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Multi-decadal variations of ENSO teleconnection over the U.S. during winter

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The impact of ENSO over the U.S. exhibits distinct multi-decadal variations during winter. Factors that contribute to these variations include variations in ENSO characteristics, and the modulation effects of the two leading slowly varying SST modes, identified as a Global Warming (GW) mode and a Pacific Decadal Variability (PDV) mode. The relative roles of these factors have been investigated from an atmospheric circulation perspective by using a stationary wave model and the NCEP/NCAR reanalysis data. Results show that during winter, both the GW and PDV modes, while in their positive (negative) phases, considerably weaken (strengthen) ENSO forced atmospheric circulation anomalies over the U.S., with the GW mode playing a more important role. While the transient anomalies play a key role in maintaining the atmospheric circulation anomalies associated with ENSO over the North America, the multi-decadal variation of ENSO associated diabatic heating anomalies is more important in explaining the multi-decadal change of the ENSO teleconnection over the U.S. during winter.