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# Warm and cold spells in Alaska and their synoptic background

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Air temperature increase during the last decades is especially pronounced over northern high-latitudes. Changes in mean temperature values entails altered frequency and/or intensity of extreme events like warm and cold spells. The aim of this study is to investigate spatial and temporal variability of summer (JJA) warm and winter (DJF) cold spells in Alaska during 1951–2015 and to determine the role of atmospheric circulation in their occurrence. The study was based on two independent sets of data. Daily maximum (TMAX) and minimum (TMIN) temperature values from six weather stations representing different climate regimes in Alaska were obtained from GSOD datasets shared by National Climatic Data Center. Additionally TMAX, TMIN, SLP and wind direction at 850 hPa level obtained from NCEP North American Regional Reanalysis were used. Unusually warm day (WD) was defined as having TMAX above 95th percentile and similarly, unusually cold day (CD) as having TMIN below 5th percentile. Percentiles were calculated for each calendar day using a centered 15-day-longtime window. Warm (cold) spell is an event lasting at least three consecutive WDs (CDs) during summer (winter). Temporal variability, spatial extent, temperature magnitude and duration of warm and cold spells in different parts of Alaska were characterized. To determine the synoptic conditions favoring their occurrence, SLP and wind direction at 850 hPa at the grid point located nearest to the considered station were analyzed. Obtained results confirm findings achieved so far for the region – the frequency of CDs and cold spells is decreasing, WDs and warm spells is increasing. Warm spells were most frequently connected with high pressure systems and inflow of air masses from the southern sector. Cold spells also occurred under the influence of anticyclones, but with an airflow from the northern sector.