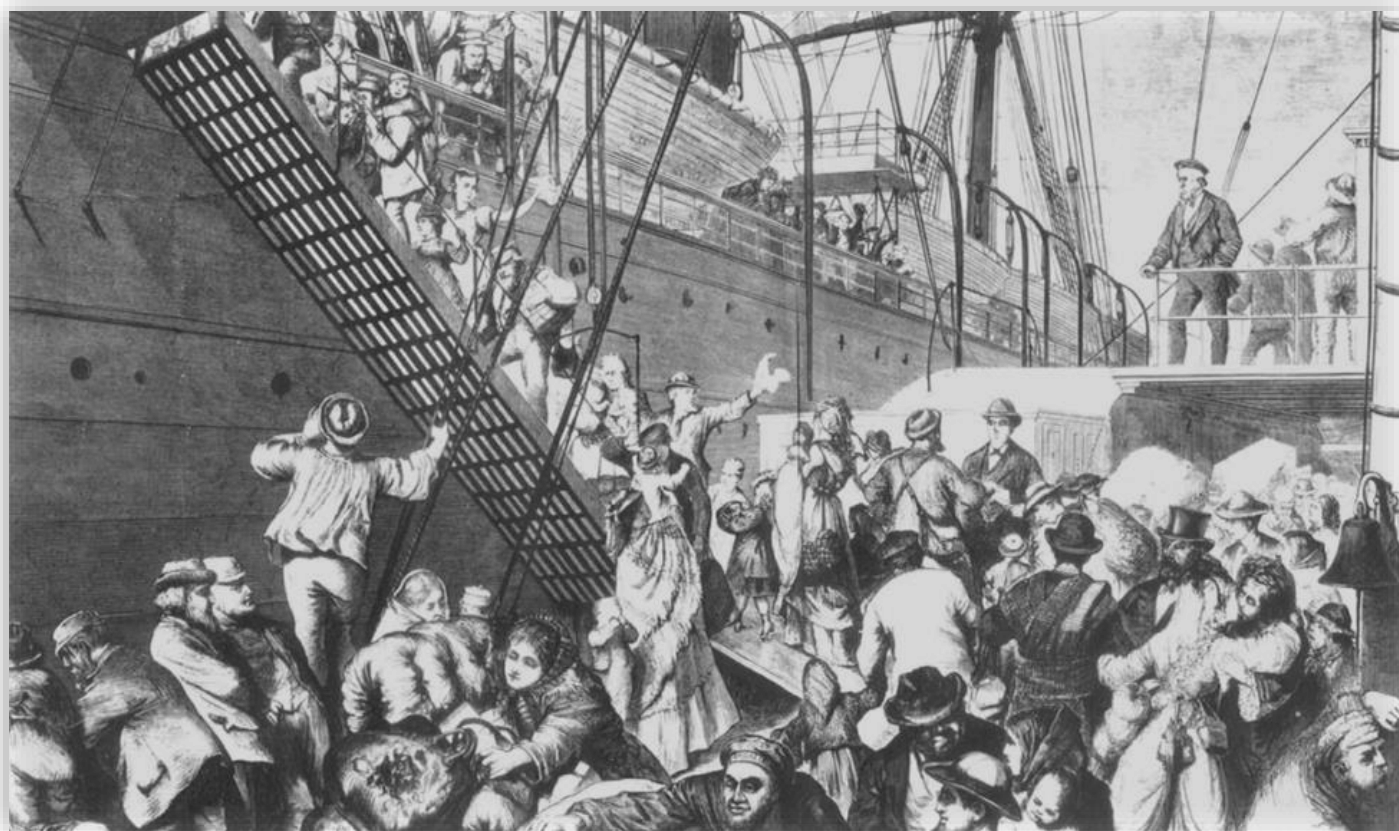


# Climate and Migration: Historical and Present Perspectives

Book of abstracts



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Department of Geography, Faculty of Science, Masaryk University



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## ABOUT WORKSHOP

Written records, early instrumental observations or various artefacts represent a significant potential to study past mobility from a climate perspective. Given current concerns over climate change, disasters, and migration, the theme of the meeting is highly topical. Although research into the present impacts of global warming and extreme weather on mobility and immobility has accelerated, the history of climate and migration has received comparatively little scholarly attention.

