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Record high Pacific Arctic seawater temperatures and delayed sea ice advance in response to episodic atmospheric blocking

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Arctic sea ice is rapidly decreasing during the recent period of global warming. One of the significant factors of the Arctic sea ice loss is oceanic heat transport from lower latitudes. For months of sea ice formation, the variations in the sea surface temperature over the Pacific Arctic region were highly correlated with the Pacific Decadal Oscillation (PDO). However, the seasonal sea surface temperatures recorded their highest values in autumn 2018 when the PDO index was neutral. It is shown that the anomalous warm seawater was a rapid ocean response to the southerly winds associated with episodic atmospheric blocking over the Bering Sea in September 2018. This warm seawater was directly observed by the R/V Mirai Arctic Expedition in November 2018 to significantly delay the southward sea ice advance. If the atmospheric blocking forms during the PDO positive phase in the future, the annual maximum Arctic sea ice extent could be dramatically reduced.