causes extreme weather events. In addition to these factors, Professor Zhang argued that China is to an increasing extent being put under international and domestic pressure as a result of climate change. Consequently, this squeezes the government’s space for autonomous decision-making, thereby challenging its governance capacity. Moreover, Zhang identified that the negative side-effects of climate change may emerge in China’s major national defence and strategic projects, and in the build-up of its military.

Policy documents focusing on climate change universally acknowledge that climate change results in a host of issues, some of which constitute threats to security writ large. The following sentences, taken from the 2021 climate strategy, is indicative thereof: “Rising temperatures and sea levels and frequent extreme climate events pose a serious challenge for the very survival of humanity and are long-term major threats to the security of global food, water, ecology, energy and infrastructure, and to people’s lives and property. Therefore, addressing climate change is a task of great urgency”.<sup>49</sup>

The yearly report on China’s climate change policies, published by the Ministry for Ecology and Environment, does not mention the PLA, defence or security at all.<sup>50</sup> Conversely, some awareness of climate security issues can be found in the PRC’s defence strategies, most importantly between 2008 and 2013.

---

47 ‘熊光楷在德国发表演讲阐述当前中国安全政策’ [Xiong Guangkai delivered a speech in Germany elaborating on China’s current security policy], Sina Military, also quoted in Jiayi Zhou, “[China in National Climate-Related Security Policies of the Permanent Member States of the United Nations Security Council](#)”, Stockholm International Peace Research Institute, 2017.

48 Zhang Haibin, [Climate Change and National Security](#), 2009.

49 The State Council Information Office of the PRC, [Responding to Climate Change: China’s Policies and Actions](#), 2021.

50 See the [2021](#), [2020](#), [2019](#), [2018](#) and [2017](#) strategies.

The Chinese government outlines its national defence strategy in National Defence White Papers written by the Ministry of National Defence and published by the State Council Information Office. Under Hu Jintao's leadership, these documents noted climate security-related issues on a number of occasions, albeit in limited ways. Explicit attention to climate change as a military security issue was given in the 2008 and 2011<sup>51</sup> national defence White Papers.

The 2008 paper was the first to mention climate change, albeit only once, by stating that “issues such as terrorism, environmental disasters, climate change, serious epidemics, transnational crime and pirates are becoming increasingly prominent.”<sup>52</sup> It also mentioned that “The PLA has launched an in-depth movement to conserve energy and resources by encouraging conservation-minded supply and consumption.”

In 2008 the PLA General Staff founded a so-called *Military Climate Change Expert Committee* (军队气候变化专家委员会).<sup>53</sup> The committee was made up of experts from the NDRC, the Ministry of Foreign Affairs, the Ministry of Science and Technology, the China Meteorological Administration, the State Bureau of Oceanography and the National Natural Sciences Foundation Commission. It was charged with “research on the impact of climate change on military operations and military development, and providing strategic decision-making and technology support for military science in overcoming climate change.”<sup>54</sup> It only held its first “report meeting” in 2013, discussing “The Military Coping with Climate Change” (“军队应对全球气候变化”)<sup>55</sup> – after which point in time it seems to have ceased its activities. Nothing has been published on the results of the said

---

51 Entitled ‘National Defense in 2010’, the White Paper was actually only published in 2011.

52 The document is no longer available on Chinese government websites, but it can be retrieved here: [http://www.andrewerickson.com/wp-content/uploads/2019/07/China-Defense-White-Paper-2008\\_English-Chinese.pdf](http://www.andrewerickson.com/wp-content/uploads/2019/07/China-Defense-White-Paper-2008_English-Chinese.pdf)

53 中国青年报, *The Military Meteorological and Hydrological Department actively participates in the activities of the Energy Conservation Publicity Week*, 28 June 2013; 中国政府网, *The first report of “The Army’s Response to Global Climate Change” will be held in Beijing*, 19 June 2013.

54 Duncan Freeman, *The Missing Link: China, Climate and National Security*, Brussels Institute of Contemporary China Studies, 2010.

55 中国青年报, *The Military Meteorological and Hydrological Department actively participates in the activities of the Energy Conservation Publicity Week*, 28 June 2013; 中国政府网 *The first report of “The Army’s Response to Global Climate Change” will be held in Beijing*, 19 June 2013.

meeting. The 2011 White Paper adds another aspect, namely the application of defence industrial technology for environmental and ecological purposes.<sup>56</sup>

Three defence White Papers have been published in the Xi Jinping era: in 2013, 2015, and 2019. The last two do not mention climate change, environmental or ecological issues in any context. The 2013 White Paper does do so, but in a particular way: it calls for the PLA to contribute to “promoting ecological progress and protecting the environment” within China. In particular, it mentions that “The PLA, militia and reserve organic troops are organized to help afforest barren hills, control desertification and preserve wetlands. ... Over the past two years, the PLA and PAPF have planted over 14 million trees, and afforested above three million mu of barren hills and beaches by large-scale planting and aerial seeding”<sup>57</sup>.

Despite the absence of a direct connection between climate change and security and defence in China’s strategy documents that specifically cover one of these two fields, in certain adjacent policy fields, issues of climate change and security do meet. Two geostrategic theatres stand out: Africa and the Arctic. At the 2022 China-Africa Peace and Security Forum, President Xi stated that China and African countries should cooperate in the face of “untraditional security threats such as terrorism, COVID-19, climate change and food security.” “Against such a background” it was stated, “to enhance China-Africa peace and security cooperation is of more practical significance.”<sup>58</sup> The event celebrated Africa-China cooperation under the banner of Xi’s newly coined but wholly undefined Global Security Initiative.

In its Arctic strategy, China clearly links climate change and security by stating that it “is also closely involved in the trans-regional and global issues in the Arctic, especially in such areas as climate change, environment, ..., security, and global governance. ... As a permanent member of the UN Security Council,

---

56 Around the same time IR scholar Zhang Haibin published a Chinese language book entitled *Climate Change and China National Security*. Although it has since come unavailable, it is still listed [here](#).

57 Ministry of National Defense, [The Diversified Employment of China’s Armed Forces](#), The State Council Information Office of the PRC, April 2013.

58 He Yin, [‘China, Africa work to build security community’](#), *People’s Daily*, 2022.

China shoulders the important mission of jointly promoting peace and security in the Arctic”<sup>59</sup>.

Since Xi Jinping took office, China’s Arctic policy has adopted an explicit geopolitical purpose, within the context of China’s geo-economic expansion, maritime ambitions and its changing relations with the US and Russia, as Clingendael research shows.<sup>60</sup> China aims to build a significant presence in Arctic governance, not to dominate the region, but to take advantage of the geopolitical, military and commercial opportunities that will arise from the melting Arctic ice caps, specifically the opening up of the Northern Sea Route (NSR), which trails the Russian coast. Chinese participation in a project like Arctic Connect, which lays new data cables along the NSR, should also be seen in this light, as these can also be used for gathering military surveillance information.

China has deployed naval vessels to the Arctic on two occasions and has sent 10 scientific expeditions into the region on the Xuelong icebreaker that officials acknowledge give it useful operational and navigational experience. It plans to build a new heavy duty icebreaker as well as semi-submersible heavy lift ships to support its increasing maritime activities as part of the Polar Silk Road.<sup>61</sup> China has also established satellite facilities in Norway, Iceland, and Sweden while pursuing additional facilities in Canada and Greenland. Finally, China has used the Arctic as a testing ground for new capabilities related to satellite coverage, fixed-wing aircraft and autonomous underwater gliders.<sup>62</sup>

---

59 [China’s Arctic Policy](#), State Council Information Office, January 2018.

60 Ties Dams, Louise van Schaik and Adája Stoetman, [Presence before Power: China’s Arctic Strategy in Iceland and Greenland](#), Clingendael Report, June 2020; Dick Zandee and Adája Stoetman, [The Future of Arctic Security: the geopolitical pressure cooker and the consequences for the Netherlands](#), Clingendael Report, April 2020; Louise van Schaik and Ties Dams, [The Arctic Elephant: Europe and the Geopolitics of the High North](#), Clingendael Policy Brief, November 2019.

61 [What does China’s new heavy icebreaker mean?](#), Polar Journal, 27 November 2021; Liu Zhen, [China to develop new heavy icebreaker for “Polar Silk Road”](#), South China Morning Post, 13 November 2021.

62 Rush Doshi, Alexis Dale-Huang and Gaoqi Zhang, [Northern expedition: China’s Arctic activities and ambitions](#), Brookings Institution, April 2021.

## Climate security in official rhetoric

Climate security has been fully incorporated into the official concept of non-traditional security (“非传统安全”, NTS).<sup>63</sup> Under Xi Jinping, the Chinese government has consistently emphasised the importance of NTS in speeches and official statements. A testament to this is the often cited 2017 speech by Xi at the UN, where the leader was quoted as saying that “non-conventional security threats, particularly terrorism, refugee crisis, major communicable diseases and climate change, are spreading.”<sup>64</sup> This appears to be merely a rhetorical move. In fact, the PRC is extremely reluctant to speak of climate change as an international security issue.

China has consistently brushed aside the idea that the United Nations Security Council should address climate change, ever since it was first included on the UNSC’s agenda in 2008 right up to the most current statement in 2021 by UN Ambassador Zhang Jun. In this statement, Ambassador Zhang implies, as have PRC representatives before him, that securitising climate change is predominantly a way for developed countries to shift the blame to developing countries, like China.<sup>65</sup>

What Zhang Haibin calls the “conspiracy” attitude towards climate change also emerges in China’s UN voting behaviour. The UNSC resolution on climate security that was tabled by Niger and Ireland in December 2021, and that was discussed in the previous chapter, did not receive a positive vote from China: the country abstained from voting, indicating the country’s reluctance towards coupling climate change and security. Ambassador Zhang explained China’s position by reiterating the message that developed countries have a responsibility to assist poorer countries in responding to climate change, rather than monitoring them.<sup>66</sup> Here a still deeper fear lingers, relating to the Chinese animosity towards the “Responsibility to Protect” concept (R2P). Allowing a securitised concept of

---

63 Liu Hongyi, [‘The role and logic of nontraditional security in China’s engagement in global governance mechanisms under Xi Jinping’s regime’](#), Journal of Chinese Political Science, Vol.26, 12 October 2020.