The 6<sup>th</sup> PAGES-CRIAS workshop builds on previous workshops and continue the development of methods for attributing societal impacts and adaptations to past climatic variability. Given current concerns over climate change, disasters, and migration, the workshop's theme is highly topical. Although research into the present impacts of global warming and extreme weather on mobility and immobility has accelerated, the history of climate and migration has received comparatively little scholarly attention.

This meeting aims to initiate new research activities on mobility and climate, share viewpoints and experience, support new international collaborations among researchers, and define research goals. Moreover, the workshop would be a forum to discuss methodological insights from comparing historical and contemporary climate impact research.

The organisers invite contributions in all of the following topics:

- Influences of past climate variability and extreme weather events on human migration;
- Impacts of climate variability on transport;
- Climate and colonialism;
- Different spatial and temporal scales of climate, migration, and mobility;
- Methodological challenges and innovations in the study of climate and migration;
- Climate change, ecosystems, diseases and migration.

The workshop is hosted jointly by the Department of Geography (Faculty of Science, Masaryk University) and CRIAS group (Climate Reconstruction and Impacts from the Archives of Societies) of the PAGES (Past Global Changes) network. The workshop is organized under the auspices of the Czech Geographical Society, the Department of Geography (Faculty of Science, Masaryk University) and the Mayor of the City of Brno Markéta Vaňková. The workshop is financially supported by PAGES.

### Organizers:

Dr Lukáš Dolák (Masaryk University)

Dr Kamila Dolák Klemešová (Masaryk University)

Dr Ladislava Řezníčková (Masaryk University)

Prof Sam White (University of Helsinki)

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Dr Qing Pei (The Hong Kong Polytechnic University)

# 1 EXTREME EVENTS AND MOBILITY IN MODERN SOUTH ASIA

Mohammad Abdul Quader (Jagannath University, Dhaka)

## Mobility of natural hazards prone coastal vulnerable people: A case of a riverine island of Bangladesh

Bangladesh is prone to several natural hazards i.e. cyclones, storm surges, floods etc. Coastal inhabitants of Bangladesh are exposed to the impact of multiple natural hazards at the same time that increase their vulnerability. Although the coast of Bangladesh is not a safe place to living coastal people live in a hazardous place due to having no alternatives. Landlessness, nature-dependent livelihood, extreme poverty and lack of multiple skills make the people immobile in some cases. But the impact of the severe and frequent natural hazards makes a portion of coastal people unemployed and put in repeated debt. To pay the debt and permanent loss of livelihood in the place of origin, people migrate far away for a particular period each year. Coastal people also migrate permanently from their place of origin. The number of migrated people and their factors of migration (mobility) in a riverine island setting in Bangladesh is missing in literature. This research aimed to identify the portion of migrants, spatial patterns and the factors of migration from island to elsewhere. Semi quantitative data collection techniques were applied at an island (Gabura Union) in the western coast of Bangladesh in 2022. Nine percent people migrated from the union to the nearest urban areas (n=1064). Migrated people were landless, lost their livelihoods after natural hazards and did not able to get rid from debt. The nature, spatial patterns and identified factors of climate migration in this research will help in formulating locally led adaptation policy.

Abdul Malak (Jagannath University, Dhaka)

