

## C.05: Climatology

### Advancing transdisciplinary climate risk research

Dr Paul Holloway, Dr Camila Tavares Pereira

University College Cork, Cork, Ireland

#### Session Abstract

Climate risks are increasing in many communities due to social and natural vulnerabilities. Improving resilience and sustainability are key to reducing climate vulnerability internationally. An understanding and assessment of current and projected climate risks underpin effective planning for disaster risk reduction. Climate Risk Assessments can provide a means for evaluating the risks in a place and support actions to manage and reduce these. With the advancement of science and the urgency to minimise these impacts, assessments and risk reduction measures are more transdisciplinary (and necessary) than ever. Different tools, such as AI and Remote Sensing, optimise large-scale assessments, while a community-based approach becomes increasingly essential in local-scale assessments. Also, recently discussed and implemented for a long time (especially by traditional communities), Nature Based Solutions are today the main low-cost tools to increase the resilience of affected populations. This session calls for papers from geographers and researchers from different backgrounds and areas interested in sharing the methods, challenges, and innovations to assess and reduce climate risk and to help achieve resilient and just societal transformation in the face of climate change.

### Changing in synoptic systems in a decade of climate change – present and future

Dr. Agnieszka Wypych<sup>1</sup>, Prof. Hadas Saaroni<sup>2</sup>

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#### Session Abstract

Synoptic systems prominently dictate weather and climate conditions. The session is dedicated to all aspects of relationships between synoptic systems and surface climate and environmental variables. Contributions concerning theoretical aspects of system's classification, variations, and their applications in various tasks (meteorological, climatological, and environmental) are particularly welcome as well as submissions on recent variability and changes and future projections studied by tools of synoptic climatology.

## Climate change and its Impact on livelihood and traditional knowledge

Dr. Bhanwar Vishvendra Raj Singh<sup>1</sup>, Professor Agnieszka Dorota Wypych<sup>2</sup>

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### Session Abstract

Climate change is having a profound impact on livelihoods and traditional knowledge systems around the world. As we know, there are several types of impacts on the livelihoods side such as the agriculture sector, that lead to unpredictable weather patterns, increased temperatures, and more extreme weather events, fishing Aquaculture side, forestry are directly connected with climate change phenomena and form forest degradation and increased forest fires. This affects the livelihoods of indigenous and local communities who rely on forests for resources such as timber, non-timber forest products, and traditional medicines. As well as livestock farming, tourism, rural and coastal communities. Meanwhile, traditional knowledge is used in crop and seed selection, weather forecasting, resource management, and cultural heritage. Medicinal Knowledge etc. Addressing the impact of climate change on livelihoods and traditional knowledge requires a multi-faceted approach, including mitigation, and reducing greenhouse gas emissions to slow down climate change. adaptation, developing strategies to adapt to changing environmental conditions. Support for vulnerable communities, providing resources and assistance to communities most affected by climate change. Preserving traditional science supports the value of traditional knowledge systems in adapting to environmental change. Conservation is protecting and restoring ecosystems that are critical for both livelihoods and traditional knowledge. Efforts at local, national, and global levels are essential to address these challenges and ensure the resilience of communities facing the impacts of climate change. Eventually, This session highlights on climate change phenomena and their impact on livelihood and traditional knowledge systems.

Key Words; Climate change, livelihood, traditional knowledge

## Climate crisis and climate justice

Dr Francisco Castelhana

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### Session Abstract

In the last report on Climate Change, the IPCC was emphatic in adopting the terms Climate Crisis and Climate Emergency over Global Climate Change. More than just a semantic alteration, this concept reiterates the emergency of the theme, reinforcing it as a phenomenon of the present time and no

longer being placed on the uncertainty of future time. This change proposed an important new direction for the public discourse of recent years on the climate issue. The advancement of debates on the international scene has led to an expansion of climate discussion beyond the natural sciences, reaching social, political, economic, and cultural areas. Therefore, the idea of Climate justice highlights the connections between climate change and social injustice, evoking a strong geographical character. The debate on climate justice advances from multiple geographic scales, at the global scale, when we find socioeconomic disparities between the global South and the developed countries in terms of emissions, responsibilities, and adaptation and mitigation policies, to the local scale, when we see the development of different levels of climate vulnerability within the same municipality, and in the same territory. The purpose of this session is to encourage debate on a concept that is still new, albeit important, as well as create opportunities to advance the debate on the relationship between social and economic issues and climate. It will be an opportunity to highlight discussions about climate risks and vulnerabilities, socio-environmental modeling, future scenarios and public policies, urban and global climate justice, and environmental justice.

