



Elevation-dependent reductions in wind speed over and around the Tibetan Plateau

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The Tibetan Plateau (TP) affects its surroundings significantly through thermal and dynamic processes. Reductions in near-surface wind speed (W_s) have been observed from ground measurements but how the trends of W_s vary with the elevation is less clear. Using long-term daily records (1970–2012) of W_s and maximum (T_{max}), minimum (T_{min}), and mean (T_{mean}) air temperatures from 139 stations over and around the TP, trends of W_s with respect to elevation were investigated. The major findings are as follows. (1) Pronounced reductions in W_s can be observed in all seasons and annually across the TP, and spring demonstrates the most prominent weakening. The rate of reductions in W_s was amplified with elevation, and higher-elevation environments experienced greater changes in W_s than lower-elevation areas. Elevation-dependent reductions in W_s have become enhanced from 1970 to 2012. (2) Statistically significant negative correlations between W_s and corresponding near-surface temperatures were detected. We suggested that the elevation dependent warming and thereby the increased surface roughness at higher-elevation environments may contribute to the elevation dependent reductions in W_s over and around TP. More detailed mechanisms causing this pattern are to be further explored.