### Older Adults' Mobility to Tropical Cyclone: Insights from the Coastal Bangladesh

Cyclones occur almost annually in Bangladesh, causing significant harm to people living on the coast. It is argued that less attention has been paid to older persons in the development and migration-related literature. In response, this study explores how cyclone impacts influence older persons' decision-making regarding mobility as an adaptation strategy. The study area is in Gabura (a coastal union of Bangladesh) as a place of origin, but migrant participants for interviews were also selected from the coastal municipality of Shyamnagar and the district city of Satkhira, as well as the mega-capital city Dhaka. The data was collected through qualitative research, including in-depth interviews and focus group discussions. The study results show that older adults face challenges during cyclones, which can lead to migration. Older persons face various economic, social, and cultural issues, including the loss of property and assets, disruption of social networks, and loss of cultural practices due to climate change-generated hazards. The results suggest that mobility to nearby towns or big cities is a common response of older persons to climate change. It is also found that such mobility decisions of older persons improved their resilience to cyclones. Overall, this study advances the knowledge concerning elderly mobility in the face of tropical cyclones and other coastal environmental stressors. The findings can be useful in developing policies and programs that include older persons and address their specific needs and vulnerabilities in the context of climate change.

Jathunge Nadeesha Deepika Jayathunga and Nideka Ishani Nanayakkara (University of Colombo, Colombo)

### Climate Change Impacts on Human Mobility and Migration: With reference to Anuradhapura and Puttalam Districts, Sri Lanka

Many nations, especially those with lower or middle incomes and economies that rely mostly on agriculture, are among the worst hit by climate change, according to the Global Climate Risk Index 2021. One of the most influential factors in human history is climate. It has primarily influenced all aspects of lifestyle, including economic, cultural, and social. People in ancient times adapted to their environment. Changes in the climate over the years have affected the economy, society, migration, and mobility. The objective of this study is to examine the influence of climate change on human lifestyles in terms of migration and mobility. This study combines quantitative and qualitative methods; secondary data is used to acquire information about climatic variability, while the latter approach uses focus group discussions conducted to study migration and mobility patterns and reasons. In the districts of Anuradhapura and Puttalam, hundred households from the agricultural sector were interviewed with a semi-structured questionnaire. This sample was chosen using a purposive and snow ball sampling. The mobility and migration trends in Sri Lanka are being affected by the irregular rainfall patterns, extreme weather events (droughts and floods) and rising temperature. Variability in the climate affects several aspects of agriculture, including the production of livestock, irrigation, agricultural farming, water management, and the economy overall. The households that make up the majority of the agricultural workers in Anuradhapura and Puttalam are rural residents who have suffered disproportionately from the effects of climate change. Agriculture in the Anuradhapura district is highly dependent on the seasonal rainfall due to the district's distinctive tank-based irrigated agriculture systems, particularly the small rainfed tanks found at the village level. Increased salinity levels, particularly as a result of the capillary rise of salt-rich groundwater produced by high air temperatures, are another consequence of drought that impacts Puttalam District. The effects of climate change on human migration and mobility have been identified in a variety of ways. Circular rural-urban movements are most prevalent in Colombo, Gampaha, Trincomalee, Kanthale, Kurunegala, and Galle whereas labour migration to the Kuwait, Italy, Korea, and Qatar is most common in Puttalam and Anuradhapura. Our research mainly aims to shed light on the connection between climate change and human migration as a result of failed farming methods. More effective reduction of climate change consequences can be achieved by actively encouraging ecologically friendly farming practices, which in turn will assist in accomplishing the Sustainable Development Goals (SDGs).

Sahana Bose (Assam University, Silchar)

**Assessing the past Climate variabilities and extreme weather events on Human migration:  
A Study on Indian Sunderbans.**

Spread over India and Bangladesh, the Sundarban is the largest single mangrove forest in the world and a UNESCO World Heritage Site for its biodiversity significance. The Indian Sunderbans is about 4262km<sup>2</sup> which has 104 islands in total, of which 54 are inhabited by humans. This region has experienced high climate variabilities and extreme weather events in the past 7 decades, like heat waves, floods, cyclones and rising sea levels which has resulted in a rise in climate-induced migration in India today. People are migrating to escape poverty because of collapse of traditional livelihoods. Within some few years, Indian Sundarban might become the most frightening humanitarian calamity of the world and Kolkata city could be the world's largest sink of climate migration. In the previous 20 years, four of its islands have sunk, including Lohachara, the first permanently drowned populated island of the world. Ghoramara and other Sundarban islands may face a similar fate in the following years. Due to the lack of definition for climate-induced migrants, or "climate refugees" under the international legal framework, they lack legal protection and recognition. This paper talks about how climate variabilities of the past have affected the human migration in Indian Sunderbans today. This paper is based on an empirical study where artefacts showing climate events, sign post of the sea level rise over the decades is taken into consideration and the land use and land cover changes has been studied to show how human migration has taken place in the past, its present trends and its future projections. This paper talks about the need of migration policy in India as it is seen that policies focus more on disaster risk management that are only limited to disaster relief totally ignoring the population displacement or human migration due to environmental stress.

