

# Editorial: Medieval Climate Anomaly

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Research on the climate of the Middle Ages began in the 1960s. Motivated by historical accounts Hubert H. Lamb documented the increase in relative frequency of warm episodes, primarily around the North Atlantic and increased cool season precipitation across Britain during medieval times (Lamb, 1965). Lamb wrote first of a “Medieval Warm Epoch” and later of a “Medieval Warm Period” ending at approximately AD 1300. Lamb recognized that the available evidence implied that due to a “... shift in the upper westerlies, the depression tracks should have had an average position north of the modern normal (AD 1900–1939) position — a displacement that probably implies less sea ice ...” (Lamb, 1965; 1969). He thus emphasized the relationship between changes in circulation and surface climate, and the idea of modest but persistent shifts in winter circulation over the North Atlantic and Europe during medieval times (see also Graham et al., 2010). Later, LaMarche (1974) used multi-elevation tree-ring and other data to infer late Holocene climate changes in the White Mountains of California. His analyses indicated that conditions were predominantly warmer and drier from AD 1000–1300, and cooler and wetter from AD 1400–1800. He showed that such changes could be explained by a northward-to-southward shift of the storm track over the region. LaMarche pointed out that the transition from the Medieval Warm Period to the subsequent Little Ice Age (LIA) over the western US was synchronous with the one inferred by Lamb (1965) for the North Atlantic and Western Europe, possibly indicating a shift in global circulation patterns, as already surmised by Lamb (1969; see also Graham et al., 2010).

Interestingly, within this period various important cultural events took place. From AD 800–1000 Iron Age Scandinavians colonized the North Atlantic islands and eastern North America. Iceland was settled around AD 874, Greenland ca. AD 985, and the short lived Vinland colony survived a few years around AD 1000 in Newfoundland (Arneborg, 2000; Wallace, 2000). By their arrival to Iceland, Scandinavian settlers encountered a mid-Atlantic island with favorable climatic and environmental conditions similar to

those prevailing in Scandinavia (McGovern et al., 2007). In North America, the Vinland colony of the Vikings was abandoned by the mid-eleventh century. At that time drift ice had already started its appearance along the vital trade routes to Greenland (Lamb, 1995), increasing the threat of ice for seafarers. Climate change and human environmental effects on the island ecosystems played an important role in the unhappy ending to the “Norse Atlantic Saga” (Amorosi et al., 1997; Dugmore et al., 2004; Ogilvie and McGovern, 2000) combined with changes in politics and market forces in Europe (Ladurie, 1983; Jones, 1986).

A large number of studies on the temporal and regional expression of the Medieval Warm Period for different parts of the world have followed since the pioneering works of Lamb and LaMarche. A comprehensive review of those studies can be found in Hughes and Diaz (1994), Graham et al. (2010) and Diaz et al. (2011). The time frame is nowadays more commonly referred to as the Medieval Climate Anomaly (MCA). This term was coined originally by Stine (1994), who sought an explanation for the results of a wide-ranging geomorphic investigation of century-long low stands of lakes in the sub-tropical latitudes of western North and South America. The subsequent adoption of this term reflects the availability of much more information on the climate during medieval times since Lamb’s pioneering studies. Since then, new proxy paleoclimate records, temporally and spatially highly resolved reconstructions, and detailed modeling studies allow for a more accurate and detailed study of the climate since the MCA (Mann et al., 2009; Cook et al., 2010; Graham et al., 2010; Diaz et al., 2011 and references therein).

Bradley et al. (2003) questioned the statement “Climate in Medieval time is often said to have been as warm as, or warmer than, it is today. Still, many aspects of the climate during the MCA require careful examination and further investigations. Among areas of ongoing research are the onset and termination as well as the positioning of the MCA in the Holocene climatic context, the climate characteristics of the period, the nature of the transition to the subsequent LIA,

the spatial extent and local expression as well as the impacts on societies, associated forcing factors, and most prominently its magnitude compared to the instrumental temperature records and the magnitude and pace of the twentieth century warming.

These aspects are the focus of this PAGES Newsletter. The special section compiles latest information on climate and impacts during the MCA on global and regional scales. Historical documents, proxy records and climate models provide new insights into the temporal and spatial climatic pattern and related dynamics and forcings during medieval times.

## References

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