



## **Elevation-dependent changes in summer precipitation over and around the Tibetan Plateau**

Lei Wang (1,2,3) and Xiuping Li (1)

(1) Institute of Tibetan Plateau Research, Chinese Academy of Sciences, Beijing, China (wanglei@itpcas.ac.cn), (2) CAS Center for Excellence in Tibetan Plateau Earth Sciences, Beijing, China, (3) University of Chinese Academy of Sciences, Beijing, China

The Tibetan Plateau (TP) experienced a rapid warming and wetting in recent decades. The elevation dependence of warming rate has been established, while the question of trend in precipitation against the elevation gradient remains open. By using the in situ observation of precipitation, air temperature, and surface specific humidity from 91 stations over and around the TP, this study investigated how the trends in summer precipitation varied along the elevation gradient over and around the TP during the period 1970–2014. The major findings are as follows: (1) the trends in summer precipitation from 1970 to 2014 displayed an increasing tendency at a rate of 0.83% decade.<sup>-1</sup> km.<sup>-1</sup> with the increased elevation, and the rate for 1991–2014 (2.23% decade.<sup>-1</sup> km.<sup>-1</sup>) is even greater and (2) the temporal trends in surface air temperature, surface specific humidity (surface water vapour) from in situ observations and total column of water vapour from Japanese 55-year reanalysis (JRA-55) data overmost stations consistently display similar elevation dependence, which provides a plausible explanation for the elevation dependence of the summer precipitation trends based on the Clausius–Clapeyron relationship. The large-scale atmospheric circulations are other possible factors influencing the elevation dependence of summer precipitation trends, which needs further investigations.