

# **Abrupt decrease in winter cold nights in Korea in the late 1980's**

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Because of vulnerability of human society and ecosystems to climate extremes, it is important to better understand the properties of climate extremes and the related dynamics. Here, we investigate the characteristics and long-term trends of extreme temperature events in Korea and their relationships with large-scale climate variability. Both cold nights (TN10p) and warm days (TX90p) in winter are examined for 11 stations of Korea for the period of 1960-2010. It is found that the frequency of TN10p abruptly decreased in the late 1980's, while essentially no change is observed in TX90p. This step-wise change in TN10p frequency mainly results from the reduction in persistent events which have prolonged 3 days or longer. Despite of the frequency change, the intensity of TN10p shows no significant change. Similar results are also found from the Global Historical Climatology Network (GHCN) stations in China over the same time period, indicating that decadal variation in TN10p has likely occurred in regional scale over the Northeast Asia.

The TN10p events in Korea are commonly associated with anomalously high sea level pressure (SLP) over the Northern China and low SLP over the western North Pacific. This pattern is evident from 1960s' to 1980's. However, the influence of the latter, cyclonic circulation over the western North Pacific, becomes weaker in 1990's and 2000's. This result indicates that local and regional climate extremes are likely modulated by large-scale climate variability. In consistent with this finding, both the Arctic Oscillation (AO) and Western Pacific (WP) teleconnection indices show a distinguishable decrease in the late 1980's.

Key words: cold nights (TN10p), warm days (TX90p), Arctic oscillation, Western Pacific teleconnection