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The recent shift of the Arctic atmospheric circulation and the reduction of sea ice

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While a shift to a more meridional atmospheric climate pattern in the last decade contributed to recent reductions in summer Arctic sea ice extent, the increase in late summer open water area is, in turn, directly contributing to a modification of large scale atmospheric wind patterns. An anomalous meridional wind pattern with high sea level pressure on the North American side of the Arctic, and low over the Siberian Arctic –which was refered to as the Arctic Dipole (AD) anomaly, shifted from primarily small interannual variability to a persistent phase during spring (AMJ), particularly in the month of June. Once there is a reduction of sea ice cover in late summer, additional heat is stored in the Arctic Ocean which is released during the autumn season. During the last six years, this persistent AD pattern creates an enhanced mean meridional flow across the Arctic. Coupled impacts of the new persistent pattern are increased sea ice loss in summer, long-lived positive temperature anomalies and ice sheet loss in west Greenland, and a possible increase in Arctic-subarctic weather linkages through higher-amplitude upper-level flow. With continuing loss of summer sea ice to less than 50 % of its climatological mean over the next decades, we anticipate increased modification of atmospheric circulation patterns in northern mid-latitudes.