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Why precipitation increased in the Qiangtang Plateau since the middle of the 1990s

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The Qiangtang Plateau basin is a closed area in the centre of the Tibetan Plateau (TP) where there are many lakes. Because human activities in the basin are rare, the lake area variability act as a unique indicator for climate change. Previous studies have found that the lakes have been expanding dramatically since the middle of 1990s, and increase in precipitation is the main cause. To understand why precipitation increased during the last two decades, the Global Precipitation Climatology Centre (GPCC) precipitation data and ERA-interim reanalysis were used to analysis the change in water vapor flux (WVF).

The results show that the convergence of the water vapor increased significantly after 1990s in the Qiangtang Plateau.

Composite analyses of the abnormal atmospheric circulation in wet and dry years indicate that a pair of cyclonic and anticyclonic circulation anomalies in the western TP strengthened the westerly. Meanwhile, the anticyclonic circulation anomaly over Siberia weakened the westerly in the eastern TP. The southerly monsoon flow from the Bay of Bengal increased simultaneously. Those three factors lead to the enhancement of WVF convergence in Qiangtang TP eventually.

The results of the Ensemble Empirical Mode Decomposition (EEMD) of the Qiangtang Plateau's precipitation series show that the interannual variability in precipitation is closely related to the ENSO and the Siberian High index, and its decadal change has a good correlation with Atlantic Multi-decadal Oscillation (AMO), suggesting that the change in AMO may be attributed to the increase in precipitation in the Qiangtang Plateau.

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