



## **Poleward shift in Indian summer monsoon low level jetstream under global warming**

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The low level jetstream (LLJ) transports moisture from the surrounding Oceans to Indian land mass and hence an important component of the Indian summer monsoon (ISM). Widening of tropical belt and poleward shifts in mid-latitude jetstreams have been identified as major impacts of global warming on large-scale atmospheric dynamics. A general northward shift in ISM circulation has been suggested recently, based on the Coupled Model Intercomparison Project (CMIP5) simulations. Here, we investigate the current and projected future changes in LLJ in observations as well as the coupled model (CMIP3/CMIP5) simulations. A poleward shift in the monsoon LLJ has been detected both in the observations and coupled model simulations. The poleward shift is also reflected in the future projections in a warming scenario, with the magnitude of shift depending on the degree of warming. Consistent with the LLJ shift, a drying (wet) trend in the southern (northern) part of the western coast of India is also observed in the last three decades. Further analysis reveals that enhanced land-sea contrast resulted in a strengthening of the cross-equatorial sea level pressure gradient over Indian Ocean, which in turn resulted in the northward shift of the zero absolute vorticity contour from its climatological position. The poleward shift in zero absolute vorticity contour is consistent with that of LLJ core (location of maximum low-level zonal winds). Possible uncertainties in the results are discussed in the context of known model biases and ensemble sample sizes. These results assume significance in the context of the concerns over ecologically fragile Western Ghats region in a warming scenario.