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# Impact of atmospheric moisture on Indian monsoon rainfall variability

The study reveals the importance of atmospheric moisture such as vertically integrated moisture flux, its divergence and precipitable water content on the changes in Indian rainfall. The analysis is carried out using the India Meteorological Department gridded rainfall measurements made from rain gauges installed at different places in India. The moisture flux is analyzed using the zonal and meridional wind components and specific humidity data taken from the National Center for Environmental Prediction and National Center for Atmospheric Research reanalysis. The result shows a strong evidence that the variability of Indian rainfall is largely controlled by the amount of moisture and its transport. The regression analyses with the moisture-related parameters, over the moisture source regions, could explain about 59 % of regional rainfall variability. This is an important finding as no other local or global factor could explain more than 40 % of Indian rainfall variability. The regression models could also reproduce most weather extreme events such as the drought of 2002 and 2004. Henceforth, this study demonstrates the significance of moisture content and its transport on regional rainfall distribution, and recommend that these parameters can be used in both statistical and dynamical models to better predict monsoon.

**Author:** R G, Prijitha (School of Sciences, JAIN (Deemed-to-be) University)

**Presenter:** R G, Prijitha (School of Sciences, JAIN (Deemed-to-be) University)

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