Offset effects of continued Indian Ocean warming and recent Pacific cooling on the Asian monsoon

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Recent research indicates that the cooling trend in the tropical Pacific Ocean over the past 15 years underlies the contemporaneous hiatus in global mean temperature increase. During the hiatus, the tropical Pacific Ocean displays a La Niña-like cooling pattern while sea surface temperature (SST) in the Indian Ocean has continued to increase. This SST pattern differs from the well–known La Niña-induced basin-wide cooling across the Indian Ocean on the interannual timescale. Based on model experiments, we show that the SST pattern during the hiatus explains pronounced regional anomalies of rainfall in the Asian monsoon region and thermodynamic effects due to specific humidity change are secondary. Specifically, Indo–Pacific SST anomalies cause convection to intensify over the tropical western Pacific, which in turn suppresses rainfall in mid–latitude East Asia through atmospheric teleconnection. Overall the tropical Pacific SST effect opposes and is greater than the Indian Ocean SST effect.

Key words: climate hiatus, monsoon rainfall, PDO, teleconnection, subsurface SWT