

# Statistically linking extreme precipitation to global warming

24 September 2013

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Extreme rainfall can have serious effects on societies and ecosystems. Increases in extreme precipitation events are predicted to occur as Earth's climate warms, in part because warmer air has greater capacity to hold moisture, leading to more precipitation in a warmer climate. However, directly attributing changes in rainfall to global warming is difficult because climate models have limited precisions and because extreme events are rare and occur at irregular intervals.

To put that link on firmer footing, Benestad used a statistical analysis to determine whether extreme precipitation is related to global mean temperatures. The author used an empirical relationship, showing that daily rainfall amounts follow an exponential distribution, to determine that slow variations in the observed heavy precipitation events (the wet day 95th percentile) on a global scale follow the changes in the global mean temperature.

Using this relationship, the author conducted a multiple regression analysis on [rain gauge](#) data and global surface air temperature data to show statistically that recent trends in wet day 95th percentile precipitation amounts are influenced by global mean temperatures.

**More information:** Association between trends in daily rainfall percentiles and the global mean temperature, *Journal of Geophysical Research-Atmospheres*, DOI: [10.1002/jgrd.50814](https://doi.org/10.1002/jgrd.50814), 2013  
<http://onlinelibrary.wiley.com/doi/10.1002/jgrd.50814/abstract>

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