Geophysical Research Abstracts
Vol. 20, EGU2018-14337, 2018
EGU General Assembly 2018

Differing drivers of Atlantic variability on quasi- and multi-decadal timescales

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The North Atlantic is notable for large decadal variability in sea surface temperature (SST) manifested as Atlantic Multi-decadal Variability (AMV). Whether the AMV is driven by external atmospheric or internal oceanic influences is an oft-disputed point. Long time series of atmospheric and ocean variables, in particular long timeseries of Gulf Stream position, reveal differing drivers of SST variability on quasi- and multi-decadal timescales. On quasi-decadal timescales an oscillatory signal identified in the North Atlantic Oscillation controls SST evolution directly via air-sea heat uxes. However, on multi-decadal timescales this relationship with SST changes, while remaining consistent in phase. and resonant in amplitude with Gulf Stream position. A recent reversal of the long term positive trend in Gulf Stream position coincides with a weakening and broadening in the Gulf Stream Extension indicating the onset of an AMV decline. Using the oscillatory nature of these variations, we can make a prediction for the timing of a declining AMV.