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Skillful seasonal prediction of North American summer hot days

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This study shows that the frequency of North American summer hot days are skillfully predictable months in advance in the newly-developed GFDL (Geophysical Fluid Dynamics Laboratory) SPEAR (Seamless System for Prediction and EArth System Research) seasonal forecast system. We also demonstrate that climate change, the Pacific Decadal Oscillation (PDO), the Atlantic Multidecadal Oscillation (AMO) and atmosphere-land feedback all contribute to the seasonal predictive skill of the frequency of North American summer hot days. Using a statistical optimization method (Average Predictability Time) we identify two large-scale components of the frequency of North American summer hot days that are predictable with significant correlation skill. One component shows an increase in the frequency of summer hot days everywhere over North America and is highly predictable at least 9 months in advance. This component is related to a secular warming trend. Another predictable component shows largest loadings over the central U.S., and is significantly predictable 6 months ahead. This second component is related to the PDO and the AMO, and is significantly correlated with the central U.S. soil water. These findings have potential implications for predictions of North American summer hot days on seasonal time scales.