64 [‘Full text of Xi Jinping keynote speech at the United Nations Office in Geneva’](#), CGTN America, 18 January 2017.

65 [Remarks by Ambassador Zhang Jun at Security Council Open Debate on Climate and Security](#), Ministry of Foreign Affairs, 2021.

66 [How UN member states divided over climate security](#), International Crisis Group, 22 December 2021.

climate change to become the norm within the UN is seen as a threat to open the door to unwanted Western interference in Chinese domestic affairs.<sup>67</sup>

China has paid lip service to foreign governments in acknowledging the security implications of climate change. In 2014 the PRC issued a joint statement with the Obama White House that put a positive spin on things by arguing that “tackling climate change will also strengthen national and international security.”<sup>68</sup> It should be noted that China has just indefinitely suspended both military as well as climate change bilateral talks with the US as a response to US official visits to Taiwan, most prominently by the Speaker of the House Nancy Pelosi.

A 2018 joint EU-China statement<sup>69</sup> explicitly links climate change to national security and international instability, arguing that climate change’s “detrimental impacts on water, food and national security have become a multiplying factor of social and political fragility, and constitute a root cause for instability, including the displacement of people.” As Dr Jiayi Zhou of SIPRI notes, “overall, in both defence papers and speeches by state officials, references to climate change as a global security threat have only ever been on a rhetorical level, grouped together with other challenges to global governance, with very few specific impacts to Chinese national security listed.”<sup>70</sup>

## The implications of climate change for the PRC’s armed forces

Despite the relative absence of a direct connection between climate change and defence in the PRC’s official strategies and rhetoric, the PRC’s armed forces, the PLA, will still be affected by climate change dynamics. This may occur in at least four ways: rising sea levels may threaten naval bases, extreme weather events will strain the capacity of the PLA, melting permafrost puts military capacity at risk,

---

67 Tiewa Liu and Haibin Zhang, ‘[Debates in China about the responsibility to protect as a developing international norm: a general assessment](#)’, *Conflict Security and Development*, Vol.14 (4), 11 July 2014; Duncan Freeman, [The Missing Link: China, Climate and National Security](#), Brussels Institute of Contemporary China Studies, January 2010.

68 The White House, ‘[U.S.-China Joint Announcement on Climate Change](#)’, *Office of the Press Secretary*, 12 November 2014.

69 [EU-China Leaders’ Statement on Climate Change and Clean Energy](#), Consilium Europa, 16 July 2018.

70 Jiayi Zhou, ‘[“China” in National Climate-Related Security Policies of the Permanent Member States of the United Nations Security Council](#)’, *Stockholm International Peace Research Institute*, 1 December 2017.



and the potential deployment of China's armed forces as a result of an increased risk of conflict following water scarcity in the region.

Firstly, according to the PRC Ministry of Natural Resources' 2020 Sea Level Bulletin, China's SLR is significantly higher than the global average, leading to expectations that China's coastal sea level will rise by 55 to 170 mm over the next 30 years.<sup>71</sup> This puts the Hainan and Jiangsu coastal naval bases at risk, as well as the multiple PLA facilities on China's natural and man-made islands in the South China Sea, not to mention the physical safety and economic security of many if not most of China's main metropolitan and commercial hubs.<sup>72</sup> It is unknown whether or to what extent China's only overseas military base in Djibouti will be affected by SLR.

Secondly, the increasing frequency of extreme weather conditions, such as flooding, drought, and cyclones, will degrade or compromise a variety of critical and security-related infrastructure across China. Heavy rainfall and mudslides already threaten fixed missile launch sites utilised by the Second Artillery Corps, China's strategic missile force. Acidification of the Bohai, Yellow and East-China Seas has a negative impact on the capacity of Chinese submarines to evade detection.<sup>73</sup> More generally, extreme weather events will put further strain on the PLA's disaster relief capacity. Little is known about the readiness and willingness of China to put PLA's disaster relief capacity to use in the region if extreme weather events cause humanitarian crises that affect China's national security.

In addition, the rapid melting of permafrost on the Qinghai-Tibet Plateau reduces the foundation-bearing capacity and therefore the operational safety of the Qinghai-Tibet Railway. This railway is not just a civilian, but a major national defence and strategic project, as it allows PLA troops to be more readily mobilised to the Indian border. Some missile bases in the north-western region of China are located in permafrost areas, and climate change has exacerbated permafrost swelling and thawing, affecting the accuracy of missile hits.

---

71 Ministry of Natural Resources, '[China Sea Level Bulletin 2020](#)', Department of Marine Early Warning and Monitoring, April 2021.

72 Thomas Corbett and Peter W. Singer, '[As Climate Change Threatens China, PLA Is Missing in Action](#)', *Defense One*, 18 January 2022.

73 Wilson VornDick, '[Why Climate Change Could be China's Biggest Security Threat](#)', *The Diplomat*, 14 August 2015.

Finally, in a different but related vein, two shared river basins put China in a powerful and complicated position when it comes to the water resources of its neighbours. The Mekong is shared by China, Cambodia, Laos, Thailand and Vietnam, but China controls the headwaters and the dams that control water flow. The same holds true for the Brahmaputra Basin, which China shares with India. In a future scenario of increasing water scarcity, conflict in the region may arise as a result of these dynamics.<sup>74</sup> Melting glaciers in China exacerbate these risks. In such a scenario, it is not unlikely that the PRC's army, the PLA, will be deployed. It is, however, very unlikely that China would call on international assistance in such instances, such dependence implying a major loss of face and a demonstration of vulnerability. Given China's increasing contributions to UN Peacekeeping operations, the question should be raised whether or to what extent climate security issues will drive China's military engagement in other countries. No statements on this issue by the Chinese authorities are known.

## Conclusions

Very little is known about what the Chinese government thinks about how climate change will affect its military capabilities, strengths and postures towards 2035, as it seems to actively pursue a strategy of resisting connecting the two issues. Nothing has been published on the development of a 'green PLA'; the Chinese army seems to be disconnected from the overall goal to become carbon neutral by 2060. Awareness cannot be the issue: in addition to international publications, Chinese scholars and officials have at times raised the issue, but the argument has been largely muffled since 2013.

If awareness is not the issue, then what is? Climate change is probably first and foremost a national security issue for the Chinese leadership: the effects of climate change can cause social instability and thus erode the CCP's power. Adopting an international securitized notion of climate change does not help that cause. Although one cannot determine which considerations cause China's reluctance to focus on climate security, a number of other hypotheses can be taken into account. The ties between the PLA and China's fossil industries rank amongst the first: the PLA leadership has been mired with corruption

---

74 Robert Glasser, Cathy Johnstone and Anastasia Kapetas (eds.), [\*The geopolitics of climate and security in the Indo-Pacific\*](#), ASPI and Konrad Adenauer Stiftung, February 2022.

scandals, directly or indirectly related to China's fossil industries.<sup>75</sup> Adopting green technologies could be seen by the military establishment as potentially cannibalising its political influence.

A second hypothesis may be that the “conspiracy attitude” toward climate security is held in earnest, at least by some: apart from the rhetorical strategy to undermine Western influence within multilateral forums, it is conceivable that relevant Chinese policymakers, especially within the military establishment, view climate change through the lens of Sino-US competition. A number of non-military entities within the Chinese state, such as the State Environmental Protection Agency, have in the past shown a willingness to address the issue and to link with Western partners. A third hypothesis is that the Chinese government does indeed take climate security very seriously, but that it vigilantly protects any information about this leaking to its strategic adversaries. The Chinese state may well have military applications in mind when it directs its large investigations into Greentech, but may be extremely cautious in showing any military link.

Independent intelligence is needed on specific climate security issues that China will have to deal with from now until 2035 and beyond. At least four priority areas can be identified: rising sea levels threaten coastal cities and naval bases, extreme weather events will strain the capacity of the PLA, melting permafrost puts military capacity at risk, and China has power over the water resources of its neighbours.

---

75 Samson Yuen, “Disciplining the Party. Xi Jinping’s anti-corruption campaign and its limits”, *China Perspectives*, 2014/3 | 2014, 41-47; Quah, Jon ST. “Hunting the corrupt “tigers” and “flies” in China: An evaluation of Xi Jinping’s Anti-corruption campaign (November 2012 to March 2015).” *Maryland Series in Contemporary Asian Studies* 2015.1 (2015): 1.

# 3 Russia: Arctic dreams and fossil realities

This chapter will review how security and defence circles and strategies in Russia view climate impacts in relation to the military. It points to a focus on opportunities of global warming, but also to the big problems that the Russian military encounters because of the melting of the permafrost, among other issues.

## The climate change-security nexus in Russian strategy documents

Russia is cautious in coupling climate change with international security, in particular when it comes to instability and conflict. The Russian blocking of a UNSC Resolution on climate security in December 2021, as mentioned in the introduction of this report, is illustrative of this, when Russia argued that the link between climate change and instability was not proven and that the resolution ignored the “genuine deep-rooted reasons” for conflict in some countries.<sup>76</sup>

This Russian reluctance to link climate change and security stems from its fear of the increased international politicisation of the issue, something of which Russia is not a supporter. However, although Russia tends to block generic UN resolutions that link these two topics, it often accepts more case-oriented resolutions. The case of Lake Chad is a good example of this approach, where Russia supported a UNSC Resolution that “recognises the adverse effects of climate change and ecological changes among other factors on the stability of the Region”.<sup>77</sup>

Russian scepticism towards the generic securitisation of climate change at an international level does not mean that Russia ignores the connection between climate change and security. Starting as early as 2008, Russia has written about

---

76 United Nations, “[Security Council Fails to Adopt Resolution Integrating Climate-Related Security Risk into Conflict-Prevention Strategies](#)”, 13 December 2021.

