

Reconstructing a multi-centennial drought history for the British Isles

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The last two decades have witnessed some of the most severe droughts experienced within living memory in the UK, but have these droughts really been exceptional? Relatively few instrumental river flow, groundwater or reservoir series extend beyond 50 years in length, with few precipitation series currently available extending over 100 years. These relatively short series present considerable challenges in determining current and future drought risk, with the results affecting society and the economy.

This study uses long instrumental precipitation series coupled with the SPI and scPDSi drought indices to reconstruct drought histories from different parts of the British Isles. Existing long precipitation series have been reassessed and several new precipitation series reconstructed (e.g. Carlisle 1757), with eight series now over 200 years in length, and a further thirteen over 150 years, with further sites currently being developed (e.g. Norwich, 1749-; Exeter, 1724-).

This study will focus on the eight longest series, with shorter series used to help explore spatial and temporal variability across British Isles. We show how historical series have improved understanding of severe droughts, by examining past spatial and temporal variability and exploring the climatic drivers responsible. It shows that recent well documented droughts (e.g. 1976; 1996 and 2010) which have shaped both public and water resource managers' perceptions of risk, have historically been exceeded in both severity (e.g. 1781) and duration (e.g. 1798-1810); with the largest droughts often transcending single catchments and affecting regions. Recent droughts are not exceptional when considered within a multi-centennial timescale, with improved understanding of historical events raising concerns in contemporary water resource management.