1. Background

The National Climatic Data Center’s (NCDC) gridded monthly climate data reported on the 2013-14 winter, defined as November 1 to March 31, as the warmest winter on record at 9.94°C, marked by a circle in Figure 1. However, UCLA’s California Surface Water Monitor (SWM) ranks the 2014 winter as the third warmest winter at 8.79°C, after 1934 and 1996; these three years are marked by a triangle in Figure 1. Figure 1 suggests that the difference in inferred long-term trends between the SWM and NCDC data sets may also be reflected in the relative magnitude of winter 2013-14 temperatures, which motivated us to examine several other data sets. In particular, we examine here the trends in six long-term data sets for California, and evaluate their estimates of winter 2013-14 and 2014-15 in an historical context.

2. Gridded Dataset Comparisons

The SWM gridded data were created by using the SYMAP algorithm of Shepard (1984); station data are used to find a long-term mean and resulting station anomalies. The station anomalies are then subtracted from the climatology of a published gridded data set, and the results are applied to a grid. The SWM winter average was constructed by taking an area-weighted average of daily data over the winter season. The data set grid encompasses the entire state of California. The NCDC, PRISM, BEST, and VOSE winter averages were compiled from the monthly statewide average values for minimum and maximum temperatures. The NCDC monthly averages can be obtained from the source Table 1. PRISM, BEST, and VOSE data were obtained from the Department of Civil and Environmental Engineering, University of Washington’s Earth Institute for providing the gridded data for PRISM, BEST, and VOSE.

3. Station Data Comparisons

We also retrieved the station data used to construct the SWM gridded fields as well as station data for the Historical Climatology Network (HCN). HCN is intended to be used for long-term trend analysis; it includes 54 stations in California. SWM uses 102 stations in California, which were selected on the basis of their record lengths, and their availability in near-real time. There are 21 stations in common between the two networks. We computed winter averages of daily temperature from all stations in both data sets. The HCN trend estimates are smaller for both minimum and maximum temperature; the maximum temperature trend is less than half that of SWM's.

4. Key Points

• All gridded datasets except SWM agree that 2013-14 was the warmest winter up to that year.
• SWM and NCDC agree that 2014-15 is the warmest winter of record.
• SWM reports the smallest trend in temperature time among the five gridded data sets.
• HCN indicates smaller trends for station averages than SWM.
• More information is needed about what stations are used in NCDC gridded data as well as interpolation methods to unravel the differences in trends.

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References: