

## Beyond collapse: climate change and causality during the Middle Holocene Climatic Transition, 6400–5000 years before present

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The twenty-first century is likely to be characterised by large changes in regional climatic and environmental conditions, with implications for the availability and distribution of key resources such as water and productive land. While the implications of such changes for human societies are potentially profound, the empirical evidence base for understanding human–environment interactions focuses largely on the relatively recent past, during which examples of rapid and severe climate change are lacking. While there are no precise past analogues for twenty-first century climate change, the Middle Holocene Climatic Transition (MHCT), from about 6400–5000 years before present, provides us with an example of a period of large-scale global climatic reorganisation, punctuated by episodes of rapid and severe climate change, at a time when human societies were beginning to resemble those of today. A survey of archaeological and palaeo-environmental data from the northern hemisphere subtropics and other regions provides us with evidence for linked climatic, environmental and societal change during the MHCT. This evidence, the strength of which varies with location, allows us to construct convincing narratives of linked climatic, environmental and societal changes that accommodate a variety of responses and outcomes, and that are much more nuanced than narratives of the proposed climate-induced collapse of individual societies. Such synthetic studies that compare contexts across time and space can help us understand human–environment interactions during times of climatic disruption, while allowing for diverse outcomes and avoiding the pitfalls of climatic determinism.

**Keywords:** climate change; Middle Holocene; societal collapse; cultural transitions; migration; adaptation; determinism

### Introduction

Under current emissions and climate policy regimes, there is a high probability that the mean surface temperature of the Earth will rise by around 4 °C sometime in the latter half of the twenty-first century (Anderson & Bows, 2008; Betts et al., 2011). This would represent a warming of the same order of magnitude, but much more rapid, as that associated with a glacial–interglacial transition, and would result in the world being warmer than it has been for millions of years (Haywood & Williams, 2005; Jansen et al., 2007).

While the precise consequences of such a warming for atmospheric and oceanic circulation and regional climate change are currently quite poorly understood, there are ample grounds for assuming that such a warming would be associated with significant changes in regional climatic conditions, qualitative changes in landscapes and ecosystems, and potentially large changes in the availability and distribution of key resources such as water and productive land. Such outcomes have been suggested by a number of model-based studies of twenty-first century climate change, and are apparent in palaeo-environmental

records from previous periods of climatic transition (e.g. Armitage et al., 2007; Betts et al., 2004; deMenocal et al., 2000; Golding & Betts, 2008; Thomas et al., 2005; Williams & Funk, 2010). A key question for the twenty-first century is the extent to which changes in resource availability driven by climate change, acting in combination with population growth and economic development, may act to drive significant societal change through mechanisms such as migration, resource conflicts, and the restructuring of livelihoods, economic systems, human relations and social organisation.

Currently, debates about the role of climate change as a driver of societal change may be characterised in terms of “maximalism” and “minimalism”, terms first applied by Suhrke (1993) in the context of environmental change and migration. Extending this model to the impacts of climate change at large, maximalist narratives tend to view climate change as something that “causes” specific societal outcomes, for example migration (e.g. Myers, 2002; Myers & Kent, 1995), or conflict (e.g. Burke et al., 2009). Such views of causality are often criticised as overly simplistic and deterministic, and for ignoring the

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