



Increased record-breaking precipitation events under global warming

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In the last decade record-breaking rainfall events have occurred in many places around the world causing severe impacts to human society and the environment including agricultural losses and floodings. There is now medium confidence that human-induced greenhouse gases have contributed to changes in heavy precipitation events at the global scale.

Here, we present the first analysis of observed extreme precipitation events using record statistics. We show that over the last three decades the number of record-breaking daily rainfall events has significantly increased in the global mean. This increase leads to an average of 12% more rainfall records over 1981-2010 compared to those expected in stationary time series. The number of rainfall records peaked in 2010 with an estimated 26% chance that a new rainfall record is due to long-term climate change. This increase in record rainfall is explained by a statistical model which accounts for the warming of air and associated increasing water holding capacity only.

Our results suggest that whilst the number of rainfall records can be related to natural multi-decadal variability over the period from 1901 to 1980, rising temperatures have significantly contributed to the observed increase in rainfall records afterwards.