

The Divorce of the North Atlantic Atmosphere and Ocean Attributed to Human Affairs

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In the middle of the 20th century the North Atlantic atmosphere and ocean divorced. Early in the century, the atmosphere and ocean jointly created sea-surface temperature (SST) variability, called Atlantic Multidecadal Variability (AMV). However, by the mid-century their relationship dissolved, marking a change in mechanism for the AMV. Here, using a simple model we show that (1) in the first half of the 20th century the AMV is primarily internally generated by the atmosphere-ocean system, including the Atlantic Meridional Overturning Circulation (AMOC) and (2) in the second half of the 20th century the AMV is primarily driven by external radiative forcing. Further, we show how the mid-century shift in mechanisms creates the appearance of a lagged relationship between North Atlantic winds and sea-surface temperature that had previously been attributed to AMOC.