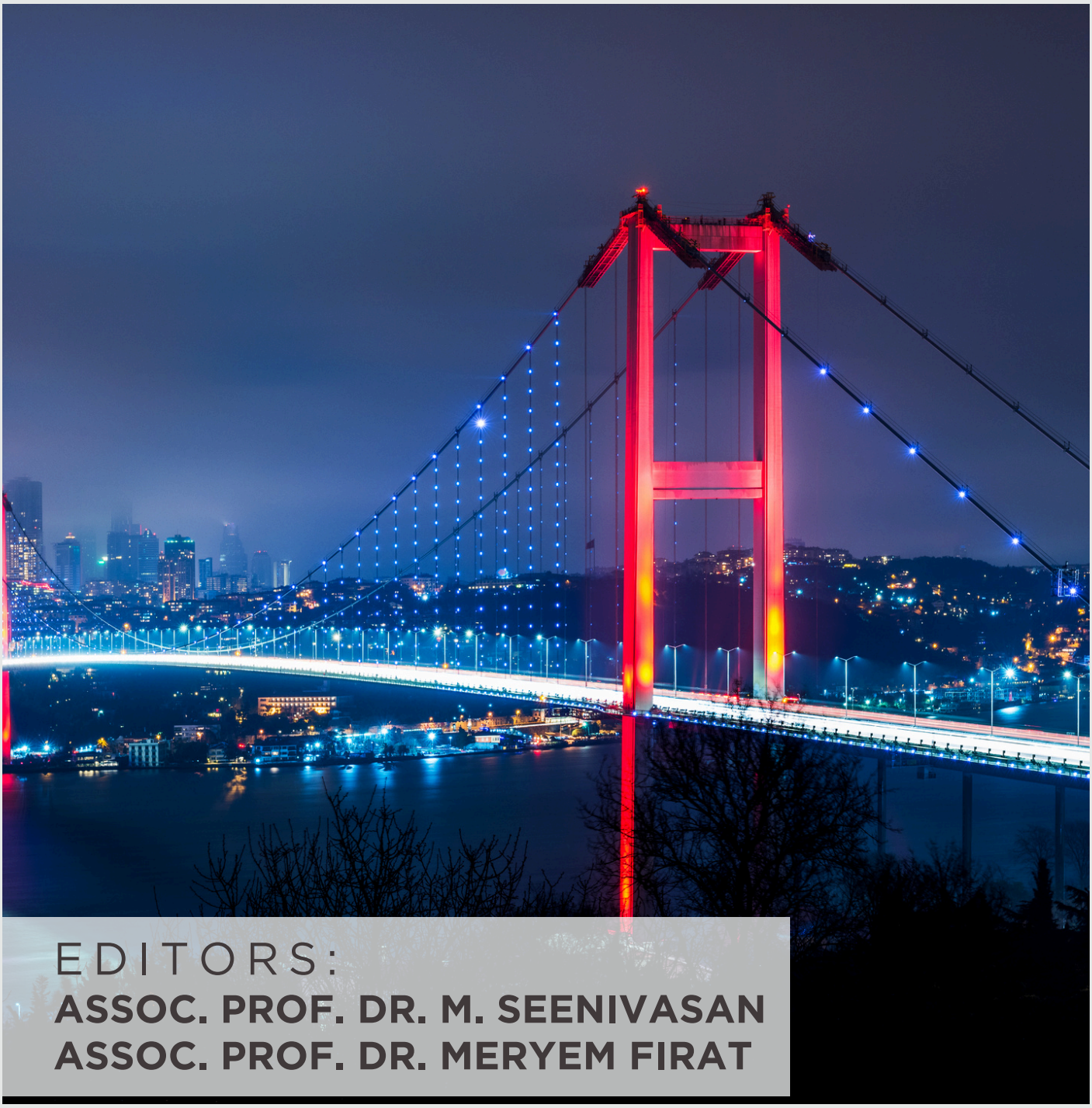
12TH INTERNATIONAL İSTANBUL SCIENTIFIC RESEARCH CONGRESS PROCEEDINGS BOOK

MAY 29-31 2024 | İSTANBUL, TÜRKİYE

PARTICIPATION FROM
23 DIFFERENT COUNTRIES



EDITORS:
ASSOC. PROF. DR. M. SEENIVASAN
ASSOC. PROF. DR. MERYEM FIRAT

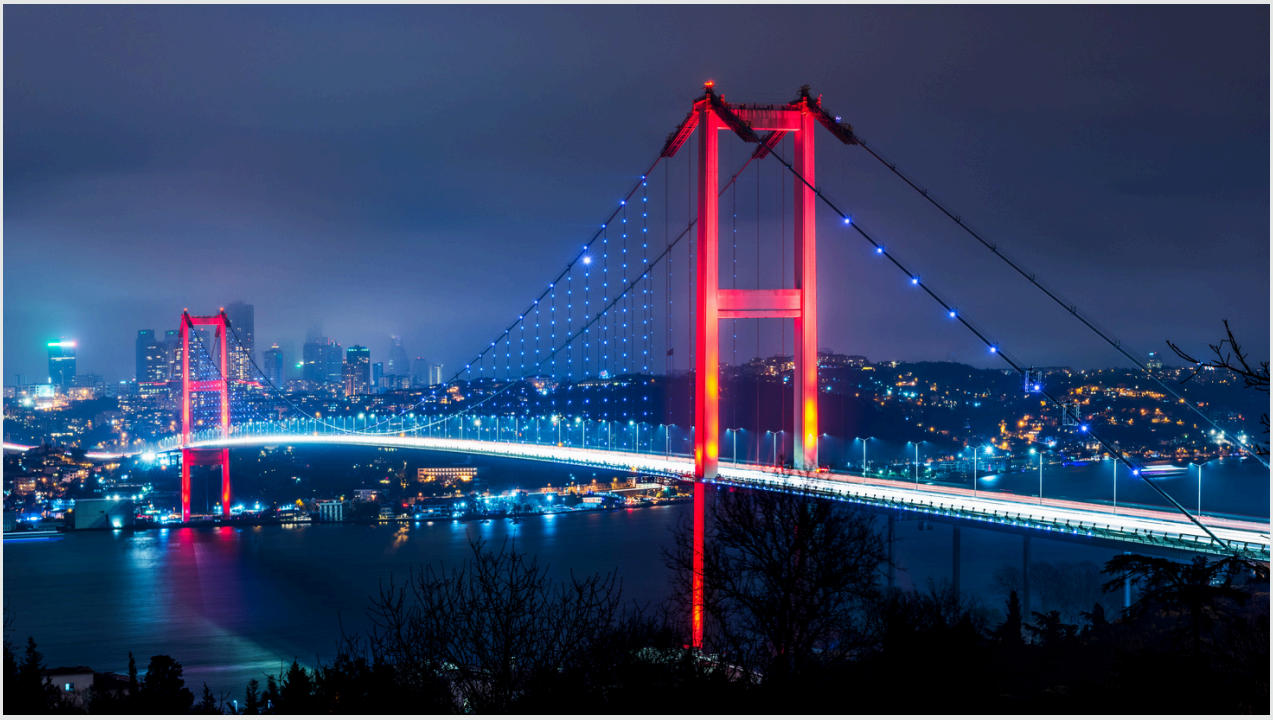
ISBN: 978-625-6879-60-7
DOI: 10.5281/ZENODO.11394789

BZT TURAN ACADEMY
PUBLISHING HOUSE

www.istanbulcongress.com
istanbulcongressinfo@gmail.com

12TH INTERNATIONAL İSTANBUL SCIENTIFIC RESEARCH CONGRESS PROCEEDINGS BOOK

MAY 29-31, 2024 | İSTANBUL, TÜRKİYE



PARTICIPANT COUNTRIES

Türkiye, Malaysia, Portugal, India, Algeria, Ukraine, Poland, Morocco, Spain, Kosovo, Malawi, Namibia, North Macedonia, Philippines, Azerbaijan, China, Morocco, Algeria, Pakistan, Vietnam, Philippines, Nigeria, United States of America.