## 2 MIGRATION IN TIMES OF CRISIS

Carina Damm (University of Silesia in Katowice, Katowice)

### (Im)mobile Vikings: environmental stress and resilience in the medieval North

Escaping political turmoil and land scarcity, several thousand settlers from Norway and the British Isles started migrating to the North Atlantic in the late ninth century. The inhospitable environment of their main settlement earned it the name Ísland, “the land of ice”, but did not deter the colonists. According to twelfth-century’s Landnámabók, all arable land was claimed within the first sixty years of settlement between c. 870 and 930. This rapid colonisation swiftly showed its ecologically destructive impact: deforestation resulted in soil erosion, whereas overgrazing and depleted fish populations triggered famines and conflicts over agricultural land and natural resources. In the first part of my talk, I will review this anthropogenic impact on the basis of palaeoecological proxies obtained from pollen, tephra, and stable isotopes and complement them with written accounts from the North such as the Icelandic sagas, annals, and law codes. In the second part, I would like to investigate how medieval Icelanders adapted to environmental and socio-economic challenges such as overexploitation of the land and overpopulation. Can the identified patterns be transposed to other Norse colonies such as the ones in Greenland, the Faroes, or Orkneys? If so, what might common strategies of mitigation and resilience tell us about environmental stress management in the medieval (Sub)arctic? Eventually, we might wonder why medieval Icelanders did not continue their migration to more hospitable lands. In other words, what immobilised the intrepid Vikings?

Dominik Collet (University of Oslo, Oslo)

### Appropriating climate. Personal mobility during the 1770s climate anomaly in Europe

The climatic anomaly of the 1770s served as a catalyst for a range of societal transformations during Europe's "Sattelzeit" (Koselleck). As people experienced harvest failures, famines, and epidemics they developed a range of responses to cope, overcome and appropriate climatic stress. One of the most prominent responses is increased mobility. It culminated in the "second Swabian trek" that saw thousands leave central Europe for Hungary. This mobility resulted not just in lasting population exchange, it also established new welfare regimes, mobility patterns, and empowering interactions between sovereigns and subjects. Most significantly, its sheer magnitude also resulted in the emergence of an entirely new and momentous concept: that of "overpopulation". This paper will provide a close-up view of mobility as entanglements of climatic stress and cultural responses. It will use the plurality of migration patterns as a lens to investigate forms of adapting and appropriating climate stress.

Nicolas Maughan (Aix-Marseille University, Marseille)

### Climate-induced Migrations During the late LIA in Southern French Alps: The Case of the “Barcelonnettes” from the Ubaye Valley

In Europe, the 19th century was a time of mass population movements, especially from rural to urban areas, but also of international migrations, mainly towards America. Political and economical events as well as social crises were responsible. But, extreme environmental and climatic conditions during the late Little Ice Age also pushed inhabitants of rural regions to migrate to other countries seeking better opportunities, this was the case, for example, in some mountain valleys of the Southern French Alps, like the “Barcelonnette valley”, located near the Italian border.

Indeed, in this mid-mountain valley ranging from 1000 m to 2600 m a.s.l, the climatic conditions and intense rainfall events of the second half of the 18th century, coupled with overgrazing and deforestation, induced a strong erosion process in unvegetated marlstone areas (black soils) as well as on steep slopes, with repeated landslides. Soil loss and landscape degradation were major issues for land use in a space criss-crossed by many small creeks, violent and torrential in flood times. This degradation of local ecosystems making many lands unsuitable for farming and pastoral activities.

