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Analysing shifts in the timing of extreme dry spells at the global scale

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Dry spells are sequences of days without rainfall and can cause adverse consequences for the environment, economy and societies. Up until today, climate impact research has mainly focused on changes in the frequency of hydrometeorological extremes. Yet, the changes in the timing can pose a real threat, for example in agriculture. In this research, we analysed changes in the within-year timing of extreme dry spells using a consistent global land surface rainfall dataset, covering a period of 60 years, with main focus on the United States, Europe, China and Australia. Our method is based on a novel combination of weather generation techniques and statistical analyses, generally applicable to any rain gauge data. We contrast two thirty-year periods: 1956-1985 and 1986-2015. Our study reveals statistically significant shifts in the timing of extreme dry spells at about 40% of all rain gauge locations. Recognizable patterns exist in some regions, but the changes are generally characterized by a high spatial variability. Our study is a starting point for a better understanding of future challenges in risk management and disaster risk reduction due to changes in the timing of extreme events.