

New study of storm generation could improve rainfall prediction in West Africa

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A new study of how storms are generated could improve rainfall prediction in dry regions of Africa, where drought and short growing seasons are common.

A team of scientists from the UK, France and Australia used [satellite observations](#) of the Sahel region of [West Africa](#) to demonstrate that brief changes in soil moisture over areas of just tens of kilometres can affect storm generation. The results are published online in *Nature Geoscience* on 12 June 2011.

The monsoon can arrive abruptly in the Sahel and the relative timing of planting and the starts of the wet season can mean the difference between a good crop and no crop at all. Better predictive modelling could make a huge difference to the people for whom the rains can be a matter of life or death.

The researchers used high-resolution satellite images -- taken every 15 minutes at a scale of a few kilometres -- to study storm generation on every day of the 2006-2010 wet seasons. They analysed 3765 storms across a region of around 2.5 million km, to see how often, when and where [convection](#) ([cloud formation](#)) was triggered.

Lead author Dr Chris Taylor from the UK's Centre for Ecology & Hydrology said, "Rainfall is difficult to predict, particularly in regions such as the Sahel where huge storms can grow from nothing in a matter of hours. We found that areas with contrasting soil moisture play an important role in the creation of new storms, a factor not accounted for in current climate models. Our study shows that this effect is important for typically 1 in 8 storms, in a region particularly prone to droughts and associated crop failures."

The study concludes that rain storms are twice as likely to form over strong gradients in soil moisture compared with uniform [soil-moisture](#) conditions.

Dr Taylor added, "By exploiting data from satellites, we hope to be able to improve model predictions of both weather and future climate."

Co-author Dr Phil Harris, also from the Centre for Ecology & Hydrology, said, "Because this dataset is much larger than those from previous studies and covers several years we're much more confident of the results. Now that we can quantify this process, and give the climate models the right conditions to work with, they are more likely to initiate the storms in the right places."

More information: Frequency of Sahelian storm initiation enhanced over mesoscale soil-moisture patterns, *Nature Geoscience* [DOI: 10.1038/ngeo1173](#)

Provided by Centre for Ecology & Hydrology

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