In addition, the attachment of the valley (now called the Ubaye valley) in 1713 to France, previously belonging to the Duchy of Savoy, following the peace treaties of Utrecht, resulted in a gradual “closure” of the valley and slowed down trade, circulation of people and goods.

From 1805 onwards, this situation prompted a small number of inhabitants to leave the Ubaye valley initially to settle in the United States, in Louisiana, then subsequently in Mexico, taking full advantage of the drafting of the Declaration of Independence of the Mexican Empire on September 1821. This immigration will continue until the 1950s and, in 150 years, nearly 2500 “Barcelonnettes”, the name given to these immigrants, left their valley to join this country.

Andrea Kiss (Vienna University of Technology, Vienna)

### Following the Sun. Droughts, pluvials and migration in/from the Carpathian Basin in the 18th-19th centuries

While in the Middle Ages climate-related food crises and military conflicts were the main reasons for migration to (or from) Hungary, in the 16th-17th centuries mass migration was mainly related to war. It is the period of the early/mid-18th and 19th centuries, when climate-related crisis became the main cause of (spontaneous) migration.

Apart from the usual work-related migration activities, including seasonal works and transhumance practices, in the Carpathian Basin mass migration events were the immediate consequence of major food crises, primarily caused by spatially extensive, prolonged (set of) climatic extreme events and the lack or inadequate form of mitigation and prevention practices. In the 18th and 19th centuries, 80% of the major, countrywide dearth (or famine) cases were caused by droughts (in combination with other extremes, epidemics or war) and only 20% of the cases were primarily related to pluvials/floods, hard winters and/or other calamities.

A typical consequence of major food crisis periods was the intensification of migration activities either talking about a change in seasonal migration patterns, (temporary or permanent) inland migration, emigration or immigration. The eastern part of the Carpathian Basin was more affected by climate-induced migrations, and there were particularly sensitive regions, 'hotspots' (i.e. in the Great Hungarian Plain, Transylvania, north-eastern part of the Carpathian Basin) and major migration routes such as the cross-Carpathian route to (and from) Wallachia and Moldova.

Apart from discussing the main, long-term characteristics of climate-induced migration in (to/from) the Carpathian Basin/Hungary in a (Central) European context, in the presentation the 18th-19th century climate-induced migration patterns, main characteristics, causes and consequences are analysed and 'modelled' through the case studies of three major countrywide crises: 1718 (1717-1729: drought), 1816 (1813-1817: pluvial/flood), and 1863 (1860-1867: drought).

### 3 PAST MIGRATIONS IN EAST ASIA

Xiuqi Fang (Beijing Normal University, Beijing)

#### Creation of social-ecological resilience by migration driven by climate change in the history of China

Social-ecological resilience is an inner attribute of the human society, which refers to the capacity of the Social-ecological system to absorb disturbances such as environment change, social-economic fluctuation and political turmoil. The essential difference between human societies and natural systems is that social learning and innovations created by climate change adaption, could enhance the social-ecological resilience, or recreate an even more resilient system, that promotes the development and progress of human civilization.

In this paper, a case of creating new social-ecological resilience by adaptive migration of climate change, the exploitation of the Southern China, in the history of China is given. The three southward refugee migration surges in the history of China are regarded to be an adaptive response to the transition of climate from warm period to cold period in the last 2 000 years. The migrations made the main agricultural area expanded to the southern China. It not only changed the development trajectory of the southern China, but more importantly has brought about a jump in the social-ecological resilience of China by providing a wider space for China to develop, not only in terms of an increase in the total amount of arable land, but also in terms of the following aspects. (1) This allows for a wider range of adaptation to climate change and the capacity to adapt to various magnitudes of climate change. (2) It makes the socio-economy more stable and less sensitive to the impacts of climate change. (3) The increased communication between the North and South centres has further strengthened the integration of regional resilience on a national scale.

Jie Fei (Fudan University, Shanghai)

### The Great Drought of 1628 AD and Immigration from Chinese Mainland to Taiwan Island

A great drought, resulting in widespread famine, hit China's southeastern province Fujian in 1628. Maritime adventurer Zheng Chenggong suggested the Fujian government to allow the famine refugee to immigrate to Taiwan Island, thus forming the first wave of immigration from Chinese mainland to Taiwan Island in history.

