

The Palgrave Handbook of Climate History

Edited by

Sam White · Christian Pfister

Franz Mauelshagen

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General Introduction: Weather, Climate, and Human History

Christian Pfister, Sam White, and Franz Mauelshagen

In the twenty-first century, man-made global warming has emerged as one of the most pressing issues for the future of humanity and the environment. However, climate variability and climate change are not new. To put anthropogenic warming in perspective, we need to understand natural climate variations, extremes, and forcings, as well as the history of climate science. To appreciate how humans can (or cannot) deal with climate change, we need to consider how past climates influenced societies and how those societies responded and adapted to their challenges. Moreover, to fully understand events and developments in human history, we need to recognize the roles that climate and weather have (and have not) played in our past.

This handbook introduces students and scholars to the vital field of climate history: the interdisciplinary study of past weather and climate variations, and their place in human history. Drawing together dozens of experts from multiple disciplines, it presents the state of the field, including:

- methods of climate and weather reconstruction from human sources, such as written records and early weather instruments;
- techniques of indexing, mapping, and modeling climate data;

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- the history of weather and climate variations for each region and period of human history since the last ice age;
- the impacts of climate variations on agriculture, conflict, health, and migration in history;
- case studies of exceptional decades of climatic variability and their human impacts;
- the history of climate ideas and climate science.

This introductory chapter explains the basics of how climate history works, outlines the core issues in climate history, provides essential background to the field (in Europe and the USA), and concludes with a guide to using this volume.

1.1 CLIMATE HISTORY AND HISTORICAL CLIMATOLOGY

Climate history remains a diverse field. Its scholars come from many disciplines and academic departments, and they approach their work in different ways. Some deal primarily in quantitative methods and others in qualitative. Some would identify themselves as environmental historians and others as economic historians, geographers, or even climate scientists. Nevertheless, state-of-the-art research in climate history typically follows certain core principles.

First, climate history makes use of one or both of two approaches of climate reconstruction: *paleoclimatology* and *historical climatology*. Paleoclimatology here refers to the statistical reconstruction of past climates from physical sources left by natural processes, or what this volume will call “the archives of nature.” Historical climatology here refers to the reconstruction of past climates and weather from physical and written sources left by humans, or what this volume will call “the archives of societies” (see Fig. 1.1 and Chap. 3). Because paleoclimatology has become a large and specialized area of research with its own textbooks, this volume will focus on the methods and results of historical climatology. It is particularly from this that climate historians derive much of the precise, local information needed to understand climate and weather impacts on the human world. The case studies provided in Chaps. 32–35 illustrate how climate historians combine paleoclimatology and historical climatology in state-of-the-art research.

Second, climate history draws on the methods and standards of *historical research*. These include training in languages, paleography, and the critical analysis of historical sources. Climate historians—just like other scholars of history—should be intimately familiar with the texts and contexts of their region and period of study in order to judge the reliability and meaning of their source materials (see Chap. 4). Many, but not all, also develop the same practices of narration and qualitative analysis practiced in conventional branches of history.

Third, climate history is concerned with understanding the role of climate and weather variations in events and developments of the *human* past. This concern distinguishes climate history from other fields. Unlike conventional history, climate history does not treat climate and weather as something exogenous to the human experience, nor does it assume that human history can be explained only by examining human factors. Unlike (paleo)climatology, climate history focuses on human experiences. Its researchers are interested in learning

about specific past events for their own sake, and not only as they relate to larger climatic patterns or trends.

The term “climate history” has a complicated background. For climatologists, it means simply the history of the earth’s climate, its long- and short-term variability from the beginnings of the atmosphere to the present. Paleoclimatology, as the study of climate prior to the period of instrumental measurements, constitutes a well-established field within climatology.¹ By contrast, historians began using the term “climate history” some fifty years ago to label a novel field of historical study: how weather and climate changed during the recorded past and how those variations affected human history. These two versions of “climate history” overlap in important respects. Both involve reconstruction of climates in the period before instrumental measurements. Each may contribute data and insights to the other. On the other hand, paleoclimatology has a scope of billions of years, uses physical rather than descriptive records, and is not concerned with the historical impacts of climate.

The term “historical climatology” is similarly complicated. Its usage was established by a seminal 1978 article in *Nature*, which outlined the techniques of reconstructing past climates from human records.² Researchers in the field used the term in part to help their research gain acceptance as a valid method of climate reconstruction within the larger discipline of climatology. Gaining that acceptance among climate scientists constituted a major achievement of the field. However, researchers trained in the humanist historical tradition have never felt entirely comfortable with the label “historical climatology.” Most historians simply do not think of themselves as climatologists, even when involved in reconstructing climates of the past. At the same time, the practice of historical climatology has been inherently interdisciplinary, combining expertise from the humanities and natural sciences (meteorology, climatology, and physical geography). To understand their source material and carry out climate reconstruction, historical climatologists have also worked on issues of historical climate impacts, perceptions, vulnerabilities, and adaptations. Thus they have often used the term “historical climatology” in the same sense as historians have used the term “climate history.”

