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## Remote Sources of Surface Temperature Cold Bias over the Tibetan Plateau: Role of Tropical SST Climatological Bias

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The surface temperature cold bias over the Tibetan Plateau (TP) is a long-lasting problem in both reanalysis data and climate models. While previous studies have mainly focused on local processes for this bias, the TP surface temperature is also closely related to tropical SST in both observations and Coupled Model Inter-comparison Project (CMIP5) models. This study investigates the role of tropical SST climatological bias in the TP surface temperature cold bias, and analysis of CMIP5 models suggests that the surface temperature cold bias over the TP is more obvious (about 4 K) in winter, with an east-west distribution pattern, than in summer (about 1 K), with a south-north distribution pattern. Considering that the tropical SST bias in CMIP5 models may be an important source of the TP surface temperature cold bias, a series of model experiments were conducted by the NCAR CAM4 to test the hypothesis. Model experiment results show that the tropical SST bias can reproduce cold bias over the TP, with 2 K in winter and about 0.5 K in summer. The mechanisms for TP surface temperature cold bias are different in winter and summer. In winter, tropical SST bias influences the TP surface temperature mainly by anomalous snow cover, while anomalous precipitation and clouds are more important for the temperature bias in summer.