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Title: A study of the impacts of late spring Tibetan Plateau snow cover on Chinese early autumn precipitation

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Abstract:

Maximum covariance analysis is utilized to study the impacts for Tibetan Plateau (TP) snow cover on the Chinese precipitation. The results show that there is a significant correlation between early autumn (ASO) Chinese precipitation and preceding TP snow cover. A strong pattern with lead positive snow cover anomalies over western TP signifies enhanced ASO rainfall over Yangze River basin and south China, and reduced rainfall over southeast coastline of China. ^M

^M

Maximum response estimation and diagnostic analyses are utilized to investigate the impacts of Tibetan Plateau snow cover on Chinese precipitation and the possible mechanism. The results indicate that positive early spring snow cover anomalies in TP can persist to summer, and modify the surface thermal conditions, which results in weak South Asian High with the disturbance propagating downstream along the westerly jet through Mongolia to Japan. Another wave train propagates along the lower southwest airflow through Bengal Bay to the South China Sea, which leads to the low-level anti-cyclonic circulation over Taiwan. The southerly flow to the west of the anti-cyclonic anomalous circulation strengthens abundant moisture transport from the South China Sea to Southern China, meanwhile, the northerly flow to the northwest of the upper-level cyclonic anomalous circulation over Japan contributes the southward moving of synoptic disturbances from the north. Both conditions lead to more rainfall in central and southern China. The stationary wave number is calculated, which reveals that as waveguides, the high-level westerly jet and the low-level southwesterly monsoon flow can contribute to the eastward propagation of disturbances over TP. The positive anomalies of geopotential height over the east coastline, accompanying with the low-level anti-cyclonic anomalous circulation suppress the rainfall along southeast coast. ^M

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