## **Climate variability in a decade of climate change and extremity**

Prof. Hadas Saaroni

Tel Aviv University, Tel Aviv, Israel

### **Session Abstract**

Both global and regional climate models predict future change in climate conditions. Such changes, including increase in extreme events, are already being observed worldwide and are attributed to anthropogenic factors. They have far-reaching environmental impact and are among the most serious challenges to society in coping with a changing climate. However, long- and short-term trends in climate conditions are affected also from natural climate variations. A prominent aspect of our climate is its variability. This variability ranges over many temporal and spatial scales and includes phenomena such as El Nino/La Nina, droughts, multi-year, multi-decade, and even multi-century variations in temperature, precipitation, pressure, and other patterns. The purpose of this session is to highlight the importance of climate variability analysis as part of climate change studies and introduce climate variations research in various spatial-temporal scales. Studies dealing with climate variability and its relation to climate change, from global to regional scales for the present and future periods, are invited to this session.

## **Extreme weather and climate events: causes, consequences, and impacts**

Dr. Guillaume Fortin

Université de Moncton, Moncton, Canada

### **Session Abstract**

July 2023 was the warmest ever recorded since 1880! Because of this scorching summer record, forest fires in different regions, such as Canada and the United States, while Europe was affected by severe droughts. Extreme weather and climate events can affect communities in many ways, depending on whether they bring too much water (flooding), not enough (drought), and if the temperatures are too hot or cold. Recently, researchers have worked to better characterize spatial and temporal climate variability and extreme events in terms of their frequency, duration, intensity, etc. Vulnerable communities everywhere are searching for innovative ways to be more resilient and to reduce the negative impact of droughts, heat waves, floods, and other natural hazards. This session will present examples of ways that extreme weather and climate events can be better monitored, estimated, modeled, prepared for, and adapted to.

## **Geoengineering and climate change**

Professor Babatunde Abiodun

University of Cape Town, Cape Town, South Africa

### **Session Abstract**

The greenhouse gas-induced climate change continues to devastate socioeconomic activities globally. The international negotiation on reducing greenhouse gas emissions is slow while the emissions themselves continue to rise. Geoengineering has been proposed as a faster solution. Geoengineering is the intentional large-scale modification of the Earth's system to end climate change and reverse global warming. Geoengineering techniques range from sucking carbon dioxide directly out of the atmosphere (e.g., ocean fertilization or afforestation using non-native species) to exerting a cooling influence on the Earth by reflecting sunlight (e.g., putting reflective particles into the atmosphere, putting mirrors in space, increasing surface reflectivity, or altering the amount or characteristics of clouds). The interest in geoengineering techniques is growing as more people seek to understand the possibility of cooling the Earth. However, the deployment of any geoengineering technique requires prior evaluation of the price, efficiency, and potential impacts of the technique. This session welcomes presentations on the physical and socioeconomic impacts of geoengineering techniques at any scale and ethical implications of geoengineering.

## Geographical perspectives on accelerated global warming: Adaptation and mitigation actions

Dr. Yoshihiro Iijima<sup>1</sup>, Dr. Babatunde Abiodun<sup>2</sup>, Dr. Abhishek Banerjee<sup>3</sup>

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<sup>3</sup>Northwest Institute of Eco-Environment and Resources, Lanzhou, China

### Session Abstract

Global warming is an indisputable reality, but its alarming rate of acceleration demands immediate attention. This session aims to delve into the multifaceted impacts of accelerated global warming, spanning from extreme high temperatures and heatwaves to droughts and intensified hydrological cycles, such as torrential rains and tropical cyclones. These phenomena have far-reaching consequences on human lives across the globe. We invite contributions presenting case studies on both global and regional climate change adaptation and mitigation efforts. We seek to emphasize the interconnectivity of events that are intrinsically linked to global warming, showcasing their significance across diverse geographical regions. Our session welcomes discussions on climate-driven agricultural transformations, sustainable renewable energy solutions, initiatives aimed at curbing environmental degradation, and strategies to combat climate-related disasters. We encourage participants to explore these topics within the context of their unique climatic backgrounds, thereby fostering a holistic understanding of the urgent need for action in the face of warming events worldwide. Join us in addressing the pressing challenges posed by accelerated global warming and charting a course toward a sustainable future.