77 [UN Security Council Resolution 2349](#), adopted by the Security Council at its 7911th meeting, on 31 March 2017.

climate change as a threat and has frequently mentioned it in its key strategic documents.<sup>78</sup> In the most recent *National Security Strategy of the Russian Federation*, for example, Russia has denoted climate change as a threat to national security – particularly to the living environment of the Russian people, which could materialise in the form of wildfires, floods, infectious diseases, or the deterioration of infrastructure.<sup>79</sup>

In many other key federal strategic documents, the threat of climate change is noted. The *Climate Doctrine* from 2009, for example, states that climate change should be considered “as one of the major long-term elements of the security of the Russian Federation”, considering that “the anticipated climate change threatens the security of the Russian Federation”.<sup>80</sup>

The *Maritime Doctrine of the Russian Federation* of July 2022 warns that the effects of climate change are one of the main risks for Russian maritime activities, because of an increase in the frequency and intensity of natural disasters. The document stresses that “the development of scientific centres and research on creation of modern technologies and methods for forecasting natural phenomena hazardous for marine activities and climate change” is one of the priorities for ensuring maritime security. In the previous version, dating back to 2015, climate change was only mentioned as something on which scientific research should be conducted – taking into account the role of climate change in the Arctic and Antarctic regions.<sup>81</sup>

In the *Foreign Policy Concept of the Russian Federation* of 2016 and 2014, climate change is mentioned as one of the cross-border threats and challenges that Russia has to deal with, and that the Russian Federation wishes to increase international cooperation to ensure environmental security and to combat climate change.<sup>82</sup> Simultaneously, however, Russia expresses its concerns

---

78 Presidential Executive Office, [The Foreign Policy Concept of the Russian Federation](#), 12 January 2008.

79 Presidential Executive Office, [Стратегия национальной безопасности Российской Федерации \[National Security Strategy of the Russian Federation\]](#), 2 July 2021.

80 Presidential Executive Office, [Climate Doctrine of the Russian Federation](#), 17 December 2009.

81 Presidential Executive Office, [Морская доктрина Российской Федерации \[Maritime Doctrine of the Russian Federation\]](#), 31 July 2022.

82 Presidential Executive Office, [The Foreign Policy Concept of the Russian Federation](#), 30 November 2016; Presidential Executive Office, [The Foreign Policy Concept of the Russian Federation](#), 12 February 2013.

regarding the international securitisation of the environment: “The Russian Federation opposes far-fetched attempts to politicise environment protection and use it as a pretext for restricting State sovereignty over natural resources or for encouraging unfair competition.”<sup>83</sup>

Finally, an earlier version of the *National Security Strategy of the Russian Federation* in 2016 warns that “the impacts of climate change are becoming more tangible”, and that accidents and catastrophes associated with global climate change are among the main threats to the Russian state and public security. In the context of ecological safety, this document stipulates that the elimination of environmental damage from global climate change is one of the strategic goals.<sup>84</sup>

Although climate change is perceived as a threat to the national security of the Russian Federation throughout key federal documents, Russia barely securitises this issue in relation to its armed forces in its strategic documents. Of all the analysed documents in this study, only the *Climate Doctrine of the Russian Federation* of 2009 indicates the potential threat of climate change to military facilities, for example, and states that potential threats to the security of the Russian Federation, such as to its defence capabilities, should be timely identified.<sup>85</sup> However, none of the federal strategic documents has established a connection between climate change and the Russian military, nor stipulated concrete responsibilities for the armed forces in mitigating the effects of climate change. One possible explanation for this is that Russia simply does not see the need for this, due to the conviction that current Russian military capabilities (which are to a large extent based on military hardware from Soviet times) will continue to function in different kinds of climate anyway.

This situation is very well exemplified in the *National Action Plan for the First Phase of Adaptation to Climate Change until 2022*, which was published by the Russian government in 2019.<sup>86</sup> After first outlining the implications of climate

---

83 Ibid.

84 Presidential Executive Office, [Стратегия национальной безопасности Российской Федерации](#) [*National Security Strategy of the Russian Federation*], 31 December 2015.

85 Presidential Executive Office, *Climate Doctrine*, 2009.

86 Presidential Executive Office, [Национальный план мероприятий первого этапа адаптации к изменениям климата на период до 2022](#) [*National action plan for the first phase of adaptation to climate change until 2022*], 25 December 2019.

change for Russia, this document finishes with a timetable containing which actions need to be taken at what moment and by whom. While two dozen ministries and other governmental organisations are involved in this process, the Ministry of Defence is not even mentioned once as a relevant actor.

Rather, the Ministry of Economic Development (on 27 occasions), the Federal Service for Hydrometeorology and Environmental Monitoring (22), the Ministry of Construction (18), and the Ministry of Finance (15) are mentioned most frequently in this action plan. This underlines that while climate change is perceived as a threat to Russian security and interests in general, economic actors in the Russian state would have to take the lead in dealing with this issue.

### **Climate change: threats and opportunities**

Beyond the threats, Russia continuously stresses how climate change will offer opportunities for the country as well, and consistently talks about *adaptation* to climate change, rather than taking significant steps to actually halt global warming. In contrast to the US, where adaptation means that the armed forces are preventively adapting to climate change (which includes a green agenda), Russia indicates by “adaptation” that it is monitoring and assessing the effects of climate change and will adapt to this when they take place.

As the 2019 *National Action Plan* mentions, “the choice of adaptation measures takes into account the full range of losses and benefits associated with climate change”, “observed and projected climate change in the Russian Federation can be both adverse and beneficial for the economy and population”, and that “climate change adaptation (...) measures are needed to reduce losses and harness the benefits associated with observed and future climate change”.<sup>87</sup> This duality is key to the Russian perception of climate change.

### **Threats stemming from climate change**

During his annual press conference in 2019, Vladimir Putin was asked by a Russian journalist what the risks of climate change are and how it could damage Russia, as everybody was talking about the issue, but nobody seemed

---

87 Presidential Executive Office, *National action plan*, 2019.

to take any action.<sup>88</sup> In response, Putin outlined three concrete threats. First, the consequences of melting permafrost for infrastructure, as 70% of Russia is located in the northern altitudes. Second, Putin warned against the risk of desertification in certain areas due to higher temperatures. Third, Putin warned that climate change will lead to a more frequent occurrence of wildfires, floods, and other natural disasters. This largely overlaps with the threats that are described in Russian strategic documents.

A variety of strategic documents warn against the possible emergencies and disasters that can follow due to climate change. The 2009 *Climate Doctrine* and the 2019 *National Action Plan* both warn against (public) health risks such as increased morbidity death rates, but also against the increased recurrence, intensity, and duration of droughts on the one hand, and extreme precipitation and flooding on the other – both forming a danger for agriculture.<sup>89</sup> These two documents also warn against an increased fire risk for forests, as does the 2021 *National Security Strategy*, and also the importation and spread of infectious diseases.<sup>90</sup>

Russian strategic documents also describe the threat that climate change poses to Russian infrastructure. This particularly applies to permafrost, as this could damage buildings and communication lines.<sup>91</sup> Infrastructure damage in Russia could account for 7 trillion roubles (117 billion euro at the time of writing this report) in 2050 due to climate change according to the Yakutsk's Melnikov Permafrost Institute,<sup>92</sup> and earlier estimates by the Russian Academy of Sciences in 2019 projected that 249 billion euro worth of housing and infrastructure is at risk because of melting permafrost.<sup>93</sup> More generally, climate change-related threats extend to “dangerous production facilities”, hydraulic structures, transportation networks, and life support objects for the population, as the 2021 *National Security Strategy* mentions. While the armed forces are not mentioned

---

88 Presidential Executive Office, [Vladimir Putin's annual news conference](#), 19 December 2019.

89 Presidential Executive Office, *Climate Doctrine*, 2009; Presidential Executive Office, *National action plan*, 2019.

90 Presidential Executive Office, *National Security Strategy*, 2021.

91 Presidential Executive Office, *Climate Doctrine*, 2009; Presidential Executive Office, *National action plan*, 2019.

92 Maxim Shemetov, [“Russia's remote permafrost thaws, threatening homes and infrastructure”](#), *Reuters*, 18 October 2021.

93 Natasha Doff, Ilya Arkhipov, and Yuliya Fedorinova, [“The Cold Calculus Behind Putin's Lukewarm Embrace of Paris Pact”](#), *Bloomberg*, 22 September 2019.



specifically here, it should be clear that damage to infrastructure due to climate change poses a risk for the armed forces as well.

Adding to the threats that Putin outlined in his press conference, strategic documents also indicate the impact that climate change will have on the economic development of Russia. Beyond the impact on economic facilities,<sup>94</sup> documents such as the 2021 *National Security Strategy* warn that “increased global attention to climate change and the environment is used as a pretext to limit access of Russian companies to export markets, to curb the development of Russian industry, to control transport routes and to hinder Russia’s development of the Arctic”.<sup>95</sup> This last point is in line with the goals set out in the *Development of the Arctic* strategy from 2020, which indicated that the “sustainable functioning of infrastructure in the face of climate change” in the Arctic must be ensured through the development and implementation of “technical solutions”.<sup>96</sup> In this sense, both climate change and the international attention given to it are perceived as security threats by Russia, which further explains why Russia is so sceptical towards securitising the issue internationally.

## Opportunities arising from climate change

While the different threats stemming from climate change are very present in a variety of strategic documents, climate change is not explicitly felt as a very acute threat by many in Moscow. The outcomes of climate change “may even turn out to be advantageous” in their view, and the state “has consistently acted on the implicit premise that the ‘cure’ to climate change is worse than the ‘disease’”.<sup>97</sup>

In line with the division of labour that the *National Action Plan* suggests, these opportunities from climate change are mainly economic in nature and apply to Russian companies, industry, and transport routes amongst others.

---

94 Presidential Executive Office, *National action plan*, 2019.

95 Putin, *National Security Strategy*, 2021.

96 Presidential Executive Office, *Стратегия развития Арктической зоны Российской Федерации и обеспечения национальной безопасности на период до 2035 года* [Strategy for the Development of the Arctic Zone of the Russian Federation and National Security until 2035], 26 October 2020.

97 Bobo Lo, “[The Adaptation Game—Russia and Climate Change](#)”, *Russie.Nei.Visions*, No. 121, Ifri, March 2021.

For example, while different strategic documents point towards the negative impact on agriculture (and thus food security), such documents simultaneously outline how food production could even improve because of climate change as formerly frozen fields become suitable for farming.

