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Role of spatial covariance in regulating interannual variability of Indian Summer Monsoon rainfall

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The interannual variability (IAV) of All India summer rainfall (AIMR) is low, with a Coefficient of variation (COV) around 9% of the long-term mean. Though regulated by global and regional sea surface temperatures, we explore the cause of low COV of AIMR due to the spatial distribution of rainfall. We find that the variability of AIMR is affected by the spatial covariance between the subregions with different rainfall characteristics, such as the arid western and wet northeast regions. By removing regions, one at a time, from the Indian region, we find that COV increases after removing the Northeast (NE) region due to negative covariance between NE and other sub-regions of India, especially Central India (CI). Further research is ongoing to explore the moisture distribution over the subregions and understand the negative covariance using a moisture tracking algorithm. We plan to investigate the contributions to rainfall distribution from oceanic and terrestrial sources. This study may reveal how the spatial distribution of rainfall influences the IAV of AIMR, emphasizing the significance of terrestrial and oceanic moisture contributions.