



Emerging trends in heavy precipitation and hot temperature extremes in Switzerland

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Changes in climate extremes have large socio-economic impacts and are of vital importance for an integrated climate risk management. We present changes in intensity and frequency of daily heavy precipitation and hot temperature in Swiss observations for the years 1901-2014/2015. A spatial pooling of temperature and precipitation stations is applied to analyse the emergence of trends. Over 90% of the series show increases in heavy precipitation intensity, expressed as annual maximum daily precipitation and in heavy precipitation frequency, expressed as the number of events greater than the 99th percentile of daily precipitation. The intensity of daily heavy precipitation sums increases on average by 7.7% K⁻¹ smoothed Swiss annual mean temperature, a value close to the Clausius-Clapeyron scaling. The hottest day and week of the year have warmed by 1.6 K to 2.3 K, while the Swiss annual mean temperature increased by 1.9 K. The frequency of very hot days exceeding the 99th percentile of daily maximum temperature has more than tripled. Despite considerable local internal variability, increasing trends in heavy precipitation and hot temperature extremes are now found at most Swiss stations. The identified trends are unlikely to be random and are consistent with climate model projections, with theoretical understanding of a human induced change in the energy budget and water cycle, and with detection and attribution studies of extremes on larger scales.