A region where the impact of climate change through the lens of opportunities is clearly visible is the Arctic region. As the 2009 *Climate Doctrine* forecasted, the “ice situation” would improve because of climate change – allowing improvements in freight haulage in the Arctic Sea and easier access to explore Arctic shelves.<sup>98</sup> The development of the Northern Sea Route in particular has been raised in a variety of strategic documents, as Russia sees it as a key interest to develop the sea route that stretches all along the northern coast of the Russian Federation. The 2020 *Strategy for Developing the Russian Arctic Zone and Ensuring National Security until 2035* spoke of how “the importance of the Northern Sea Route as a transport corridor of global significance for national and international freight traffic will increase as a result of climate change”, and other documents have also stressed how increased navigation along the Northern Sea Route and its development are amongst the opportunities that climate change creates.<sup>99</sup>

In the *Maritime Doctrine* of 2022, the Arctic is frequently mentioned and a whole chapter is dedicated to the region – with much attention being given to the militarisation thereof. This chapter stipulates how the role of the navy is increasing here in order to ensure national defence in the Arctic zone of Russia, how an operational regime in the Arctic needs to be ensured by strengthening the combat capabilities of the Northern and Pacific Fleets and federal security agencies, and how control needs to be exercised over the naval activities of foreign states in the Northern Sea Route (which Russia considers to be internal waters). In the context of all of this, the *Maritime Doctrine* stresses how scientific research needs to be conducted “into the state and pollution of the Arctic marine environment under conditions of active anthropogenic impact, taking into account the role of the Arctic basin in global climatic processes”.<sup>100</sup>

---

98 Presidential Executive Office, *Climate Doctrine of the Russian Federation*, 17 December 2009.

99 Presidential Executive Office, *Strategy for the Development of the Arctic Zone*, 2020; Presidential Executive Office, *Maritime Doctrine*, 2022.

100 Presidential Executive Office, *Maritime Doctrine*, 2022.

## The consequences of climate change for the armed forces

Although Russia barely stipulates the concrete consequences of climate change for the armed forces in its strategic documents, the relationship between climate change and security at large does have implications for the Russian military.

The Russian invasion of Ukraine offers a very current example of this. As the war begins to drag on into winter, it might become increasingly difficult for both sides to make progress during the next couple of months. Over the past three years, the ground in southern Ukraine has not frozen,<sup>101</sup> and a continuation of this would mean that it becomes more challenging for military vehicles to cross the muddy terrain, compared to dry or frozen land.

In the east of Russia, the thawing of permafrost will have an impact on military bases and energy installations. Over a decade ago, the then president Dimitry Medvedev already warned that “we will need to make thorough checks of civil and military infrastructure located in regions with the most complicated climatic conditions, and if necessary, take measures to make them more reliable in the context of climate change” during a meeting of the Russian security council dedicated to climate change.<sup>102</sup> This appeared to be no unwarranted warning.

Already in 2012, a study similar to this report on climate change and the military forces in Russia, China and the US warned that Russia had taken no concrete steps towards dealing with the impact of climate change on military bases, while their foundations would melt away due to rising temperatures.<sup>103</sup> This also applies to the islands where Russia has deployed bases, radar stations, rocket sites and other military infrastructure, as these are under threat due to melting ice.<sup>104</sup> A very recent study on “*Russia’s climate gamble*” identified a variety of regions where the thawing permafrost would likely have a destructive effect, which included many military and energy systems. Additionally, the report indicated

---

101 Felicia Schwartz, James Politi, and Mehul Srivastava, “[Ukraine faces critical battle in the south before winter, US says](#)”, *Financial Times*, 5 October 2022.

102 Presidential Executive Office, [Security Council meeting on preventing national security threats arising from global climate change](#), 17 March 2010.

103 Michael Brzoska, [Climate change and the military in China, Russia, the United Kingdom, and the United States](#), *Bulletin of the Atomic Scientists*, Vol. 68(2), 2012.

104 Stefan Bayer and Simon Struck, [The Strategic Orientation of Armed Forces in Times of Climate change](#)”, GIDS research, no. 1, November 2019.

that Russia appears to favour strengthening its already existing infrastructure in the Arctic region as opposed to building new military infrastructure, which was halted partially due to climate implications.<sup>105</sup>

Russia's militarisation of the Arctic occurs through what is characterised as a "double dual approach", where on the one hand infrastructure in the Arctic has a dual-use for both military and civilian usage, and on the other hand this infrastructure has a dual-purpose as "Russia is also blurring the lines between offensive and defensive intent".<sup>106</sup> The changing climate is also taken into account in this process. As the environment of the Arctic becomes increasingly unpredictable due to rising temperatures, the Russian armed forces anticipate this and are investing in military capabilities that can endure extreme weather conditions, such as special drones.<sup>107</sup> Russia also invests in the presence of nuclear submarines, flying with MiGs over the North Pole, and exercising with its Arctic Motorised Brigade, all in order to show "that it is present and, if required, will use force to defend its strategic interests" to other states with interests in the Arctic,<sup>108</sup> such as maritime routes, oil, gas and minerals.

Interestingly, Russia raised the status of its Northern Fleet to the same level as the four other Russian military districts in 2021.<sup>109</sup> This is not just significant because it was the first time that such a change was made, it also indicates the increasing importance of the Arctic region and (the defence of) the Northern Sea Route for Russia. A year earlier, within the Northern Fleet, a special naval engineering brigade was set up that has tasks such as building bridges and laying pontoons, but also constructing and restoring infrastructure in the Arctic, which "demonstrates an understanding within the Russian Ministry of Defence of the potential impacts of climate change on Arctic installations" as the *Climate Gamble* study illustrates.<sup>110</sup>

---

105 Heather A. Conley, Cyrus Newlin, Colin Wall, and Andrew Lohsen, [Russia's Climate Gamble: The Pursuit and Contradiction of Its Arctic Ambitions](#), CSIS, September 2021.

106 Mathieu Boulègue, ["The militarization of Russian polar politics"](#), Chatham House, June 2022.

107 Conley et al., *Russia's Climate Gamble*, 2021; Mathieu Boulègue, [Russia's Military Posture in the Arctic: Managing Hard Power in a 'Low Tension' Environment](#), Chatham House, June 2019.

108 Timothy Clack, ["Climate change is creating security threats around the world – and militaries are responding"](#), *The Conversation*, 17 January 2022.

109 Thomas Nilsen, ["Putin heightens the strategic role of the Northern Fleet"](#), *The Barents Observer*, 8 June 2020.

110 Conley et al., *Russia's Climate Gamble*, 2021.

## Russia's contribution to 'green' defence

So far, Russia has made no serious efforts to develop green energy sources or to reduce the emissions of its armed forces, while simultaneously strengthening its development of the Russian fossil fuel industry.<sup>111</sup> Hence, there is no indication that Russia will make a serious attempt at greenifying its armed forces.

One of the primary reasons for this is that the Russian economy is too reliant on fossil fuels. Over the past years, a major part of the Russian federal budget came from energy exports – between 2005 and 2018 the total oil and gas revenues made up 45% of the budget on average.<sup>112</sup> Since fossil fuels are one of the key strengths of the Russian economy, decision makers prioritise this current strength over the development of a sustainable green economy.<sup>113</sup>

As a columnist in the Russian *Kommersant* newspaper sharply summarised: “It would be naïve to think that the ruling elite would willingly dismantle the foundations of its dominance and source of wealth, especially since, on the international stage, oil and gas and the armed forces constitute the regime’s most important lever of power”.<sup>114</sup> After the full-scale Russian invasion of Ukraine in February 2022, Russia has actively weaponised this leverage vis-à-vis Europe. Step by step, Russia has decreased its gas exports to European countries in an attempt to break European support and solidarity for Ukraine, as energy prices have multiplied. Additionally, the European dependence on Russian fossil fuels might have strengthened Putin’s belief that the West would not react as strongly to the war as it has done.

Since fossil fuels form such an important foundation of the Russian economy and influence, a green economy poses a bigger threat to the interests of those in power than climate change, and Russian strategic goals (both domestically and on the international stage) are more important than climate policy.<sup>115</sup> Due to the

---

111 Lo, “The Adaptation Game”, 2021.

112 Минфин России [Ministry of Finance of Russia], “[Ежегодная информация об исполнении федерального Бюджета](#) [Annual information on the implementation of the federal budget]”, last modified March 5, 2020.

113 Lo, “The Adaptation Game”, 2021.

114 Ralph Fücks, “[Изменение климата и Россия как топливная сверхдержава](#) [Climate change and Russia as a fuel superpower]”, *Kommersant*, 18 March 2021.

115 Lo, “The Adaptation Game”, 2021.

political situation in Russia and the economic downturn of the Russian economy, it is unlikely that climate change will feature prominently on the Russian agenda in the nearby future – nor in relation to its armed forces. Due to the war, Russia will need to replenish a great deal of its arsenal, and it is unlikely that this will take the ‘greenification’ of the defence industry into account.

## Conclusions

While the Kremlin is well aware of the threats that climate change poses for its national security and indirectly for the Russian armed forces, it does not wish to securitise this issue internationally and chooses to adapt to these problems as they occur nationally – rather than preventing them. Moscow prefers to focus on the opportunities that climate change has to offer. As such, climate action is particularly perceived as an economic issue in Russia that economic actors need to engage with, which includes very limited responsibility for the armed forces. An exception to this is the Arctic region, where Russia has doubled down on its development and militarisation of the region in the wake of climate change. But even though Russia takes little action in other areas, the consequences of climate change for the armed forces are nevertheless present.

This is very well exemplified by the impact that climate change has on military infrastructure in Russia, as well as on military capabilities in light of the Russian invasion of Ukraine. The other way around, the conflict between Russia and Ukraine also has an impact on climate change. Although Rishi Sunak has expressed the view that the war is a reason to tackle climate change more rapidly, Volodymyr Zelensky has argued that the world has been distracted from taking effective action in dealing with climate change, and that “there can be no effective climate policy without the peace” during the COP27 conference.<sup>116</sup> As climate change occupies a lower place on the international (and often national) agenda because of this, the ‘greenification’ of the defence apparatus is, with only a few exceptions, also likely to decrease – not just in Russia.