In this volume we try to establish a clear and simple terminology. We use “climate history” in the historians’ sense only; and we identify paleoclimatology and historical climatology as two different fields of climate reconstruction, the former using the archives of nature, and the latter using the archives of societies. Nevertheless, the reader should be aware of the inconsistent and overlapping use of these terms elsewhere.

1.2 METHODOLOGICAL AND CONCEPTUAL CHALLENGES

Methodologically and conceptually, climate history grapples with two sets of core issues. Many of the methods, themes, and case studies in this volume reflect these issues and the techniques employed to address them.

First, climate history must integrate data and perspectives from history and the humanities with those from the natural sciences and sometimes social sciences. This integration poses several challenges. Climate historians need to

bridge qualitative and quantitative information and methods, particularly in the analysis of past climates reconstructed from written records. Moreover, the analysis of human history often operates on different scales from the analysis of climate science. Atmospheric events taking place over weeks, days, or even hours may have a decisive influence on human societies, while for the climatologist these may represent little more than statistical “noise.” Historically, individuals rarely observed long-term climate change directly. They usually experienced climatic change in terms of the frequency and severity of extreme weather events or environmental challenges. Finally, the natural and social sciences tend to emphasize long-term patterns and probabilities, whereas history tends to focus on particularity and contingency. Historians, unlike scientists, “tend to eschew broad generalizations, partly because it is the detail, the differences from one case to another, which is central to historical research.”³

Figure 1.1 provides an overview of evidence and approaches used in paleoclimatology and historical climatology, and how these relate to each other. Both disciplines have developed methods to reconstruct climate elements such as temperature and precipitation from *proxies*, or indirect representations of past climate. Examples from the archives of nature would include the width of tree rings, and from the archives of society the dates of grape harvests (see Chap. 3). Historical climatologists subsequently developed their own approach to climate reconstruction, climate indices, which combine the interpretation of historical weather narratives and proxy data (see Chap. 11). It often helps to compare the results of historical climatology with high-resolution evidence from the archives of nature, especially where written sources are not abundant. Human perceptions and interpretations of weather and its impacts on the human world constitute another focus of climate history, closely tied to cultural and economic history. Weather constitutes the physical and psychological nexus between people and the atmosphere.

The second set of methodological and conceptual issues in climate history concerns causality. In general, research in climate history seeks to demonstrate causation and not merely correlation between climatic and human develop-

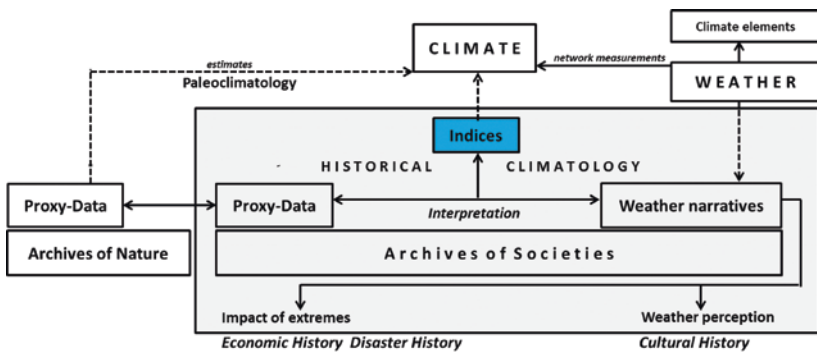


Fig. 1.1 Schema of evidence and approaches in paleoclimatology and historical climatology

ments. Even where circumstantial evidence strongly suggests some influence of climate change or variability on past societies, direct causal links can be difficult to prove. Figure 1.2 illustrates this problem schematically.

As shown in Fig. 1.2, at each step—from biophysical impacts to economic impacts to political and culture change—the role of weather variations becomes

