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Differences in moisture sources of precipitations over the northern and southern Tibetan Plateau

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The northern and southern Tibetan Plateau (NTP and STP) show different trends in precipitation, with the NTP precipitation increasing significantly, and no apparent or an insignificant negative trend in STP. This suggests different mechanisms in influencing precipitations over the two regions. By applying WAM2Layers, atmospheric data from ERA-Interim, and two sets of evaporation and precipitation, moisture sources of precipitations for the two regions were tracked. The results show that for NTP, both the northwest (moisture transported by the westerlies) and southeast (moisture transported by the Asian monsoons) to NTP are major moisture source regions for the NTP precipitation, with the southeast contributes a bit more. Moisture contribution from the northwest decreases insignificantly, while that from the southeast increases markedly and significantly, which results in an overall increase in moisture supply for the NTP precipitation. For STP, moisture of precipitation mainly comes from the southeast which contributes more than 2 times of moisture than that by the northwest. Both experiments suggest a stronger decrease in moisture from the northwest and a weaker increase from the southeast, which results in a negligible or negative trend in overall moisture contribution. Changes in moisture circulation for NTP and STP both show weaker moisture transport by the westerlies and stronger transport by the Asian monsoons, which are consistent with changes in moisture contribution of different areas. However, the Indian subcontinent, where moisture is transported by the Indian summer monsoon, decreasing in moisture contribution for STP, adds to the complexity of moisture source-sink relationships.