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## Temperature Annual Cycle Variation and Response to Solar Radiation during 1960 to 2016 in China

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The change of its annual cycle is extremely important due to global warming. A widely used method to analyze the changes of temperature annual cycle is based on the decomposition to phase, amplitude and baseline terms. Solar radiation as the leading energy source of temperature changes can directly influence temperature annual cycle. In this study, we investigate the phase, amplitude and baseline of temperature and solar radiation annual cycle after Fourier transform during 1960-2016 in China. The results show that annual cycle of maximum, minimum and mean surface air temperature are advancing in time (-0.08, -0.27 and -0.33 days per ten years), decreasing in range (-0.07, -0.25 and -0.18 degrees per ten years) and rising in baseline (0.20, 0.34 and 0.25 degrees per ten years). To further quantify the effect of surface solar radiation to temperature, we remove the effect from its original time series of maximum and mean temperature, based on a linear regression. The compare of raw and adjusted temperature shows that surface solar radiation advancing the time by 0.19 and 0.19 days per ten years, reduces the range by 0.14 and 0.13 degrees per ten years, and reduces the baseline by 0.08 and 0.04 degrees per ten years, for surface maximum and mean daily air temperature. The result can explain parts of seasonal temperature variation. Effect of surface solar radiation is most obvious Yunnan-Guizhou Plateau for maximum phase. The low phase value in this area is corrected and well-match with other same latitude area after adjusted.