

A tree-ring reconstruction of East Anglian (UK) hydroclimate variability over the last millennium

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The online version of this article can be found at: <http://www.springerlink.com/content/xw22k69526x06302/>

Abstract

We present an annually resolved reconstruction of spring-summer precipitation variability in East Anglia, UK (52-53°N, 0-2°E) for the period AD 900-2009. A continuous regional network of 723 living (AD 1590-2009) and historical (AD 781-1790) oak (*Quercus* sp.) ring-width series has been constructed and shown to display significant sensitivity to precipitation variability during the March-July season. The existence of a coherent common growth signal is demonstrated in oaks growing across East Anglia, containing evidence of near-decadal aperiodic variability in precipitation throughout the last millennium. Positive correlations are established between oak growth and precipitation variability across a large region of northwest Europe, although climate-growth relationships appear time transgressive with correlations significantly weakening during the early twentieth century. Examination of the relationship between oak growth, precipitation, and the North Atlantic Oscillation (NAO), reveals no evidence that the NAO plays any significant role in the control of precipitation or tree growth in this region. Using Regional Curve Standardisation to preserve evidence of low-frequency growth variability in the East Anglian oak chronology, we produce a millennial length reconstruction that is capable of explaining 32-35% of annual-to-decadal regional-scale precipitation variance during 1901-2009. The full length reconstruction indicates statistically significant anomalous dry conditions during AD 900-1100 and circa-1800. An apparent prolonged wetter phase is estimated for the twelfth and thirteen centuries, whilst precipitation fluctuates between wetter and drier phases at near centennial timescales throughout the fourteenth to seventeenth centuries. Above average precipitation reconstructed for the twenty-first century is comparable with that reproduced for the 1600s. The main estimated wet and dry phases reconstructed here appear largely coherent with an independent tree-ring reconstruction for southern-central England.

Files

[EastAnglia2.zip](#) - Contains supplementary information, input data files and output values.

Amendment record

- 2012-11-07 Files placed online