Tropical rainfall and sea surface temperature link could improve forecasts

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Tropical rainfall, averaged on seasonal time scales, is influenced far more strongly by nearby sea temperatures in the real world than in almost all climate simulations, scientists have found, paving the way for

more accurate global weather forecasts.

A team led by Peter Good at the Met Office and including the University of Reading studied the effect of tropical sea surface temperatures and resulting wind patterns on seasonal rainfall in the region by filtering out other influences, revealing a stronger relationship in the real world than that simulated by 43 of 47 climate models studied.

The study, published in *Nature*, used new analysis of satellite observations and other meteorological data and also found that important low-altitude wind patterns in the wider tropical region were stronger than most models simulate. Deficiencies in the simulation of low-altitude cloud cover were highlighted as a potential cause of these discrepancies.

Weather and climate patterns in the tropics are known to have a knock-on effect on weather thousands of miles away. This means that the findings could help improve seasonal weather forecasts for Europe, as well as longer-term climate predictions.

Dr. Chris Holloway, a tropical weather researcher at the University of Reading, said: "Global weather and climate models continue to have errors in simulating and predicting tropical rainfall patterns. Limited quality measurements of tropical rainfall and atmospheric circulation have also made it difficult to understand and rectify these errors. In our study, we were able to filter out interactions between remote regions to focus on the relationship between sea surface temperatures, rainfall and tropical winds within a particular region, showing us how much the models are underestimating the increase of rainfall that accompanies a warmer sea surface temperature. Resolving these discrepancies between models and the real world can make a big difference to how accurately we can predict the weather or how much confidence we have in projections of regional climate change in the future."

More information: Peter Good et al. High sensitivity of tropical precipitation to local sea-surface temperature, *Nature* (2020). DOI: 10.1038/s41586-020-2887-3

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