Simultaneously, the loess plateau, northeastern China and other areas possibly also suffered droughts, famine and social unrest, therefore the great drought of 1628 AD could be a large-scale climate event. We suggest that Solar variability anomaly and volcanic eruptions could be possible ultimate causes.

Diyang Zhang and Siyu Chen (University of Freiburg, Freiburg/University of Bern, Bern)

### Changing pathways from drought to rural migration: A retrospect of drought events in the North China Plain

Migration was a time-honored way by which the inhabitants of the North China Plain coped with the negative effects of climate-related extreme events, such as drought. Through the excavation of original written records and the secondary research of published materials, the presented study revisited the extreme drought events in this region over the past 300 years, analyzed the pathways along which precipitation deficit could trigger rural migration, and discussed the changes in drought-migration linkages over time. In the pre-industrial period, plentiful large-scale migrations during droughts were documented with a clear cause and orientation. Those records demonstrated that the drought-induced migrations strictly followed the “precipitation deficit-famine-migration” pathway. Life-threatening food crisis was always an inescapable link, whether it was directly caused by insufficient grain production or unaffordable grain prices. In the early 1920s, the railway system was first extensively involved in disaster relief, which diversified the destination, increased the distance, and optimized the organization of refugees relocating from drought-affected areas. However, it did not change the intermediate links from precipitation deficit to rural migration. While in recent years, ambiguously oriented rural mobility during drought was still observed in demographic and economic statistics, although there were hardly any records of famine or drought-induced mass migration. Additionally, the agricultural income loss became one of the most mentioned negative impacts at the household level. These implied a new pathway where precipitation deficits could trigger rural migration via affecting household economic well-being. The reforms of the hukou system (household registration), more convenient transportation, and increasing rural-urban gap in industrialized society might motivate the drought-affected rural population to leave their land, even if drought has not yet induced any life-threatening food crisis. Meanwhile, they complicated the patterns of rural migration, which made climate-driven migrations less visible and more difficult to characterize in terms of size and orientation.

Pi-ling Pai (Academia Sinica, Taipei)

### Exploring Climate Disasters and Migration Associated with the Social Unrest of the White Lotus Rebellion in Late 18th Century China Based on the SIER and REACHES Databases

Historically, a variety of factors have contributed to population migration, including governmental policies as well as climate disasters such as floods and droughts, epidemics and other regional events. In view of the possibility that climatic factors may lead to population migration, we build on the current research exploring the relationship between climate change and social unrest by investigating the role of migration in social unrest during the Little Ice Age.

The data used in our study are from SIER (Societal Impact Events Records) database compiled since 2020, and REACHES (Reconstructing East Asian Climate Historical Encoded Series) database. Similar to REACHES (Wang et al. 2018), the SIER database compiles a rich quantity of Chinese historical documents. It further focuses on the demography, crop yield, tax, epidemics, and warfare aspects and digitizes the documentary records by using a systematic coding procedure to facilitate application among international scholars for studying climate and societal conflict.

To illustrate the application, we took the White Lotus Rebellion (1794-1804) at the end of the early heyday of the Qing Dynasty as an example. The outbreak of the rebellion occurred in the west-inland, mountainous, region of China bordering Sichuan, Hubei and Shaanxi Provinces. A large number of rebels claimed to be followers of the White Lotus Sect (a religious society) rising up with the call to fight against the Qing Dynasty. Many previous studies have debated the factors of the uprising including geographical factor (i.e., remote, mountainous region), governmental impetus (i.e., emigration policy to this reclamation region), and climate factors (i.e., frequent flood and drought). By integrating different data, we will present a multivariate analysis of how those factors interact in the socio-spatial dimensions leading to the uprising of the rebellion. The roles of climate and migration will be specifically investigated and elaborated in this study.

