Results (cont’d): Changes in Atmospheric Circulation over Time

Figure 5 (above): Difference in SON mean 250 hPa zonal wind between 1997-2016 and 1980-1996 in (a) MERRA-2, (b) a single member of M2AMIP, (c) M2AMIP with SST and SIC from ERA-I, and (d) the M2AMIP ensemble mean.

Figure 6 (above): Difference in SON variance of the 250 hPa meridional wind between 1997-2016 and 1980-1996 in (a) MERRA-2, (b) a single member of M2AMIP, (c) M2AMIP with SST and SIC from ERA-I, and (d) the M2AMIP ensemble mean.

Figure 7 (above): Difference in SON covariance of the 250 hPa zonal and meridional wind between 1997-2016 and 1980-1996 in (a) MERRA-2, (b) a single member of M2AMIP, (c) M2AMIP with SST and SIC from ERA-I, and (d) the M2AMIP ensemble mean.

Results (cont’d): Greenland Blocking Index

• GBI is a proxy for the NAO and is defined as the area averaged 500 hPa height over 60–80°N, 20–80°W (Hanna et al., 2013).

Figure 8 (left): GBI time series for (a) DJF, (b) MAM, (c) JJA, and (d) SON from MERRA-2 (red), M2AMIP (black), and M2AMIP with ERA-I SST and sea ice (blue) for the period of 1980 through 2015.

Conclusions
• Arctic Amplification is not present in M2AMIP, however using boundary conditions from ERA-I mitigates this issue.
• Analysis increments play a large role in Arctic Amplification in MERRA-2, but the ratio between turbulence and dynamics matters as well.
• The zonal progression within the North Atlantic storm track has slowed in all datasets, but the variance in meridional winds has not increased.
• Uncertainty remains in the influence of Arctic Amplification on blocking over Greenland and the North Atlantic Oscillation.