---

116 Georgina Rannard, [“COP27: Ukraine a reason to act fast on climate change – Rishi Sunak”](#), BBC, 8 November 2022; Gloria Dickie and William James, [“COP27: Ukraine’s Zelenskiy says climate policy impossible without peace”](#), Reuters, 8 November 2022.

## 4 United States taking climate security risks to the military very serious

Successive US governments have adopted divergent positions on climate change. While under President George W. Bush (2001-2009) the American attitude on the matter was lukewarm – to say the least – the Barack Obama administration (2009-2017) proactively supported US engagement in the worldwide campaign to address the challenges of climate change. A setback followed under President Donald Trump (2017-2021), once again followed by an upturn after Joe Biden entered the White House in January 2021. This case study zooms in on the approach of the US military to climate change, how they assess its impact and what measures should be taken by the US Armed Forces.

### The climate change-security nexus in national strategy documents

It is no surprise that following the invasion of Ukraine, Russia – as a threat to the security of the US and its partners – features prominently in the new US National Security Strategy (NSS), released in October 2022. But besides the emphasis on Russia, and naturally China, climate change is also extensively being discussed in the new security strategy. Already in the Interim National Security Strategic Guidance of March 2021, it was clear that the Biden administration would proactively support US engagement for addressing the effects of climate change worldwide. It called for action “to avert the most dire consequences of climate change for the health of our people, our economy, our security, and our planet.”<sup>117</sup> The NSS now highlights that “of all of the shared problems we face, climate change is the greatest and potentially existential for all nations”<sup>118</sup>. The strategy recognises the effects that climate change will bring about at home, with respect to the increasing frequency of natural disasters, as well as abroad, in terms of

---

117 The White House, [Interim National Security Strategic Guidance](#), March 2021.

118 The White House, [National Security Strategy](#), October 2022, p. 9.

rising tensions and the potential emergence of conflicts following competition over resources and energy.<sup>119</sup>

In November 2022, the US Department of Defense (DOD) released a public version of the new National Defense Strategy (NDS). Climate change is mentioned as a challenge to the US Armed Forces in terms of the dangers posed to military installations, the increased call on the military to assist in humanitarian and disaster relief operations as well as the risk of conflict in poor governance zones with the potential effect of a growing call for stabilisation operations. The US Armed Forces have to adapt to the requirements related to climate change, also with regard to reducing energy demand which is defined as “a priority”.<sup>120</sup>

Two US armed services have issued their own climate strategy: the US Army and the US Navy. The US Army Climate Strategy (February 2022) defines two major categories of climate change leading to security implications for the US Army: 1) primary impacts, resulting from immediate hazards such as rising temperatures, extreme rainfall and other extreme weather situations; and 2) secondary impacts, the most important amongst them being “an increased risk of armed conflict in places where established social orders and populations are disrupted.” Without mentioning specific areas or countries, it is clear that the US Army considers the mix of climate change social-economic effects and fragile states as the biggest risk of endangering the security environment. Thus, climate change will only make the mission of the US Army “more challenging, and the Army must proactively reduce the risks that climate change imposes.”<sup>121</sup> The US Navy is using even stronger terms. Its strategy is labelled as ‘Climate Action 2030’. It refers to the urgency “to build a climate-ready force” in order to deal with climate change as “an existential threat”. The rising sea level, endangering for example the Norfolk Naval Base and the Marine Corps Recruit Depot Parris Island, is considered as existential for the US Navy.<sup>122</sup> In 2020, Hurricane Sally damaged over 600 facilities on Naval Air Station Pensacola in

---

119 Ibid.

120 U.S. Department of Defense, [2022 National Defense Strategy, Nuclear Posture Review, and Missile Defense Review](#).

121 Department of the Army, Office of the Assistant Secretary of the Army for Installations, Energy and Environment. [United States Army Climate Strategy](#), February 2022.

122 Department of the Navy, [Climate Action 2030](#).



Florida.<sup>123</sup> The US Air Force has also experienced the effects of extreme weather on multiple occasions. In 2018, a severe storm damaged a number of KC-135 tanker aircraft at Guam while 26 fighter aircraft in the region had to be flown to bases in Japan as a precautionary measure.

In addition, in March 2021 the US Department of Homeland Security (DHS) issued its Strategic Approach for Arctic Homeland Security. The US is an Arctic nation as the northern part of Alaska is located within the Arctic Circle. The DHS depicts the Arctic region as one of great power competition, referring to Russia with a growing military presence and China desiring to control the Arctic trade routes as the two “threat actors who remain intent, directly or indirectly, on exerting malign influence that undermines global security and the international rule-based order.”<sup>124</sup> The October 2022 US NSS confirms this by outlining China’s and Russia’s attitude and actions in the Arctic as being a source of rising geopolitical tensions in the region. Especially Russia’s “aggressive behavior” has raised tensions, thereby “creating new risks of unintended conflict and hindering cooperation”.<sup>125</sup>

## General consequences for the US Armed Forces

In its Climate Risk Analysis Report (2021) the DOD concludes that the US Armed Forces have to adapt to and mitigate the impacts of climate change which is considered as “one of the many factors that contribute to instability and conflict”. In particular the Arctic is mentioned as the area where “a new frontier of geostrategic competition” is arising due to climate change. For the DOD, all of this leads to the implication to “include consideration of climate across all relevant strategy, planning, force management, force employment, force development, and budget documents.” Furthermore, the DOD “plays an important role in the whole-of-government effort to address climate change security risks”, and this includes “working closely with allies, partners, and multilateral institutions”.<sup>126</sup>

---

123 Ibid.

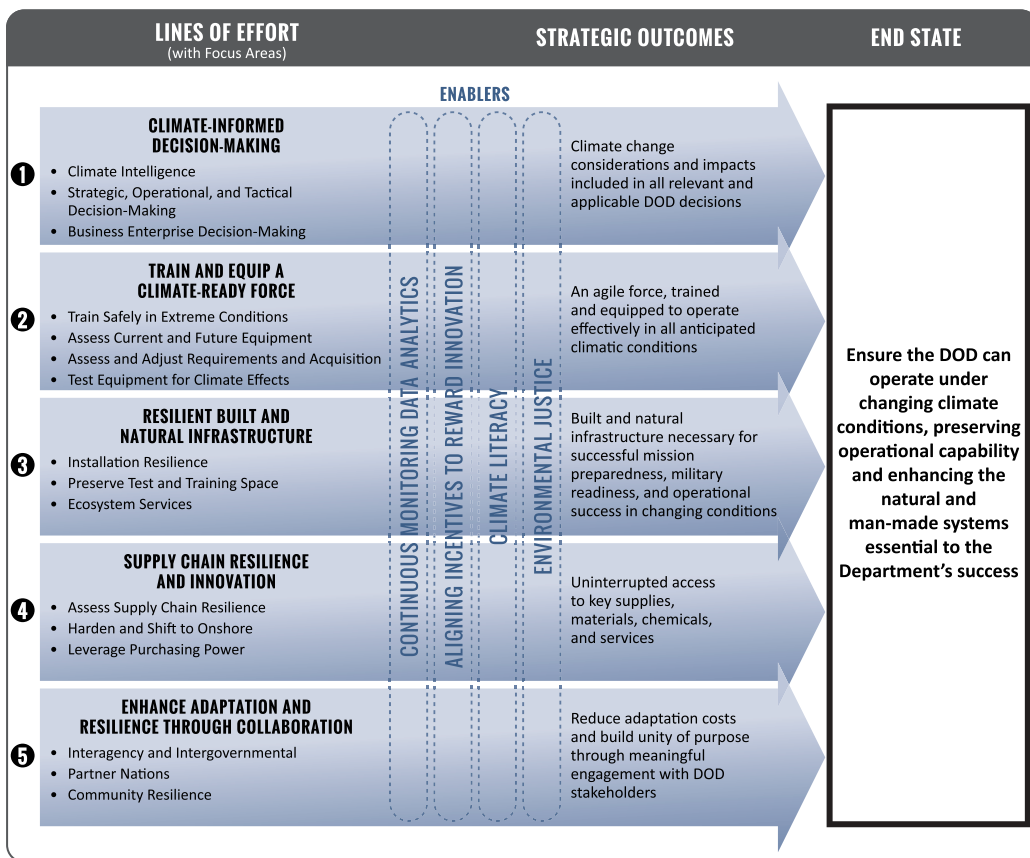
124 U.S. Department of Homeland Security, [Strategic Approach for Arctic Homeland Security](#), 11 January 2021.

125 The White House, [National Security Strategy](#), October 2022, p. 44.

126 U.S. Department of Defense, Office of the Undersecretary for Policy, [Department of Defense Climate Risk Analysis](#), 202.

Also in 2021, the DOD released its Climate Adaptation Plan (CAP).<sup>127</sup> It provides a climate change strategic framework with strategic outcomes for five lines of effort: climate-informed decision-making; train and equip a climate-ready force; resilient built and natural infrastructure; supply chain resilience and innovation; enhance adaptation and resilience through collaboration (see Figure 1).

Figure 1 US Department of Defence climate change strategic framework



The CAP lists focus areas, responsible actors, timelines and performance metrics – thus guiding the executive work to be conducted by all relevant parts of the DOD. Overall responsibility for the implementation of the plan rests with

127 U.S. Department of Defense, [Climate Adaptation Plan](#), 1 September 2021.

the DOD Chief Sustainability Officer, Paul Cramer, Deputy Under Secretary for Acquisition and Sustainment.

The US Navy has ‘translated’ the CAP in its own Climate Action 2030 strategy document with emphasis on increasing installations’ resilience against the effect of climate change and contributing to reducing energy consumption (see the section below on ‘Greener Armed Forces’). With regard to the impact on operations, equipment and training, there is little or nothing stated in the Climate Action 2030 document. In 2019, the US Navy released a Strategic Outlook for the Arctic, which provides several interesting details on the effects of climate change.<sup>128</sup> First, the Bering Straits will become a key sea passage between the Arctic and the Pacific as the ice continues to melt. As a result, the role of the US Navy and US Coast Guard in safeguarding passage through the Bering Straits will increase.