### Historical climatology I

Dr Carla Mateus, Dr Conor Murphy

Maynooth University, Maynooth, Ireland

### Session Abstract

High-quality and long-term instrumental climate data and documentary sources are paramount to better assess climate variability and change and extreme events. Historical climate data are important to place the current climate change trends into context. Extreme events have significant impacts on society and the environment.

In this session, we welcome contributions to the following major research topics:

1. Climate data and metadata rescue, quality control, and homogenisation.
2. Climate change detection, assessment of trends, variability and extremes
3. Climate change attribution.
4. Impact of climate change on past societies.

5. Instrumental data, documentary sources and natural climate proxies used to assess past climate.
6. Hydrological and meteorological extreme events.

Interdisciplinary contributions in historical climatology and palaeoclimatology based on established or emerging methodologies are also welcome.

## Historical climatology II

Dr Kieran Hickey

UCC, Cork, Ireland

### Session Abstract

This session is concerned with all aspects of historical climatology. This includes papers on philosophical approaches and methodologies including novel source materials, all types of weather and climate phenomenon, all time periods and all regions.

## Human-wildlife conflict under the climate change

Dr. Bhanwar Vishvendra Raj Singh<sup>1</sup>, Professor Agnieszka Dorota Wypych<sup>2</sup>

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### Session Abstract

In the era of the climate crisis, nearly all countries are facing difficult challenges to meet the growing demands for land, food, water, and energy, which are further compounded by climate change risk. These challenges are especially pronounced in developed and developing countries, where the impacts of climate change are already visible on biodiversity resources. Without appropriate measures against climate change, these countries will face serious risks to food, water, and energy availability. Therefore, biodiversity conservation is critically important for nature-crisis countries.

All the protected areas as national parks/wildlife sanctuaries face the common challenges of how to cope with climate change risk and anthropogenic impact on the natural habitat that conserve the natural habitat without degrading the natural resources. As a result, the natural habitat faces encroachment and resource extraction from the natural habitat areas by local communities. The downsizing and extraction of natural resources from natural habitats are interlinked with the demand for food, water, and energy by local communities in many complex ways and cannot be managed

effectively without cross-sectorial integration. Therefore, the local community approach is expected to obtain an integrated solution for the biodiversity conservation of natural habitats and climate change mitigation and adaptation.

Henceforth, this session focuses on the natural environment, wildlife, and local livelihood to tackle the natural resources and climate change adaptation and mitigation through local community engagement. Mitigating this conflict requires a multi-faceted approach that combines conservation efforts, community engagement, sustainable practices, and effective governance near protected areas.

## Urban climate

Prof. Jun Matsumoto<sup>1</sup>, Prof. Jennifer Salmond [J.Salmond@auckland.ac.nz](mailto:J.Salmond@auckland.ac.nz) University of Auckland<sup>2</sup>

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### Session Abstract

Understanding and predicting the unique interactions between urban areas and the atmosphere, at a variety of scales, is critical to ensuring sustainable growth of cities. This is especially true in an era of anthropogenically induced climate changes which maybe both caused by, and enhanced by, urbanization. Such changes have the potential to have a disproportionate impact on urban areas, infrastructures and populations. Complex and heterogeneous natures of urban land surfaces, heat sources, air pollutants or aerosol are combined together to constitute urban climate. In turn, urban climate influences on human health and human life also in various ways. We therefore invite papers on all aspects of urban climate including (but not limited to): urban air pollution, impacts of extreme weather on cities, urban heat islands and their mitigation, heat stress and urban bio-meteorology, urban design, smart cities and urban energy balances. Papers based on original research from a variety of perspectives (including conceptual, empirical, experimental, theoretical or modelling studies) are welcome.