CLIMATE – POSTER #19

Trends in surface air temperature and temperature extremes in the Great Basin during the 20th century from ground-based observations

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Key Points: Temperature trends in the Great Basin during the 20th century from observations

We analyzed trends in surface air temperature and temperature extremes in the Great Basin during 1901–2010. We found that annual average daily minimum temperature increased significantly (0.9 ± 0.2 °C) during the study period, with daily maximum temperature increasing only slightly. The asymmetric increase in daily minimum and maximum temperature resulted in daily diurnal temperature range (DTR) decreasing significantly from 1901 to 2010. Seasonally, increases in daily minimum temperature and decreases in DTR occurred in winter, summer and autumn but the speed was faster in winter. In contrast, daily maximum temperature showed no significant trend in any season. These trends in temperature measures, however, were not monotonic with decadal periods that included either reversal or acceleration of century-scale trends. The trend magnitudes in temperatures were not significantly associated with elevations. Increases in daily minimum temperature resulted in a decrease in the number of frost days (-0.14 ± 0.04 day yr^{-1}) and cool nights (-0.09 ± 0.04 night yr^{-1}) from 1901 to 2010, while the number of warm days (0.11 ± 0.04 day yr^{-1}) and warm nights (0.19 ± 0.03 night yr^{-1}) increased significantly. Surprisingly, the number of cool days and the length of the growing season showed no significant trend during the study period. Thus, the results of this study suggest that continuation of the overall warming trend would lead to markedly warmer conditions in upcoming decades.

Index Terms: climate change, temperature trend, temperature extremes, diurnal temperature range, growing season length, Great Basin