



## **Observed surface and upper-air wind speed changes over China since 1960**

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Previous studies indicated that surface wind speed over China became weakening during past decades, and several explanations exist in the literature. This study presents the longer-term (1960-2009) changes of both surface and upper-air wind speed as well as observed surface and upper-air evidences accounting for the wind speed change. According to our analyses, the surface wind over China underwent a three-phase change during the past 50 years: strengthened before 1974, then weakened till 2002, and turned to be steady during recent years. The variability of surface wind speed is greater at higher elevations and less at lower elevations. Accordingly, surface wind speed over the elevated Tibetan Plateau has changed more rapidly during both the strengthening and the weakening phases, and turned to be increasing during recent years. The upper-air wind speed changes observed from rawinsonde was similar to surface wind change. Both radiosonde data and NCEP/NCAR reanalysis data indicate that the wind speed changes are consistent with the changes in geopotential height gradients at 500 hPa surface. Based on all these analyses, the background of adjustment of general circulation to pressure gradient force was regarded as the main cause of the changes in surface wind speed in China most likely. The recovery of wind speed over the Tibetan Plateau might be a precursor of the reversal of wind speed trend over China, as the Plateau can respond more rapidly to the atmospheric circulation change.