ISBN: 978-625-6879-60-7
DOI: 10.5281/ZENODO.11394789

EDITOR
ASSOC. PROF. DR. M.SEENIVASAN
ASSOC. PROF. DR. MERYEM FIRAT

BZT TURAN PUBLISHING HOUSE®

TURKEY, USA
TR: +90 538 334 59 23 USA: +1 518 629 5640

BZT TURAN ACADEMY
PUBLISHING HOUSE

12th INTERNATIONAL ISTANBUL SCIENTIFIC RESEARCH CONGRESS

MAY 29-31, 2024

ONLINE & IN-PERSON PARTICIPATION

ZOOM & ISTANBUL, TURKIYE

CONGRESS PROCEEDINGS BOOK

EDITORS

ASSOC. PROF. DR. M. SEENIVASAN

ASSOC. PROF. DR. MERYEM FIRAT

BZT AKADEMi YAYINEVi®

TÜRKiYE, GERMANY

TR: +90543 671 0123 GR: +491774586777

istanbulcongressinfo@gmail.com

https://www.istanbulcongress.com/

BZT TURAN YAYINEVi®

BZT TURAN PUBLISHING HOUSE

Publishing Date: 07.06.2024

ISBN: 978-625-6879-60-7

DOI: 10.5281/zenodo.11394789

CONGRESS ID

CONGRESS NAME

12TH INTERNATIONAL İSTANBUL SCIENTIFIC RESEARCH CONGRESS PROCEEDINGS BOOK

DATE AND VENUE

MAY 29-31, 2024

ONLINE & IN-PERSON PARTICIPATION (IZMIR, TÜRKIYE)

(FROM 23 DIFFERENT COUNTRIES)

Türkiye, Malaysia, Portugal, India, Algeria, Ukraine, Poland, Morocco, Spain, Kosovo, Malawi, Namibia, North Macedonia, Philippines, Azerbaijan, China, Morocco, Algeria, Pakistan, Vietnam, Philippines, Nigeria, United States of America.

ORGANIZERS & PARTICIPANT INSTITUTIONS

BZT Turan Academy, Türkiye

Giresun University, Türkiye

Pristina University, Kosovo

Sir Seewoosagur Ramgoolam Medical College, Mauritius

Annamalai University, India

Tetovo University, N. Macedonia

Presidents / V. President of Organization Committee

ASSOC. PROF. DR. M. SEENIVASAN

ASSOC. PROF. DR. MERYEM FIRAT

President of Scientific Committee

PROF. RENMIR JAN D. MAALA

President of Coordinators' / General Coordinator

Dr. Baha Ahmet YILMAZ

ACCEPTED PAPERS

200 Turkish Participants

240 Foreign Participants

%55 Foreign Participant Rate

%,44 Turkish Participant Rate

REFUSED PAPERS

7 Foreign Participants

EVALUATION PROCESS

All Submissions Have Passed a Double-Blind Referee Evaluation Process

All Responsibility for the Works Belongs to the Author

12. ULUSLARARASI İSTANBUL BİLİMSEL ARAŞTIRMALAR KONGRESİ
29-31 MAYIS 2024
YÜZ YÜZE & ÇEVRİMİÇİ
İSTANBUL, TÜRKİYE

29-31 Mayıs 2024 tarihlerinde ZOOM üzerinden çevrimiçi ve Türkiye'nin İstanbul kentinde yüz yüze olarak gerçekleştirilen 12. Uluslararası İstanbul Bilimsel Araştırmalar Kongresi **YÖK ÜAK kuralları ve üniversiteniz yönetmeliğiniz gereği akademik teşvik kriterlerini sağlamaktadır.** Toplam 440 adet bildirinin yer aldığı kongre üç gün boyunca ZOOM üzerinden çevrimiçi ve İstanbul'da yüz yüze olarak gerçekleştirilmiştir.

Türkiye dışından toplam **5 farklı ülkeden açılış konuşmacısı; 15 farklı ülkeden katılım (detaylar kongre bildiri kitabında yer alan kongre programında yer almaktadır)** sağlanmış olup, 440 adet bildirinin 240 tanesi yabancı, 200 tanesi Türk katılımcı tarafından sunulmuştur. Kongrenin yabancı katılımcı oranı %55'dir.

Bu belge ilgili üniversitenin akademik teşvik komisyonuna takdim edilmesi üzerine verilmiş.

İlgili bilgilerin detayları kongre bildiri kitabının künye kısmında yer almaktadır.

Kongremize ilginiz için teşekkür ederiz.
Saygılarımızla,

Prof. Dr. Jafar JAFAROV
Organization Committee Member

Bu belge 29-31 Mayıs 2024 tarihleri arasında İzmir'de verilmiştir.

