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## Study: Climate change models overstate droughts

By Dan Vergano, USA TODAY

There will be more flooding and less drought than has been forecast in widely used projections of global warming, according to a new study.

The study using measurements taken by NASA weather satellites compared ocean rainfall from 1987 to 2006 to earlier climate model projections of what that precipitation would be. The models, based on physics equations, were found to be off the mark, according to the study released Thursday by the journal *Science*.

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"The increase in global rainfall associated with global warming may be three times greater than currently predicted," says study lead author Frank Wentz of Remote Sensing Systems (RSS) in Santa Rosa, Calif.

In the last century, temperature records indicate average surface temperatures have risen roughly 1 degree, with a bigger increase, perhaps 3 to 7 degrees, projected by 2100.

Global warming has become a hot scientific and political issue, focusing attention on the release of greenhouse gases, which retain heat in the atmosphere. Such gases include carbon dioxide, released when coal, oil and natural gas burn.

Projections have suggested that rainfall will rise in coming decades, but not as fast as temperature, leading to drier days and droughts worldwide. In February, the Intergovernmental Panel on Climate Change (IPCC) cited studies showing "extreme drought increasing from 1% of present-day land area to 30% by the end of the century."

The new study suggests models are flawed, underestimating how increased humidity in a warmer climate produces more rain clouds, Wentz said by e-mail.

The February IPCC report said global warming makes it "very likely" that storms bringing heavy rains will occur more often in coming decades. The satellite study shows rainfall falling in patterns that mirror IPCC projections, but in greater amounts.

That finding "will help us to improve the models," says Gerald Meehl of the National Center for Atmospheric Research in Boulder, Colo. "That's how climate science is supposed to work."

Meehl, who co-led the IPCC report chapter looking at precipitation and drought, cautions that the satellite study only measured ocean rainfall, estimating precipitation over land. He adds that 20 years is a relatively short time period for testing rainfall.

In 2005, RSS showed that climate model predictions of man-made temperature increases closely match satellite records. Last year, for example, climate scientist James Hansen of NASA's Goddard Institute for Space Studies showed in a *Proceedings of the National Academy of Sciences* report that temperature increases over the past two decades closely track a 1988 projection.

The new findings suggest climate modelers are overstating how much rainfall will dry up in a warmer climate, says Wentz. "With respect to severe weather events like hurricanes, I am not sure what the implications are. But this much more rain worldwide could certainly pose one of the most serious risks (from flooding) associated with climate change," he says.

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