

Orographically-anchored El Niño effect on summer rainfall in the mountainous regions to the east of Tibet

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Year-to-year variations in summer precipitation have great socioeconomic impacts on China. Historical rainfall variability over China is investigated using a newly released high-resolution dataset. The results reveal summer-mean rainfall anomalies associated with ENSO that are anchored by mountains in central China east of the Tibetan Plateau. These orographically-anchored hot spots of ENSO influence are poorly represented in coarse-resolution datasets so far in use. In post-El Niño summers, an anomalous anticyclone forms over the tropical Northwest Pacific, and the anomalous southwesterlies on the northwest flank cause rainfall to increase in mountainous central China through orographic lift. At upper levels, the winds induce additional adiabatic updraft by increasing the eastward advection of warm air from Tibet. In post-El Niño summers, large-scale moisture convergence induces rainfall anomalies elsewhere over flat eastern China, which move northward from June to August and amount to little in the seasonal mean. Our results suggest that summer flooding risks are likely to increase in mountainous regions east of Tibet as climate warms.