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Summer hot drought events over northeastern China and its possible linkage to Barents Sea ice decline in spring

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Hot drought events often have great impacts on society, the ecosystem, and agriculture. Northeastern China (NEC) is the ganary of China, thus it is quite important to investigate the characteristics of summer hot drought event (SHDE) over NEC and find the possible mechanisms. Based on the observation and the reanalysis datasets, we found that the decline of Barents Sea ice (SICBS) in March is closely related to the occurrence of summer SHDE over NEC during 1997-2016. The decline of SICBS can lead to decrease of snow depth over the western Eurasia (SDWEA) in April. On the one hand, the decline of SDWEA in April can regulate the atmospheric circulation during May-June that lead to dry soil in Yangtze River valley and northern China regions, which is further linked to SHDE over NEC. On the other hand, both the decline of SICBS in March and the decrease of SDWEA in April favor the positive Polar/Eurasia teleconnection pattern and dry soil over NEC in JA, which provides favorable atmospheric circulation patterns for SHDE over NEC. All of these results can be verified by the simulations from the Community Earth System Model and the numerical experiments that based on the version 4 of Community Atmosphere Model. Consequently, the Barents Sea ice in March might be a potential predictor for the SHDE over NEC.