

Indian Continental Rainfall and Indian Ocean SST

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We here explore the spatial structure of the interannual variability of southwest monsoon precipitation over the Indian subcontinent, based on gridded precipitation over the period 1982-2001, and its association to Indian Ocean sea surface temperature anomaly (SSTA) structures. We find that India is dominated by two independent regions of strong mean and variance in precipitation: the Western Ghats and the central plains region.

We explore statistical relationships of precipitation anomaly in these two regions and All-India Rainfall, with SSTA in the Indian Ocean. We are able to find strong ($r \sim 0.6-0.7$) simultaneous and lead correlations between distinct Indian Ocean SSTA patterns and precipitation anomaly in the two regions, but do not find similarly strong connections with All-India rainfall. June through September (JJAS) Western Ghats precipitation (WGP) is positively correlated with JJAS western Arabian Sea SSTA, and July through September (JAS) WGP is positively correlated with June western Arabian Sea SSTA. Meanwhile, JJAS Central Plains precipitation (CPP) is negatively correlated with JJAS SSTA off the coasts of Sumatra and Java, and JAS CPP is negatively correlated with June Sumatra and Java SSTA. We are also able to find significant correlations ($r \sim 0.5-0.7$) at longer leads, in which JJAS WGP is positively correlated with SSTA in the southwest Indian Ocean in the previous northeast monsoon, and JJAS CPP is negatively correlated with SSTA in the southern Indian Ocean.

The correlations between each regional precipitation index and SSTA provide stronger statistical connections than examining the Indian subcontinent as a whole. These statistical connections could possibly be used in the statistical prediction of Indian southwest monsoon precipitation. Further, examination of the dynamics controlling interannual precipitation variability in the Indian subcontinent should likely be explored independently for each of these two regions, rather than for the Indian subcontinent as a whole.