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# Arctic circulation regimes and their transformations under the influence of climate change

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One of the most intriguing manifestations of climate change is the cessation of decadal Arctic climate variability in the 21st century. Between 1948 and 1996, the Arctic atmospheric circulation experienced a well pronounced decadal variability, alternating between anticyclonic circulation regimes (ACCRs) and cyclonic circulation regimes (CCRs) at 5 to 7 year intervals. Since 1997, however, the Arctic system has been dominated by a 16-year ACCR with a set of environmental parameters (e.g. sea ice extent, sea level, etc.) that are atypical for ACCRs. We hypothesize that additional freshwater fluxes into the Greenland, Irminger and Norwegian Seas, associated with the acceleration of Greenland ice sheet melt in the 21st century, could be the major factor responsible for the cessation of decadal Arctic climate variability and stabilization of the present ACCR over the Arctic Ocean. We present results from a relatively simple Arctic climate system box model and provide observational evidence that supports this hypothesis. We describe a scenario in which the Arctic system in an anticyclonic circulation regime can begin to cool (with an increase in sea ice) under continued fresh water flux from Greenland.