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Oral
(Virtual Talk)
This paper presents a new idea that by minimizing spring land surface temperature/subsurface temperature (LST/SUBT) anomalies over the Tibetan Plateau (TP) to improve prediction of subsequent summer droughts/floods over several regions over the world. The work was performed in the framework of the GEWEX/LS4P Initiative. The LS4P Phase I experiment focused on whether the TP LST/SUBT provides an additional source for subseasonal-to-seasonal (S2S) predictability. The summer 2003, when there were severe drought/flood over the southern/northern part of the Yangtze River basin, respectively, has been selected as the focus case. Large biases in simulating the spring TP LST and regional summer wet/dry conditions by the LS4P-I Earth System Models were noticed
With the newly developed LS4P initialization method for TP land temperature (Xue et al., 2021), the surface temperature bias over the TP has been largely reduced in the LS4P-I model ensemble mean, and 8 hotspot regions in the world were identified where June precipitation is significantly associated with anomalies of May TP land temperature. Consideration of the TP LST/SUBT effect has produced about 25%-50% of observed precipitation anomalies in most hotspot regions. For comparison, the global Sea surface temperature (SST) effect has also been tested and 6 hotspot regions with significant SST effects were identified in the 2003 case, explaining about 25-50% of precipitation anomalies over most of these regions. This study suggests that the TP LST/SUBT effect is a first-order source of S2S precipitation predictability, and hence it is comparable to that of the SST effect.
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