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# Impact of Eurasian spring snow decrement on East Asian summer precipitation

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In this study, the relationship between Eurasian spring snow decrement (SSD) and East Asian summer precipitation and related mechanisms were investigated using observational data and the Community Atmospheric Model version 3.1 (CAM3.1). The results show that a west-east dipole pattern in Eurasian SSD anomalies, with a negative center located in the region between eastern Europe and the West Siberia Plain (EEWSP) and a positive center located around Baikal Lake (BL), is significantly associated with East Asian summer precipitation via the triggering of an abnormal mid-latitude Eurasian wave train. Reduced SSD over EEWSP corresponds to abnormally dry local soil conditions from spring to the following summer, thereby increasing surface heat flux and near-surface temperatures. Similarly, the increase in SSD over BL is accompanied by abnormally low near-surface temperatures. The near-surface thermal anomalies cause an abnormal meridional temperature gradient, which intensifies the lower-level baroclinicity and causes an acceleration of the subtropical westerly jet stream, leading to an enhanced and maintained Eurasian wave train. Additionally, the atmospheric response to changed surface thermal conditions tends to simultaneously increase the local 1000–500 hPa thickness, which further enhances the Eurasian wave train. Consequently, significant wave activity flux anomalies spread from eastern Europe eastward to East Asia and significantly influence the summer precipitation over China, with more rainfall over northeastern China and the Yellow River valley and less rainfall over Inner Mongolia and southern China.