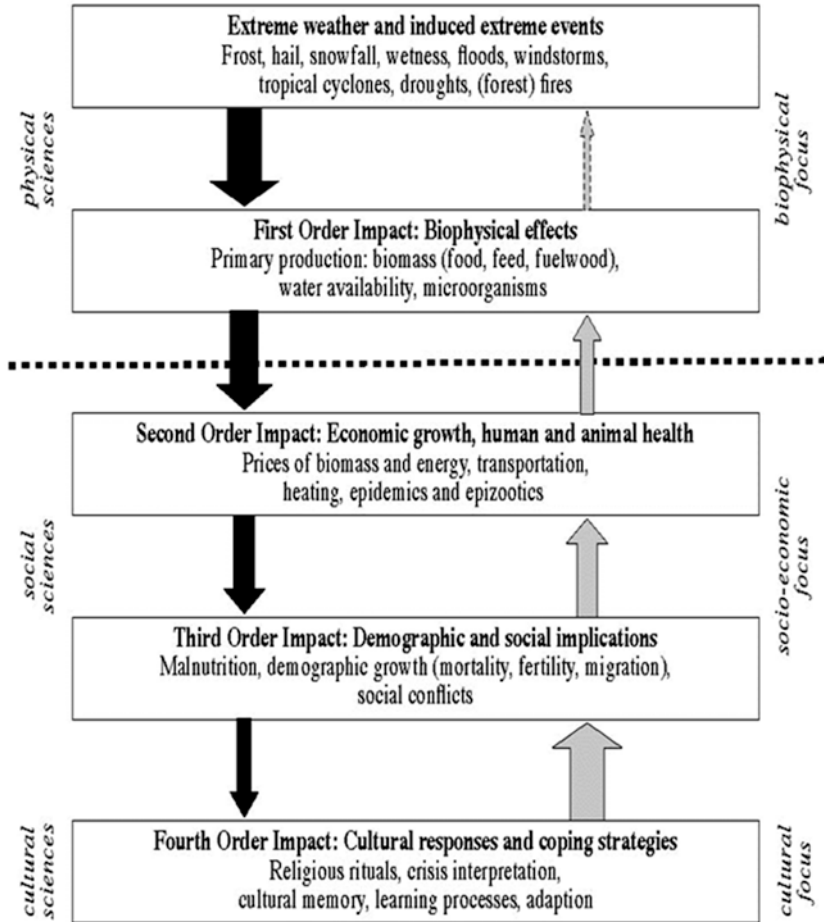


Fig. 1.2 A schematic linear model of climate–society interactions (from Krämer 2015). This simplified model of climate and society illustrates how extreme weather and climate can have a range of consequences, starting with immediate first-order effects on biomass production, which in turn may cause second-order effects on economic growth, water availability, and human and animal health. Third-order effects include demographic and social changes, and resource conflicts. Fourth-order (cultural) effects may range from the persecution of marginal people to the adoption of new adaptation strategies. The diminishing width of the arrows represents how causality becomes less direct moving from climate through biophysical, economic, social, and cultural effects, and back again.

less certain. Climate and weather reconstruction, therefore, is often just the first stage in climate history research. Much of the work in the field is involved in demonstrating actual series of events connecting climate change with human impacts; in exploring additional historical factors and explanations; and above all in understanding societal vulnerabilities, responses, and adaptation in the face of climatic and meteorological challenges.

For decades, climate historians have been anxious to establish the role of weather and climate in the past while avoiding the problem of *climate determinism*, or the fallacy that climatic factors control the development of societies. On the one hand, most historians and many sociologists “have chosen to ignore the possible importance of climate on the development of society,” or have explicitly rejected the role of environmental factors altogether.⁴ On the other hand, many science articles and popular science books that claim to identify some climate-driven crisis or collapse continue to confound correlation with causation. Sociologist Nico Stehr and climate physicist Hans von Storch argue that “a large proportion of today’s climate impact research is genuine climate determinism.”⁵ The challenge for climate history lies in giving climate and weather their proper place in human affairs without obfuscation or exaggeration.

1.3 BACKGROUND

The idea that climates and climate change could influence societies and history can be traced as far back as ancient authors such as Herodotus, or the works of Enlightenment thinkers such as Montesquieu, Voltaire, and Gibbon (who understood the term “climate” in a very different sense: see Chap. 36). Systematic efforts to compile evidence on past weather and climate date back only to the late nineteenth and early twentieth centuries (at least in Europe and the USA).⁶ A few scholars, notably German geographer Eduard Brückner (1852–1927) and English meteorologist C.E.P. Brooks (1888–1957), gathered evidence of climate events and variability from European historical sources from the Middle Ages onwards, making the case for their economic and political consequences.

Starting in the mid-twentieth century, two scholars in particular helped establish climate history as a significant field of research. Celebrated French historian Emmanuel Le Roy Ladurie (b. 1929), who had a passion for studying past weather and climate, pioneered the integration of phenological data such as grape harvest dates with human records in order to reconstruct seasonal temperature during past centuries. His 1967 monograph *Histoire du climat depuis l’an mil* (*Times of Feast, Times of Famine*) spread his influence beyond the French-speaking world and drew public attention to historical climatology. This influential book also included an important chapter about glacier variations in the French and Swiss Alps, which helped popularize the concept of an