



The characteristics and mechanisms of persistent temperature inversions in the U.S. Intermountain West

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During winter season, temperature inversions may last from one day to more than ten days in valleys and basins in the Intermountain West of the United States. The strong static stability, together with low wind speeds, may severely limit atmospheric dispersion and result in high air pollution. To understand the climate characteristics of these persistent temperature inversions and the large-scale atmospheric conditions accompanying these episodes, we have performed climatological analyses using a combination of twice-daily rawinsonde soundings and gridded North American Regional Reanalysis (NARR). The analyses reveal the general characteristics, such as the depths, strengths, and lengths, of these persistent temperature inversion episodes. The results also reveal the typical atmospheric conditions accompanying these episodes including surface heat and moisture fluxes and cloudiness, and changes in 500 hPa geopotential heights and upper-level winds. The multi-decadal data allow for i) the calculation of frequency of their occurrence, ii) an examination of the interannual variability and its relationship to the variability of large-scale circulation patterns, and iii) a determination of whether there exist any linear trends in the frequency of their occurrence.