Secondly, the changing Arctic environment has effects on the technical requirements of the US Navy in areas such as acoustic modelling, breaking the ice, mitigating navigation hazards and recovery from chemical spills. The lack of navigational charts has already resulted in giving more priority to collecting hydrographic information. Another particular technical challenge is the limited satellite and terrestrial communications north of the Arctic Circle. In 2019, the US Navy considered submarines and air assets to be sufficient for meeting its operational requirements for the area. However, more recently surface ships have been sent into Arctic waters under the US Navy’s label of Freedom of Navigation Operations (FONOPS). Furthermore, a biannual Ice Exercise (ICEX) is held, often with partner nations such as Canada. The US Navy claims a leadership role in the Arctic, according to the Strategic Outlook. In cooperation with the US Navy, the US Coast Guard has a programme to acquire three Polar Cutter Ships to become operational in the timeframe 2024-2025 to replace the only currently available 46-year old icebreaker. The Polar Security Cutter programme foresees the further construction of three medium cutters later on.<sup>129</sup> A potential interim solution – buying a modern but already used ice breaker – to bridge the gap between the planned modernisation is under consideration.<sup>130</sup>

---

128 Chief of Naval Operations, [The United States Navy Strategic Outlook for the Arctic](#), January 2019.

129 [Polar Security Cutter program](#), Wikipedia.

130 Craig Hooper, [U.S. Coast Guard, Desperate For New Polar Icebreakers, Eyes A Used Ship](#), *Forbes Aerospace & Defense*, 11 May 2022.

The US Army had already released its Climate Strategy before the CAP was completed. It defines Army Climate Goals and three lines of effort: (i) installations; (ii) acquisition & logistics; (iii) training. The first two lines of effort are mainly related to increasing resilience and reducing the carbon emission footprint (see the relevant section below). Line of effort three aims at preparing “a force that is ready to operate in a climate-altered world”. Six intermediate objectives are mentioned, such as: the release of a climate lessons and best practices publication (first edition foreseen in 2024); to incorporate climate change topics in leader development and soldier training no later than 2028; to ensure that climate change risks and threats are considered in all exercises and simulations by the same year. Training for extreme weather conditions will be part of the exercises programme. Various training programmes are underway, such as the “Climate 101 Course” of the Army Materiel Command for installation and garrison commanders, and the courses of the Engineer Corps<sup>131</sup> which is to play an important role in both preventing and responding to climate change effects.

Also, with regard to the Arctic the US Army plays an important role. The US Army Alaska (USARAK) has 11,600 troops stationed in Alaska, amongst other units including two Brigade Combat Teams. The Alaska Army National Guard consists of approximately 2,000 military and the same amount is available from the Army Reserve Force. There is an extensive cold weather training and exercises programme. Equipment has to be able to operate to minus 54 degrees Celsius. Different vehicles (tracked vs wheeled) might be required in the future when the permafrost disappears.<sup>132</sup> In a recent study, the Inspector General of the DOD draws attention to the impacts on US Air Force and US Army infrastructure in Alaska: cracks and depressions in runways and their shoulders; ammunition bunkers with walls showing wide cracks; and roads and buildings being flooded regularly. The Inspector General concluded that the base leaders of the US Army and the US Air Force in Alaska and Greenland were addressing the problems with ad hoc measures, they were found to be unfamiliar with climate change requirements and did not engage in planning for climate resilience.<sup>133</sup>

---

131 United States Army Climate Strategy, p. 14.

132 U.S. Army, Chief of Staff of the Army, [Chief of Staff Paper #3: Regaining Arctic Dominance](#), March 2021.

133 Department of Defense Office of Inspector General, [Evaluation of the Department of Defense's Efforts to Address the Climate Resilience of U.S. Military Installations in the Arctic and Sub-Arctic](#), 13 April 2022.

## 'Greener' US Armed Forces

On 16 August 2022, President Biden signed the Inflation Reduction Act which – due to opposition from two Democratic senators – has been reduced in terms of climate change investment. Nevertheless, it still includes an amount of 369 billion dollars to be spent for that purpose by the US administration. According to several experts the US will reach the target of a 40% greenhouse emissions reduction by 2030<sup>134</sup>, which is below the target of 50% of the Paris Agreement. Before Congressional approval, President Biden had already announced a series of executive actions, justified by his view that climate change is “a clear and present danger to the United States”. A first set was announced on 22 July 2022, entailing immediate measures on infrastructure to better cope with extreme heat and plans to increase offshore wind energy.<sup>135</sup>

The US Armed Forces contribute substantially to the US' carbon emissions. Of all governmental institutions, the DOD is the single largest energy user, accounting for one percent of all US emissions.<sup>136</sup> If it were to be treated as a nation, the US military would rank number 47 on the list of the largest emitters in the world, with countries such as Morocco, Peru, Sweden, Hungary, Finland and many others performing better.<sup>137</sup> The biggest consumer of fossil fuels is the US Air Force, with the US Navy in second place followed by the US Army.<sup>138</sup> It is important to note that US Agencies (such as the DOD) are exempted from applying the targets for reaching national greenhouse reduction targets in cases of national security interests.

In an attempt to contribute to climate change action, the DOD's 2023 budget request contains important new investments. Amongst these investments are: USD 2 billion for installation resilience; nearly USD 250 million in operational energy and buying power for improving operational platforms; more than USD

---

134 [Inflation Reduction Act of 2022](#), Wikipedia.

135 The White House, [White House Fact Sheet: President Biden's Executive Actions on Climate Change to Address Extreme Heat and Boost Offshore Wind](#), 22 July 2022.

136 Neta C. Crawford, ['US Army plan to combat climate change lacks the fighting spirit'](#), *Bulletin of the Atomic Scientists*, 17 March 2022.

137 Jangira Lewis, ['US Military Pollution: The World's Biggest Climate Change Enabler'](#), *Earth.org*, 12 November 2021.

138 In 2017, the US Air Force bought USD 4.9 billion worth of fuels. The US Navy figure was USD 2.8 billion and the US Army bought fuels worth USD 947 million. See: Jangira Lewis, *US Military Pollution: The World's Biggest Climate Change Enabler*.

800 million in science and technology research including for hybrid tactical vehicles.<sup>139</sup>

Moreover, the US Army and the US Navy have set carbon emission reduction targets following up on President Biden's Executive Order. In its Climate Strategy, the US Army declared its intention to realise the net-zero target by 2050 and a 50 percent reduction by 2030. According to some analysts, the latter can easily be realised as the year of comparison is 2005, the year when the US Army was deployed in large numbers in Iraq and Afghanistan and, thus, peaking in fuel consumption. The same applies to the reduction of carbon emissions from all installations by 50 percent from a 2005 baseline.<sup>140</sup> Between 2010 and 2019 these emissions had already been reduced by 33 percent.<sup>141</sup>

The Army plans to have an all-electric light-duty non-tactical vehicle fleet by 2027 and a complete all-electric non-tactical vehicle fleet by 2035 in line with President Biden's Executive Order. For heavy combat vehicles such targets seem to be unattainable. Nevertheless, the US Army is already experimenting with heavy equipment such as the Bradley armoured infantry fighting vehicle equipped with a lithium-ion battery and an expected 10-20 percent reduction in fuel consumption.<sup>142</sup> With regard to 'acquisition & logistics'<sup>143</sup> the aim is to field fully electric tactical vehicles by 2050 and to have the charging capability to meet the needs of such a fleet. Naturally, this will require sustained investment in technologies. The first prototype of an Electric Light Reconnaissance Vehicle is to be tested before the end of 2023. Deployable bases will reduce their fuel and water usage and should achieve carbon-pollution-free status by 2050.

The Department of the Navy (DON) aims at achieving a 65 percent reduction of greenhouse gas emissions by 2030, measured from a 2008 baseline.<sup>144</sup> As the US Army, the DON is also applying the all-electric vehicle targets for 2027 and 2035.

---

139 U.S. Department of Defense, '[Preparing for Climate Change Impacts, Official Says](#)', DOD News, 15 June 2022.

140 'Installations' (greenhouse gas emission reduction) is the first line of effort in the US Army Climate Strategy.

141 Neta C. Crawford, US Army plan to combat climate change lacks the fighting spirit.

142 Alejandro De La Garza, '[To Take Climate Change Seriously, the U.S. Military Needs to Shrink](#)', *The Military Truth Blog*, 23 February 2022.

143 The second line of effort in the US Army Climate Strategy.

144 For these and the other targets mentioned, see: Department of the Navy, Climate Action Plan 2030.

The hybridisation of ship propulsion will be explored. Navy and Marine Corps bases along the coast will be better protected against coastal erosion and other effects of the rising sea level.

Although the US Air Force lacks its own climate strategy or action plan, efforts are underway to become less dependent on fossil fuels. For example, industrial suppliers have been asked to provide new, more efficient adaptive cycle engines for fighter aircraft – although for some critics this is often more driven by obtaining better engines than by climate concerns. Also, synthetic oil is under development with the aim of being used in a 50-50 percent mix with natural petroleum. However, progress is slow due to delays and the lack of adequate funding. Hundreds of plants to produce fuels based on emerging fuels technology will be required, but only a few are under construction.<sup>145</sup> A quicker way to reduce the carbon footprint of the US Air Force would be to reduce flight hours and the number of aircraft, but this is unlikely to occur.<sup>146</sup>

Green technologies can create greener US Armed Forces, but transferring to sustainable energies will not be accepted by the DOD if that runs counter to the operational output. The US Army Climate Strategy states that “its primary mission first and foremost (is) to deploy, fight, and win the nation’s wars”.<sup>147</sup> The US Navy links the aim of “remaining the world’s preeminent naval power” more explicitly to “building a climate-ready force”.<sup>148</sup> Joe Brian, senior climate advisor to Secretary of Defense Lloyd Austin and the DOD’s chief sustainability officer, has expressed this even more clearly in Time Magazine: “DOD’s mission is to provide the military forces needed to deter war and ensure our nation’s security. We will never compromise on that.”<sup>149</sup>

## Conclusions

Compared to the uncertainties in the political attitudes of the US on climate change, the American military have a more consistent approach in assessing the impact of climate change and the measures to be taken. Changes in the

---

145 Alejandro De La Garza, *To Take Climate Change Seriously, the U.S. Military Needs to Shrink*.

146 Ibid.

147 US Army Climate Strategy, p. 16.

148 Department of the Navy, *Climate Action 2030*, p. 7.

149 Quoted in: Alejandro De La Garza, *To Take Climate Change Seriously, the U.S. Military Needs to Shrink*.

White House leadership will either speed up or slow down the measures of the US Armed Forces, but there is in fact more continuity in their approach than can be witnessed at the political level.

