



UK Hydrological Droughts: how severe were historic events? Insights from a systematic event characterisation and ranking over the last 125 years

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Drought can occur in any climate zone (including the UK), and studies aiming to characterise and understand hydrological drought should utilise appropriate hydrological data (rather than, for example, rainfall data which best characterises meteorological drought). Although the UK has a dense flow gauging network, the majority of the river flow records begin in the 1960s. Yet, we know from individual long river flow records, regional reconstructions and qualitative data that severe hydrological droughts occurred in the late 19th and early 20th century. Until recently, it has not been possible to identify and characterise these hydrological droughts at the national scale.

Using a new dataset of daily river flow reconstructions dating back to 1891, it has been possible to identify, characterise and rank hydrological drought events nationally. Drought events were systematically identified using the Standardised Streamflow Index (using accumulation periods of 3 and 12 months) for 108 near-natural catchments across the UK from 1891 to 2015. Events were then characterised and ranked according to four characteristics: duration, accumulated deficit, mean deficit and maximum intensity.

The results provide an unparalleled account of hydrological droughts in the UK, their characteristics according to different measures of severity and their relative ranking. This enables a comparison of recent events to those outside of the observed record, as well as shedding light on the poorly documented events of the late 19th and early 20th century. This extended understanding based on an objective identification protocol over ~125 years, provides vital information: informing the planning and management of future events; aiding the development of scenarios beyond those observed; and providing benchmarks against which current and future events can be compared.