



Warm Indian Ocean, Weak Asian Monsoon

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There are large uncertainties looming over the status and fate of the South Asian monsoon in a changing climate. Observations and climate models have suggested that anthropogenic warming in the past century has increased the moisture availability and the land-sea thermal contrast in the tropics, favoring an increase in monsoon rainfall. In contrast, we notice that South Asian subcontinent experienced a relatively subdued warming during this period. At the same time, the tropical Indian Ocean experienced a nearly monotonic warming, at a rate faster than the other tropical oceans.

Using long-term observations and coupled model experiments, we suggest that the enhanced Indian Ocean warming along with the suppressed warming of the subcontinent weaken the land-sea thermal contrast throughout the troposphere, dampen the monsoon Hadley circulation, and reduce the rainfall over South Asia. As a result, the summer monsoon rainfall during 1901-2012 shows a significant weakening trend over South Asia, extending from Pakistan through central India to Bangladesh.