## 4 METHODS FOR THE STUDY OF HISTORICAL MIGRATION

Mika Ichino (Research Organization of Information and Systems, Tokyo)

### Climate Change and Severe Famines: Exploring the Relationship between Solar Radiation and the Dynamics of Historical Migration

Understanding the effects of past climate change on human societies and their adaptations is vital not only for historical studies but also for future resilience strategies. A comparison of seasonal variations in the distribution of solar radiation, estimated from diary weather records from 18 locations across Japan, with the Osaka rice market price indicated that severe weather caused high rice prices during the Tenpo famine (1833–1839). Consequently, using data with a higher temporal resolution than annual data or data of limited seasons can be effective for investigating the impacts of climate change on society. Using historical weather descriptions, rice prices, and migration data, this study explored how climate change affects food and economics and how economic stresses, such as famine and grain price fluctuations, impacted migration patterns. The migration data were calculated based on individual-level panel data from local population registers of four communities (current Fukushima prefecture) from 1708 to 1870. The rice price series in the local market of Aizu in the same prefecture was used to measure the annual fluctuations in local agricultural output. Monthly solar radiation was reconstructed from historical weather descriptions north (Yamagata) and south (Nikko) of the target area. A comparison of the migration data with the reconstructed monthly solar radiation indicated that an increase in migration, abscondence, and death after summer solar radiation decreased significantly in the Tenmei (1782-1788) and Tenpo (1833-1839) famines. Hence, we investigated the correlation between solar radiation and rice prices as well as between rice prices and migration, focusing on the period from 1830 to 1850, covering the Tenpo famine period. This study aims to highlight the relevance of integrating solar radiation data into migration studies and understand the historical interrelationship between climate variability and human mobility.

Carla Mateus (Maynooth University, Maynooth)

### Impacts of extreme air temperature events and climate change in Ireland

Ireland has a great heritage of documentary sources and early instrumental meteorological observations, which allow the study of past mobility from a long-term climate perspective.

The assessment of frequency, duration, intensity and geographical distribution of heat waves and cold waves (Mateus, 2021) and extreme air temperature indices (Mateus and Potito, 2022) has been made on long-term rescued, quality-controlled and homogenised data back to 1885.

Documentary sources comprising annals, weather diaries, newspapers, monographs and other publications were assessed to examine the frequency, duration, intensity, geographical distribution, and human, environmental, and socio-economic impacts of heat waves and cold waves from AD. 583 to the 21st century in Ireland (Mateus, 2021). This analysis allows the understanding of how the impacts of these extreme air temperature events, vulnerability, and adaptation of societies have changed throughout time.

This presentation will focus on case studies and links between past 1) extreme air temperature events, 2) plagues, pandemics, epidemics, 3) famines and 4) colonialism to explore the impacts on Irish mobility from a long-term historical and climate perspective.

#### References:

Mateus, C., 2021. Development of long-term daily maximum and minimum air temperature series and assessment of past extreme air temperature events in Ireland. Doctoral dissertation. National University of Ireland Galway.

Mateus, C. and Potito, A., 2022. Long-term trends in daily extreme air temperature indices in Ireland from 1885 to 2018. *Weather and Climate Extremes*, 36, p.100464.

Michael Kahle (University of Freiburg, Freiburg)

### Decyphering Impacts of Climatic Extremes on Mobility by Methods of Machine Learning

Mobility had been (and still) is highly affected by weather conditions, especially to their extremes, such as cold events, heavy snowfall, low water levels induced by droughts, severe weather including heavy rain, flooding and storms.

Impacts on transportation, traveling, pilgrimage and migration are referenced in historical documents. Sources and documents usually include descriptions of weather situations, the means and zones of transportation likewise shipping, wagons, horse riding, sledges, walking etc. and the intensity and kind of impact.

The relations between climatic stressors and their effects on transportation will be shown as well as their development in time for the last 1000 years. A key question here is the extent to which long-term climate change will affect mobility.

Additionally we will discuss methodological approaches for unlocking these information from written sources including their advantages and disadvantages. They cover manually approaches using classical hermeneutic, semi-automatically searches by selected keywords, statistical methods of machine learning and natural language processing like Bayesian bag-of-words analysis but also include modern approaches using artificial intelligence and deep learning.