İLETİŞİM
E-mail: istanbulcongressinfo@gmail.com
Phone: +90(543) 671 0123
https://www.istanbulcongress.com/

29-31 MAY 2024

Istanbul Türkiye &
ZOOM Online

12th International İstanbul Scientific Research Congress

Schedule

istanbulcongress.com

BZT TURAN ACADEMY

ANNAMALAI UNIVERSITY

ISBN: 978-625-6879-60-7 DOI: 10.5281/zenodo.11394789
12TH INTERNATIONAL İSTANBUL SCIENTIFIC RESEARCH CONGRESS PROCEEDINGS BOOK

CLIMATE CHANGE AS A REGIONAL THREAT: THE CASE OF CENTRAL ASIA

Assoc. Prof. Dr. Fatih DEMİRCİOĞLU[1*], Assoc. Prof. Dr. Halil Emre DENİŞ[2]

[*1]Hakkari Üniversitesi, İktisadi ve İdari Bilimler Fakültesi, Siyaset Bilimi ve Uluslararası İlişkiler Bölümü, Hakkari, Türkiye.
ORCID ID: https://orcid.org/0000-0001-7057-0795

[*2] Hakkari Üniversitesi, İktisadi ve İdari Bilimler Fakültesi, Siyaset Bilimi ve Uluslararası İlişkiler Bölümü, Hakkari, Türkiye.
ORCID ID: https://orcid.org/0000-0002-9830-5624

ABSTRACT

Climate change poses a significant threat to Central Asia, affecting various sectors and exacerbating vulnerabilities in the region. This study examines the current and projected impacts of climate change in Central Asia, highlighting the region's susceptibility to changes in mean temperatures, precipitation patterns, and extreme weather events such as droughts, heatwaves, and floods. Drawing from recent literature, it elucidates the emerging trends and their implications for sectors like energy, agriculture, transport, and public health. The interaction of these impacts amplifies the vulnerability of local populations and may escalate tensions, particularly concerning water, a contentious resource in the region. The study underscores the urgent need for tailored mitigation and adaptation measures to address the specific challenges faced by Central Asia. It emphasizes the importance of interdisciplinary research to deepen understanding of climate change impacts, including their societal and sectoral ramifications and their intersection with gender dynamics. This study provides valuable insights, however further research is imperative to comprehensively assess climate change impacts and inform effective adaptation strategies. Ultimately, advancing knowledge in this domain will be pivotal in devising sustainable solutions to mitigate the adverse effects of climate change in Central Asia.

Keywords: Central Asia, Climate Change, Security

INTRODUCTION

Central Asia, with its diverse landscapes ranging from high mountains to vast deserts, stands as a region of unparalleled natural beauty and ecological significance. However, beneath this breathtaking facade lies a landscape increasingly under threat from the impacts of climate change. The intricate balance of ecosystems, livelihoods, and cultures in Central Asia faces unprecedented challenges as global temperatures rise and weather patterns shift.

As we delve into the heart of Central Asia's climate narrative, it becomes evident that the region's fate is intertwined with the broader discourse on climate change. From the towering Pamir and Tien Shan mountain ranges to the arid steppes and fertile valleys, every corner of Central Asia bears witness to the relentless march of environmental transformation.

In this context, understanding the intricate interplay between climate dynamics and regional vulnerabilities becomes paramount. Through a comprehensive exploration of the latest scientific findings, policy frameworks, and societal responses, we embark on a journey to decipher the multifaceted impacts of climate change on Central Asia.

By illuminating the challenges and opportunities presented by climate change in Central Asia, we aim to foster a deeper understanding of the urgent need for coordinated action. From adaptation strategies tailored to local contexts to global initiatives aimed at mitigating greenhouse gas emissions, our exploration seeks to chart a path towards a more sustainable and resilient future for Central Asia and beyond.

CLIMATE OF CENTRAL ASIA

Central Asia is one of the most mountainous regions in the world, but has landscapes ranging from grasslands to deserts and woodlands in addition to its high mountains. The mountains of Central Asia consist of two major mountain ranges, the Pamir and the Tien Shan, which are critical to the livelihoods of the local communities. The region is influenced by a variety of climates, with the desert and Mediterranean type environments in the south and continental climes everywhere else. The wide range of climates results in a high level of temporal and spatial variability in temperature and precipitation in the region. In most high-elevation areas, where the climate is dry and continental, there are hot summers and cool or cold winters with periodic snowfall. At lower elevations, the climate is mostly semi-arid to arid, with hot summers and mild winters with occasional rain and/or snow.