The most important factor for this awareness of the challenges and the need to act stems from the practical experiences of the US military with the impact of climate change. Infrastructure such as naval ports on the Atlantic coast are increasingly at risk due to the rising sea level. In Alaska, US Air Force airfields (damaged runways) and US Army infrastructure (cracks in buildings) are already being affected by the melting of the Arctic ice. Moreover, the call for the deployment of the US Armed Forces for humanitarian assistance and disaster relief operations, both nationally and internationally, is growing, as stated in the 2022 National Defense Strategy. Furthermore, the US military encounter climate change effects in their deployments overseas, from extreme heat to heavy rainfall.

Thus, the Department of Defense and the US Armed Forces are not only recognising the threats of climate change to the security of the US, but they are actively contributing to address the challenges and to increase the American military's resilience to climate change. Under the Biden Presidency, ambitious targets have been set, in particular by the US Army and the US Navy, with the US Air Force lagging behind. The latter might be explained by the fact that transferring from fossil fuels to sustainable energy is most challenging for military aviation. However, also the other armed services are likely to face serious problems in moving towards zero green gas emissions by the middle of the 21<sup>st</sup> century – the target set by President Biden. National security interests can be invoked as exemptions from ambitious targets, but these targets might also turn out to be impossible from a practical point of view – taking into account the amount of electric energy that will be required to sail aircraft carriers, to drive main battle tanks and to fly fighter aircraft.



# 5 Comparing China, Russia and the United States

This chapter presents a comparative analysis of the three case studies on China's, Russia's and the US' approach towards linking climate change and the armed forces. This is done through assessing the three main pillars of the research: the climate change-security nexus in the strategy documents of the respective countries, how climate change affects the armed forces of the three countries and, finally, the countries' efforts towards realising a greener defence sector.

## Climate change-security nexus in strategy documents

The way in which the climate change-security nexus is treated in the strategy documents of the three countries is quite different. What the three countries have in common, though, is that they have all indicated that climate change has security implications. The degree of severity varies, however.

China acknowledged the security implications of climate change in its strategy documents in the period 2008-2013. However, after 2013, the connection between climate change and security has disappeared from these documents. This leads to the conclusion that China is aware of the security implications of climate change but has deliberately chosen no longer to include them in its strategy documents.

In Russian strategy documents the climate change-security nexus is present. But the country's understanding of this nexus primarily relates to the effects that it has on the living conditions of the Russian population, presenting climate change as a potential threat to the living environment and conditions of the Russians.

The country with the most extensive elaboration of the security implications of climate change in its strategy documents is the United States. In multiple strategy documents, both at the level of the federal government – such as the *National Security Strategy* – as well as at the ministerial level – the various strategies of the US Department of Defense (DOD) – it is highlighted that climate change presents a threat to both national and international security. This latter aspect sets the US

apart from China and Russia: where the latter two are mainly focussed on the relation between climate change and security in the national – and in the case of China also regional – context, the US, under de Biden administration, also explicitly addresses the implications of climate change for international security. Of course, it should be noted that the US' approach towards climate change and (international) security can alter if a different president should enter the White House in 2025.

A second aspect of these strategy documents is the way in which armed forces are included as a relevant actor in addressing (the effects of) climate change. The Chinese and Russian strategy documents do not explicitly prescribe a role for their armed forces, or do so in a very limited way. Russia, for example, rather tends to focus on other actors, such as the Russian ministries of economic development, construction and natural resources. China, in contrast, focusses more on climate-induced national security issues and the potential role of the armed forces therein. In contrast, the US strategy documents are very clear in that the US armed forces have a critical role to play in tackling (the effects of) climate change. This is illustrated by the fact that the US DOD has an overarching climate strategy and the US Army and US Navy have their own strategies to deal with (the effects of) climate change.

## **Consequences for the armed forces**

With respect to the relation between the armed forces of the three global powers and climate change, there are two important similarities that can be identified. All three countries' defence sectors will be affected by climate change. Firstly, climate change will affect the military infrastructure in China, Russia and the US. For China, this has mainly to do with the threat that stems from rising sea levels and the thawing permafrost. Rising sea levels will put China's coastal naval bases in Hainan and Jiangsu at risk of flooding. In addition, thawing permafrost affects the Qinghai-Tibet Railway which is also used for military purposes, such as troop mobilisation to the Indian border. Moreover, the thawing permafrost might threaten the operations of the missile bases in north-western China, affecting the accuracy of potential missile hits.

The US experiences comparable problems as a result of climate change. Extreme weather events and rising sea levels have already resulted in US military facilities, such as the naval base in Norfolk, experiencing floods on multiple

occasions. Other US bases, for example in Guam, also run the risks of falling victim to extreme weather conditions, something which already occurred in 2018 when a storm destroyed multiple KC-135 tanker aircraft. For Russia, the military infrastructure is primarily at risk because of thawing permafrost and melting ice in the Arctic. The thawing of permafrost particularly affects military bases and energy installations.

Secondly, all three countries have invested in military capabilities that are able to endure extreme weather conditions, thereby implying that they have considered the effects of climate change. For China, no concrete information is available on the investments made, but what is known is that the country has invested in (nuclear) icebreakers that are able to operate in the Arctic. For Russia, investments in military capabilities because of climate change are mainly related to the Arctic area. Russia is investing in, amongst other things, capabilities that can endure extreme weather conditions, such as special drones and nuclear submarines. Climate change is also directing the US DOD investments in military capabilities. These investments are all being made within the framework of the 2021 DOD Climate Adaptation Plan (CAP). The investments in military capabilities are primarily directed at training and equipping a climate-ready force and enhancing the resilience of military infrastructure – two out of the five lines of effort in the CAP.

However, besides these similarities, there are also some important differences between the three countries, amongst others related to training and exercises. The case study on China revealed that there is no public information available as to whether the country is adapting the PLA's training and exercises to climate change-induced security risks. As for Russia, a great deal is also unknown about the country's plans regarding training and exercises. Moscow will, however, invest in the presence of nuclear submarines, flying with MiGs over the North Pole and exercising with its Arctic Motorised brigade. The US strategy documents, and in particular the ones of the US Army, clearly state that training and exercises will be adapted to climate change-induced security risks. For example, training for extreme weather conditions forms part of exercise programmes, such as the "Climate 101 Course". Moreover, the US Army also hosts an extensive cold weather training and exercise programme, directed at deployment to the Arctic.

As for deployment, there is, logically, not much public information available. The strategy documents as well as secondary sources do not reveal any concrete plans for the future deployment of the armed forces following climate

change-induced events, such as conflicts. What is known, however, is that the Arctic region will most likely become a theatre where the three global powers will increasingly face each other; Russia and the US as 'Arctic nations' and China as a country with explicit economic and political interests in the region. All three major powers have expressed their interest in the region – something which is also visible in the strategy documents of the three global powers. It is highly likely that these interests will conflict from time to time.

Similarly, the armed forces can be expected to see an increase in calls for humanitarian assistance and disaster relief operations, thereby directly affecting the deployment of the armed forces. Here, however, we do see a difference between the three global powers: whereas the US explicitly acknowledges the potential increase in demand for humanitarian assistance and disaster relief operations following climate change in their strategy documents, this is not as clear-cut for Russia and China. It nevertheless remains likely that the latter two will also have to deal with an increased call for such types of operations.

### **Efforts towards 'green defence'**

The third pillar that allows for a comparison of the approaches of the three global powers relates to their efforts to realise a more greener defence sector. Within this pillar, a clear distinction can be made between China and Russia, on the one hand, and the US, on the other. China and Russia do not aim at the 'greenification' of the defence sector, as far as is known. The strategy documents do not prescribe a role for the armed forces in mitigating (the effects of) climate change, even though it is clear that armed forces have a significant share in greenhouse gas emissions. This clearly indicates that moving towards 'green defence' is not a priority for Moscow and Beijing. The US is the complete opposite, even though decarbonisation must not compromise its ability to wage war. The country is actively aware of the contribution of the US armed forces to greenhouse gas emissions. It therefore aims to significantly reduce emissions. In order to do so, the US DOD, but also the US Army and US Navy, have set specific targets for emission reductions and have drafted plans to reduce dependency on fossil fuels and to move towards more sustainable means of energy. Importantly, however, although the US is actively trying to contribute to 'green defence', the implementation of measures to do so should never be at the expense of operationality.

Table 2 summarises the Chinese, Russian and American approaches regarding climate change and how this relates to their armed forces and military capabilities. The overview helps in identifying the similarities and differences between the global powers' approaches.

**Table 2** Climate change and defence – differences and similarities in the global powers' approaches

|  |   | China              | Russia | United States |
|--|---|--------------------|--------|---------------|
| <b>Strategy documents</b>                | Climate change in security strategies               | X                  | V      | V             |
|  | Climate change in defence strategies                | V <sup>150</sup>   | X      | V             |
|  | Climate change as a national security threat        | V                  | V      | V             |
|  | Climate change as an international security threat  | X/V <sup>151</sup> | X      | V             |
|  | Defence in climate strategies                       | X                  | X      | V             |
| <b>Consequences for the armed forces</b> | Effects on military infrastructure                  | V                  | V      | V             |
|  | Investment in military capabilities                 | V                  | V      | V             |
|  | Adaptation of training and exercises                | X                  | V      | V             |
|  | Effects on the deployment of armed forces           | X                  | ?      | V             |
| <b>Green defence</b>                     | Aims for the 'greenification' of the defence sector | X                  | X      | V             |
|  | Carbon reduction targets for armed forces           | X                  | X      | V             |
|  | Electrification programmes                          | X                  | X      | V             |

V = applicable  
X = not applicable  
? = unknown

150 Climate change appeared in the PRC's defence White Papers in 2008 and 2011. In subsequent defence White Papers, climate change was no longer included.

