

Climate change and the South Asian summer monsoon

June 24 2012



This shows the approaching monsoon rain. Credit: Gisela E. Speidel, International Pacific Research Center

The vagaries of South Asian summer monsoon rainfall impact the lives of more than one billion people. A review in *Nature Climate Change* (June 24 online issue) of over 100 recent research articles concludes that with continuing rise in CO₂ and global warming, the region can expect generally more rainfall, due to the expected increase in atmospheric moisture, as well as more variability in rainfall.

In spite of the rise in atmospheric CO₂ concentration of about 70 parts per million by volume and in [global temperatures](#) of about 0.50°C over

the last 6 decades, the All India Rainfall index does not yet show the expected increase in rainfall. The reviewers Andrew Turner from the Department of Meteorology at the University of Reading and H. Annamalai from the International Pacific Research Center at the University of Hawaii at Manoa give several reasons for why the region's observed rainfall has not yet increased, among them are inconsistent rainfall observations, decadal variability of the monsoon, the effects of aerosols resulting from industrialization, and land-use changes.

Regional projections for devastating droughts and floods--which are most meaningful for residents living in South Asia-- are still beyond the reach of current climate models, according to the reviewers' detailed analyses of the present state of research. The authors conclude that in order to make regional projections that can help in disaster mitigation and in adapting to [climate change](#), the following is needed: establishing more consistent rainfall datasets by expanding observations to include, for example, agricultural yield; a better grasp of the complicated thermodynamics over the monsoon region and of the interactions among [monsoon rainfall](#), land-use, aerosols, CO₂, and other conditions; and an evaluation in coupled circulation models (which allow feedbacks among variables) of those processes that have been shown in simpler models to affect the monsoon and rainfall.

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