

# Rules of thumb for climate change turned upside down

September 14 2014

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Clouds over Australia are shown. Credit: NASA

With a new analysis of land regions, ETH climate researcher are challenging the general climate change paradigm that dry regions are getting drier and wet regions are getting wetter. In some regions they are encountering divergent trends.

Based on models and observations, [climate scientists](#) have devised a simplified formula to describe one of the consequences of [climate change](#): regions already marked by droughts will continue to dry out in

the future [climate](#). Regions that already have a moist climate will experience additional rainfall. In short: dry gets drier; wet gets wetter (DDWW).

However, this formula is less universally valid than previously assumed. This was demonstrated by a team of ETH climate researchers led by Peter Greve, lead author of a study recently published in *Nature Geoscience*. Traditional analyses use metrics that can comprehensively describe climate characteristics above the ocean, but is problematic over land. While this fact was mentioned in said studies, scientific and public discourse has overlooked this aspect so far. In their new study, the ETH researchers in the group headed by Sonia Seneviratne's, professor for land-climate dynamics, take into account the specific climatic properties of land surfaces, where the amount of available water is limited when compared with the ocean.

In their analysis, the climate scientists made use of measured data compiled solely on land, such as rainfall, actual evaporation and potential evaporation. The data derived from various sources was combined by Greve and his co-authors – this allowed them to extract trends in terms of a region's humidity and dryness. Furthermore, the researchers compared data from between 1948 and 1968 and 1984 to 2004.

## **Half of the surface areas show divergence**

The evaluation shows no obvious trend towards a drier or wetter climate across three-quarters of the land area. There are solid trends for the remaining quarter. However, only half of this surface area follows the DDWW principle, i.e. one-eighth of the total landmass, while the trends seem to contradict this rule over the other half.

Some regions which should have become wetter according to the simple DDWW formula have actually become drier in the past – this includes

parts of the Amazon, Central America, tropical Africa and Asia. On the other hand, there are dry areas that have become wetter: parts of Patagonia, central Australia and the Midwestern United States.

Nevertheless, the 'wet gets wetter' rule is largely confirmed for the Eastern United States, Northern Australia and northern Eurasia. 'Dry gets drier' also corresponds to indications in the Sahel [region](#), the Arabian Peninsula and parts of Central Asia and Australia.

However, the DDWW principle does still applies to the oceans. "Our results emphasise how we should not overly rely on simplifying principles to asses past developments in dryness and humidity," Greve explains. This can be misleading, as it cannot do justice to the complexity of the underlying systems.

**More information:** Greve P, Orlowsky B, Müller B, Sheffield J, Reichstein M, Seneviratne SI. Global assessment of trends in wetting and drying over land. *Nature Geoscience*, Advanced Online Publication 14th September 2014. [DOI: 10.1038/ngeo2247](https://doi.org/10.1038/ngeo2247)

Provided by ETH Zurich

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