IMPACTS OF CLIMATE CHANGE

In 2021, Working Group I of the Intergovernmental Panel for Climate Change (IPCC) released its contribution to the Sixth Assessment Report in which they presented the most up-to-date physical understanding of the Earth's climate system and climate change. This new report specifically examines the regional impacts of climate change—or Climate Impact Drivers (CIDs)—on the so-called "climate reference regions". These include "West Central Asia" (WCA), which corresponds to our area of interest. For simplicity, we refer to the WCA region as Central Asia in this study (IPCC, 2021).

For Central Asia, the IPCC (2021) foresees several key changes in CIDs, including some that are predicted with high confidence. The IPCC predicts a future increase in mean temperature and extreme heat as well as a decrease in cold spells and frost. They also report that, with the exception of a reduction in frost, these changes have already emerged in the historical period covered by their analysis. This is consistent with several studies showing how Central Asia has been warming faster than the global average over recent decades, with altitudinal variations already affecting the region and local populations in multiple ways (Hu et al., 2014; Zhang et al., 2019; Haag et al., 2019). These trends are concerning, particularly as the IPCC also predicts other changes with high confidence, for instance a loss of snow, glaciers and icesheets, declines in which have already been observed in several locations in the Pamir and Tien Shan mountain ranges (Sorg et al., 2012; Barandun et al., 2020). These changes have important implications in terms of water availability, a crucial and contentious resource in Central Asia (Vakulchuk et al., 2022). This issue could be aggravated further since the IPCC predicts—with medium confidence—an increase in aridity, alongside an increase in agricultural and ecological droughts. The combined increase in droughts and heatwaves can produce favorable conditions for wildfires, increasing the potential for burning across Central Asia (IPCC, 2021) and the related risk of biodiversity loss (IPBES, 2021).

Unlike mean temperature, changes in mean precipitation can be difficult to assess as climate models diverge on the direction and magnitude of the predicted changes (Christensen et al., 2013). The region's complex topography and lack of climate observations can at least partly explain the heterogeneous results. More recent work, however, is starting to shed light on expected future changes for Central Asia, such as a robust increase in annual mean precipitation, which is expected to be greatest over the Tian Shan mountains and the northern part of the region (Jiang et al., 2020). According to the 2021 IPCC report, the climate models also agree (with high confidence) on an increase in extreme precipitation leading to an increase in pluvial floods and associated landslides (the latter with medium confidence). Other types of

flood risk are also expected: Zaginaev et al. (2019) have already observed an increase in glacial lake outburst floods over recent decades in Central Asia owing to its many high-altitude lakes and rapidly melting glaciers.

VULNERABILITIES AND IMPACTS

Climate change has the potential to severely impact the livelihoods of local populations in Central Asia, with simultaneous and interlinked effects on the agriculture, energy, and transport sectors, as well as on public health. This section describes the ways in which the vulnerability of some of the most important sectors in Central Asia could increase in the future as a result of the effects of climate change.

In Central Asia, the majority of the population lives in rural areas and is highly dependent on agriculture and irrigation. The impacts of climate change on agriculture are diverse, and may be both positive and negative. Higher carbon dioxide concentrations and warmer temperatures can trigger an increase in crop yields (Orlov et al., 2021), whereas the impacts of extreme events (e.g. droughts, floods or heatwaves) can be devastating. The impacts on livestock should also not be omitted: climate change can affect both the quality of the feed and the health of the animals. The impacts on crops and livestock have obvious implications in terms of food security (see Standal et al., this volume).

The energy sector is also highly vulnerable to the effects of climate change as it is largely based on hydropower. Similarly to agriculture, the impacts on this sector can be both positive and negative. On the one hand, for some locations the increase in temperatures can lead to a diminution in the number of days where heating is required, therefore reducing the demand on the energy system. On the other hand, the current melting of glaciers and/or extreme precipitation can lead to floods, damaging infrastructure and leaving communities without electricity. In addition, the disappearance of glaciers, decreases in snow and/or changes to precipitation variability can also make water less available, increasing the pressure on the energy system as water is crucial for generating energy through hydropower. Furthermore, as more water will be needed for irrigation in the future, water use could become a source of tension between the energy and agriculture sectors. Water is already a contentious resource in Central Asia; a decrease in water availability could also exacerbate tensions between nations.

