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The Dominant Modes of Recycled Monsoon Rainfall over India

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This study estimates the seasonal mean (June to September) recycled rainfall and investigates its dominant modes of variability over the continental regions of the Indian summer monsoon. A diagnostic method based on the basic atmospheric water vapor budget equation is employed in order to bifurcate the observed rainfall into recycled and advected components.
The global teleconnections with the recycled (advected) rainfall is found to be weak (strong), which is consistent with the basic assumptions of the sources of atmospheric water vapor. It is shown that the mean recycled rainfall over the Gangetic plain, central India and western Himalaya varies between 10-40% of the total rainfall. While EOF1(38.5%) of the recycled rainfall reveals co-variability between the regional and external influences, EOF2(14%) shows a mode independent to the external influences (i.e. advected rainfall), prevailing over the Gangetic plain. Furthermore, a strong decreasing trend in PC2 over the last 36 year suggests a change in the local feedback (land, atmosphere), which in turn may have also contributed to the decreasing trend in the observed monsoon rainfall over central and northern India.