151 In general, China is very reluctant to denote climate change as an international security threat, but, in its rhetoric and sometimes even in joint statements, such as with the EU, climate change and international security are linked to each other.

## 6 Conclusions: implications for Europe and the Netherlands

Climate change and security are to an increasing extent associated with one another. The relationship between the two becomes increasingly clear: climate change may have serious security implications both at the national level, as well as at the international level. Naturally, because of this trend, the involvement of all security actors, including the armed forces, in addressing the effects of climate change is paramount.

The growing involvement of the armed forces in addressing the implications of climate change has a direct cause. The defence sector is feeling the impact of climate change in multiple ways: damage to military infrastructure following extreme weather events, changing patterns of deployment (e.g. humanitarian assistance and disaster relief operations; deployment to the Arctic), but also the need for the 'greenification' of the defence sector as this sector is a main contributor to greenhouse gas emissions.

The three global powers – China, Russia and the US – have different approaches towards the climate change-security nexus and which role their armed forces should play therein. The analysis shows that the US actively acknowledges the relationship between climate change and security, both at the national and international level, and prescribes a clear role for the armed forces. In contrast, China and Russia are more reluctant in doing so, especially at the international level due to a fear of politicisation or even securitisation.

These differences in the approaches of China, Russia and the US beg the question of what the potential implications might be for Europe, including the Netherlands, and what the possible opportunities and threats are that arise therefrom. Below an overview of the most important opportunities, on the one hand, and the threats, on the other, is provided.

## Opportunities

The analysis of the three case studies demonstrates that opportunities for Europe, and the Netherlands, can be identified. As China and Russia have a rather diverging stance on the climate change–security nexus and the role of the armed forces therein, it is difficult to identify possible opportunities and threats in this regard. Moreover, cooperation in general with Beijing and Moscow has become more difficult given recent international developments, including Russia’s unlawful invasion of Ukraine, China’s stance towards the invasion, and China’s assertive position vis-à-vis Taiwan.

The most significant opportunity for Europe and the Netherlands is to advance and strengthen Europe’s information position vis-à-vis China and Russia when it comes to the climate–security nexus. As far as is publicly known, China and Russia do not take into account the implications of climate change for the armed forces. Hence, it is most likely that the two countries will be less prepared when the effects of climate change on the armed forces are to materialise. In addition, Russia continues to invest significantly in fossil fuels, which keeps it heavily reliant on these polluting fuels. Here lies an opportunity for Europe and the Netherlands: explicitly considering the implications of climate change for the armed forces and also reducing dependency on fossil fuels, a development which has already been seized upon, will leave Europe with an advanced information position in the long run.

A similar logic applies to technological innovation. Europe should lead the way when it comes to technological developments for the ‘greenification’ of the defence sector. If China and Russia fail to advance in this area in the short term, Europe will have a strategic (technological) advantage. Eventually, also China and Russia will have to move towards a greener defence sector. If Europe possesses the necessary expertise, know-how and technologies to do so, it will be able to filter which expertise to share with Moscow and Beijing and which not to do so, explicitly taking into account the potential dual use of certain technologies.

Despite the opportunity to gain a strategic advantage vis-à-vis China and Russia, the most important opportunities can be identified with respect to the US. Presently, the US, and in particular the US military, is feeling the effects of climate change more severely than Europe. As a result, the US has had to take the necessary steps to address those effects, which has given it an

advantage in terms of knowledge and expertise. This offers an opportunity to seek cooperation. Europe, including the Netherlands, can learn from how the US approaches the climate change–security nexus and embeds it into its defence policies. Given the Netherlands’ extraordinary position in terms of technology regarding hydraulic engineering and the delta works to protect the coastline, the country would be very well placed to take a leading role in this.

A similar opportunity arises with respect to training and exercises. Europe, including the Netherlands, is lagging behind when it comes to the embedding of the climate change–security nexus and its effects on the armed forces. The US is way ahead in this area, having incorporated climate change dynamics into defence strategies and action plans such as on building climate-resilient installations and training and exercise programmes. Here too, there is an opportunity to seek cooperation with the US in order to learn from the country’s best practices in this area.

Another area where an opportunity arises is related to humanitarian assistance and disaster relief (HADR) operations. Besides the US, several European countries, including France and the Netherlands, have extensive experience in these types of operations, during which the armed forces increasingly operate as a first responder. For example, France and the Netherlands closely worked together when Hurricane Irma destroyed the windward island of Sint Maarten in 2017. Considering that there will be an increasing demand for HADR operations, which is explicitly acknowledged by the US as well, this is an area where European countries, including the Netherlands, can seek more intensive cooperation with the US.

A final opportunity that can be derived from the analysis is related to the transfer towards a greener defence sector. The US has set specific targets to contribute to emission reductions. In doing so, Washington has embarked on a process of the electrification of the armed forces, in particular within the US Army and the land component of the US Navy. This effort will help them to realise their emission targets. On the one hand, this offers Europe and the US the opportunity to align emission reduction targets. On the other hand, it also provides Washington and Brussels (EU) with an opportunity to work more closely together to strive for the electrification of the armed forces. In particular, alignment with respect to the development and production of engines could be beneficial for both Europe and the US. Even though this offers huge potential for increased cooperation between the US and Europe, a caveat is in order, as it is likely that such alignment efforts



might be hampered by conflicting defence industrial interests between the US and various European countries.

## Threats

Besides these opportunities, several threats can be identified. One of the principal threats that will affect the security of Europe is the potential of escalating geopolitical tensions between China, Russia and the US in the Arctic region. Although, traditionally, Arctic states prefer to keep security issues outside Arctic cooperation efforts, the trend is pointing in the direction of the area as a new geopolitical playground between the three global powers. Most likely, the Russian war in Ukraine and the deteriorating relations with the US will reinforce this trend. Considering that various European countries – Denmark, Iceland, Finland, Norway and Sweden – are Arctic states, not only Europe's general security interests are at stake, but more specifically the territorial integrity of these Arctic nations will be severely affected if a clash between the global powers were to occur in the region. In a related, but slightly different manner, Russia's stakes in the Northern Sea Route result in the country seeking the upper hand in this area. When Russia commercialises this area, this could have dire consequences for foreign, non-Russian companies, if the use of the Northern Sea Route would be restricted or rejected by Moscow.

Another threat that can be derived from the analysis relates to the cooperation of knowledge institutions in Europe, including in the Netherlands, with countries like China and Russia. Technology sharing poses a risk if the knowledge institutions are not aware of its potential dual-use application, that is for civilian and military purposes. This applies to technology sharing in general, but also specifically to the sharing of information regarding the development of sustainable technologies. If such sustainable technologies are easily shared with partner institutions in China or Russia, there is a risk that Europe might lose its strategic technological advantage vis-à-vis Beijing and Moscow.

In a completely different vein, China's and Russia's approaches towards the climate change-security nexus and the role of the armed forces therein also offers a rhetorical and political threat. Beijing's and Moscow's positions and policies (or the lack thereof) towards the issue are significantly different from those of the West, and they continue to express their opposition towards the Western perspective. This will continue to form a hurdle for the Western political

agenda at the international level in linking climate change and security. Related to this matter is the risk of the absence of a political dialogue. Political dialogue between Russia and the US and between China and the US is currently absent. This is the result of two particular developments: the Russian invasion of Ukraine, and the increased tensions between China and the US following Nancy Pelosi's visit to Taiwan. Having no political dialogue, even on matters such as climate change, means that it is not possible to gain an insight into the strategic choices and policies of these countries. Consequently, this will mean a deterioration of the information position of the West vis-à-vis Chinese and Russian policies.

But political risks do not only arise in relation to China and Russia. There is also a significant risk, or even a threat, for Europe stemming from the US. At present, President Biden is very adamant in tackling and mitigating climate change and his administration, including the DOD, is putting in serious efforts in doing so. There is, however, no guarantee that a subsequent US President will devote a similar amount of attention and financial means to the matter. If a Republican President will be elected in 2024, the US climate policy will most likely significantly shift, as was also the case under the Trump administration. This will also affect the efforts of the Pentagon, even though some degree of continuity can be witnessed there.

## Recommendations

Following the overview of the most important opportunities and threats, the following recommendations can be made:

- **The Dutch government could learn from the US' approach regarding climate security. It should strive to, just like the US, structurally embed climate change dynamics into its security and defence strategies as well as into planning systems for the armed forces.** In this regard, it is also important to continue to seek cooperation with the private sector, as they will remain a critical partner with respect to innovation technologies to achieve a greener defence sector.
- **In a related vein, the US fulfils a leading position when it comes to assessing the implications of climate change for its military, including for military infrastructure.** Because of the existing knowledge and expertise, the US will be able to make a better educated guess as to the potential consequences of climate change for our potential adversaries. This will allow us **to make**

**a considered estimation of how climate change might potentially weaken our adversaries' capabilities.** A particular role can be laid down here for the NATO Climate Change and Security Centre of Excellence (CCASCOE). **The Netherlands should emphasise the potential role of the NATO CCASCOE.**

- Information sharing between European countries and the US can help to structurally embed the climate change–security nexus into policies and subsequently policy output. **The Netherlands can offer to operate as a knowledge broker on this matter, both within the EU as well as within NATO.** With respect to the latter, this is particularly relevant considering the establishment of the NATO CCASCOE.
- **As the Arctic area might be a future theatre of great power conflict, the region should remain high on the political agenda of the Netherlands, the EU and NATO.** The potentially severe security implications of a geopolitical conflict in the region should not be overlooked but rather anticipated.
- **The Netherlands should act as a driving force behind strengthening the strategic knowledge and technological position of Europe vis-à-vis China and Russia. This particularly applies to the strategic technological position of Europe with respect to the effects of climate change on the military infrastructure of states.** Considering that the Netherlands has a strong knowledge base and extensive expertise in, for example, hydraulic engineering and the delta works for coastline protection, it is well equipped to take on this role.
- **More extensive information gathering on the vulnerabilities of China and Russia with respect to their military infrastructure is necessary. This can be done through organising scenario exercises and simulations with relevant stakeholders.** Such exercises should also include countries from the region and countries that would potentially be affected by China's and Russia's inability to address these vulnerabilities.