The expected increase in extreme temperatures will enhance heat stress for both urban and rural populations. In cities, more frequent and intense heatwaves can affect the health of the population, especially the most vulnerable, e.g. the youngest and the oldest (Meade et al., 2020). For rural populations,

an increase in heat stress can affect the health of livestock, as well as impacting the health of the farmers and their ability to work outside (Orlov et al., 2021). Additionally, the impacts of climate change can lead to a decline in food quality via a decrease in nutrients, leading to increasing malnutrition (Myers et al., 2014). The potential increase in wildfires could also lead to an increase in air pollution, which is already a concern in urban areas in this region (UNDP, 2021).

Transportation is interconnected with many sectors as it encompasses the mobility of people, energy and goods. In Central Asia, the projected effects of climate change (e.g. increase in flooding) can limit road access, limiting transportation or rendering it impossible. These impacts can have severe consequences for the livelihoods of local populations as well as the energy or agriculture sectors.

CONCLUSION

This study has provided an overview of the physical impacts of climate change in Central Asia and shown the increasing threat it represents for this region. According to the most recent literature, multiple changes in Climate Impact Drivers (CIDs) are expected in the future, including changes in mean temperatures and precipitation levels (rain and snow), as well as extreme events such as droughts, heatwaves and floods. The IPCC report also shows that some of these trends have already emerged in the historical period of their analysis. All these changes will increase the vulnerability of local populations via impacts to and across the energy, agriculture and transport sectors, as well as to public health (Vakulchuk et al., 2022). In this context, climate change can generate multiple tensions, including between sectors and between nations. For instance, the agriculture and energy sectors may find themselves fighting over water, an already contested resource in Central Asia, while questions of water scarcity and energy and food security could potentially cause or exacerbate tensions between Central Asian countries.

To better prepare for climate change and to limit its effects, mitigation and adaptation measures appropriate to the context of Central Asia are needed. To this end, more research is needed across the disciplines (Vakulchuk et al., 2022; Vakulchuk and Overland, 2021) on, for example, extreme events and their multiple societal and sectoral impacts. Additional work is necessary to better assess the impacts of climate change in this region.

REFERENCES

Barandun, M., Fiddes, J., Scherler, M., Mathys, T., Saks, T., Petrakov, D., & Hoelzle, M. (2020). The state and future of the cryosphere in Central Asia. *Water Security, 11*, 100072. https://doi.org/10.1016/j.wasec.2020.100072

Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. (2021). *Scientific outcome of the IPBES-IPCC workshop on biodiversity and climate change*. http://www.ipbes.net/sites/default/files/2021-06/2021_IPCC-IPBES_scientific_outcome_20210612.pdf

Intergovernmental Panel on Climate Change. (2021). *Climate change 2021: The physical science basis* (V. Masson-Delmotte, P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J. B. R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, & B. Zhou, Eds.). Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press. (in press)

Meade, R. D., Akerman, A. P., Notley, S. R., McGinn, R., Poirier, P., Gosselin, P., & Kenny, G. P. (2020). Physiological factors characterizing heat-vulnerable older adults: A narrative review. *Environmental International, 144*, 105909. https://doi.org/10.1016/j.envint.2020.105909

Myers, S. S., Zanobetti, A., Kloog, I., et al. (2014). Increasing CO2 threatens human nutrition. *Nature, 510*(7503), 139–142. https://doi.org/10.1038/nature13179 [Accessed 21 May 2024]

Sorg, A., Bolch, T., Stoffel, M., et al. (2012). Climate change impacts on glaciers and runoff in Tien Shan (Central Asia). *Nature Climate Change, 2*, 725–731. https://doi.org/10.1038/nclimate1592

United Nations Development Programme. (2021). *Tackling air pollution in Europe and Central Asia for improved health and greener future*. http://undp.org/

Vakulchuk, R., & Overland, I. (2021). Central Asia is a missing link in analyses of critical materials for the global clean energy transition. *One Earth, 4*(12), 1678–1692. https://doi.org/10.1016/j.oneear.2021.11.012

Zaginaev, V., Petrakov, D., Erokhin, S., Meleshko, A., Stoffel, M., & Ballesteros-Cánovas, J. A. (2019). Geomorphic control on regional glacier lake outburst flood and debris flow activity over northern Tien Shan. *Global and Planetary Change, 176*, 50–59. https://doi.org/10.1016/j.gloplacha.2019.03.003

Zhang, M., Chen, Y., Shen, Y., & Li, B. (2019). Tracking climate change in Central Asia through temperature and precipitation extremes. *Journal of Geographical Sciences, 29*, 3–28.