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Changes in heat waves in Ireland

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Long-term air temperature series are crucial for examining modern climate warming within a historical context and assessing changes in the frequency, duration, intensity, and distribution of extreme air temperature events. This knowledge is crucial for reducing vulnerability, enhancing resilience, and mitigating the impact of future events in the context of climate change, as part of climate adaptation and mitigation policies.

Environmental impacts during heat wave events include increased water consumption and water shortages (which are exacerbated when coupled with drought events), higher energy demand, crop failures, heat stress in cattle, and an increased risk of wildfires.

Ireland has a rich historical record of daily maximum and minimum air temperature observations dating back to the 19th century. The objectives of this research were to assess the magnitude and statistical significance of trends at the station level and for Ireland in the number, frequency, intensity, magnitude, and duration of heat waves for the period from 1885 to 2023. This assessment was based on long-term, quality-controlled, and homogenised air temperature series and employed a range of definitions. Long-term trends in the timing of events, accounting for changes in start and end dates, were assessed.

This presentation will highlight methodologies for heat wave indices and statistical methods, present and discuss the results.

Upward trends were identified in the number of heat waves, indicating that heat waves have become markedly more common over time at most stations. The number of days contributing to heat waves has increased markedly. The longest heat wave of each year has become markedly longer across nearly all sites. Several stations show significant increases in the probability of experiencing a heat wave.

Heat waves have become longer and more seasonally extensive, beginning earlier and persisting later into the year. This pattern indicates a progressive broadening of the period in which extreme heat events occur, consistent with a lengthening and intensifying warm season across stations.