



Arctic Sea Ice Influences on Northern Hemisphere Precipitation

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An Arctic Ocean with less sea ice and more open water in September has led to anomalous warming of the overlying atmosphere in autumn. Through influences on column water vapor and atmospheric circulation, it is reasonable to expect that this warming will have impacts on Arctic precipitation. Statistical analysis of observational data sets suggest that the increasing snow cover over Siberia and parts of Eurasia during fall and early winter is correlated with the decreasing September Arctic sea ice over the Pacific sector. This covariance is also found in future simulations from the Community Climate System Model (CCSM3) despite a hemispheric scale reduction in future snow cover. Analysis of data from the JRA-25 atmospheric reanalysis reveals an autumn increase in cyclone associated precipitation over the past decade. This increase is primarily linked to a shift in atmospheric circulation towards more frequent and more intense cyclones in the Atlantic sector of the Arctic. Composites based on years with the five lowest and five highest September ice extents reveal more autumn cyclone associated precipitation and column water vapor during low ice years than during high ice years. However, difficulties remain in establishing cause and effect, including the absence of a clear association between spatial patterns of recent precipitation changes and ice extent anomalies.