## 5 PAST AND CONTEMPORARY PERSPECTIVES

Philipp Nicolas Lehmann (University of California, Riverside)

### Moves Against the State: Climate and Migration Colonial Southwest Africa

With its deserts and arid grasslands, the colony of Southwest Africa (Namibia) did not only pose economic challenges to the German colonialists around the turn of the twentieth century; it also confronted administrators, settlers, and soldiers with population movements and patterns of migration that went against the static settlement policies and plans of control and surveillance of the colonial government. In this paper, I will explore how the German colonial state attempted to police – and ultimately failed at policing – population movements from 1890 to the beginning of the First World War. In their attempts to establish reservations for the African populations, German officials often conflated the regular migrations following the oscillations of rainy and dry seasons with extraordinary migrations due to particular weather events and larger climatic patterns. And while administrators realized the importance of environmental factors, they tended to interpret all population movements as ultimately inspired by political motives.

In this paper, I am interested both in how the colonial administrators in Southwest Africa attempted to grapple with what is now sometimes called "environmental" or "climatic" migration, and in how far violence became an accepted tool to police population movements in the colonial context. To close, I will briefly discuss to what extent colonial practices became incorporated into both codified and customary frameworks in the metropole.

Esmatullah Khyber (University of East Anglia, Norwich)

### Climate Change as a Catalyst for Migration: Understanding the Multidimensional and Gradual Impact of Climatic-environmental Changes on Global Migration Patterns

Existing literature often posits a direct causal relationship between climate change and migration, with the assumption that environmental stressors mainly drought and water scarcity inevitably trigger significant population movements, especially in the context of fragile states. However, these claims often rest on intuitive assumptions rather than empirical evidence. This paper addresses this gap by conducting a rigorous investigation into the nexus between climate change and migration, with a particular focus on water stress and drought as primary drivers. By undertaking an in-depth literature review, case studies, and revising the Foresight Conceptual Framework (2011), this study elucidates the explicit linkages between these environmental changes and migration patterns. Our findings underscore that while a discernible relationship exists, but the gradual climatic-environmental impact cannot be viewed as the sole driver of migration. The degree to which climate change influences migration decisions is significantly shaped by the vulnerability and adaptive capacities of the affected populations and regions and is intricately linked with other migration drivers.

Natália Melo (University of Évora/In2PAST, Évora)

### Empowering communities in shaping narratives: a comparative analysis of museum exhibitions and piscatory communities in Portugal and Brasil

This presentation critically examines the dynamics of narrative construction in museum exhibitions, focusing on the representation of human-climate relationships, changes, migrations, and personal stories. Drawing on case studies from prominent exhibitions such as the long term exhibition "Perspectives" (Klimahaus, Germany) and the itinerant exhibition "Conversations with the Earth: Indigenous Voices on Climate Change", we delve into the roles of central figures, namely curators or artists, who traditionally spearhead the exhibition narrative-building process within local communities. In an effort to challenge this conventional approach, our research proposes a paradigm shift by exploring the possibilities of empowering communities to actively participate in representing and exhibiting their own narratives. What if communities were given the authority to shape the discourse surrounding their relationships with the environment and climate? This presentation navigates a dual perspective by juxtaposing the museum-centric view with insights gleaned from piscatory communities in Portugal and Brasil. We inquire into the narratives these communities choose to articulate, examining the ways they represent their connections with climate and climate change through historical and contemporary documentation, with a particular focus on photography. With a deliberate emphasis on raising questions rather than providing definitive answers, our research seeks to unravel the potential for collaboration with and advocacy for these communities. By creating space for decolonized and collective narratives about climate and environmental changes, we aim to understand the role of change as a catalyst for movement, migration, and proactive engagement. This exploration serves as a call to action for a more inclusive and participatory approach to narrative construction in the context of climate discourse.

## PARTICIPANT LIST AND EMAILS

Last name	First name	Country	Email	Expertise (keywords)
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