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Impact of ENSO on the thermal condition over the Tibetan Plateau

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This study examined the relationship between the Tibetan Plateau (TP) thermal condition and El Niño and Southern Oscillation (ENSO). There were significantly positive correlations between the snow water equivalent (SWE) over TP from September to next April and the sea surface temperature (SST) in Eastern Equatorial Pacific (EEP) in September. SST in EEP in November is most significantly correlated with the TP-SWE in next April, which suggests an accumulative effect of the ENSO on the TP snow cover. Although El Niño condition could bring anomalous snowfall over TP by generating a wave train entering the North African-Asian jet, it is questionable if this impact could change the thermal condition over TP. There was almost no significantly negative correlation between the SWE and the TP surface temperature (representing TP thermal condition) in winter. This suggests that TP thermal condition hardly vary with the anomalous snowfall caused by this ENSO impact despite some cooling effect of snowfall during the El Niño phase. On the other hand, preceding El Niño condition tended to be associated with increasing TP surface temperature in May and there was significantly positive correlation between SWE in April and TP surface temperature in May and June. ENSO might play a part in affecting TP thermal condition in a way that is quite different from previous research. A plausible mechanism about the relationship of ENSO-TP thermal condition has been proposed. The mechanism explained the direct and indirect effect of ENSO on TP thermal condition and the role the seasonal progress can play on this relationship. The issues about snow cover aging and the impact of global warming etc. were also included in the mechanism.