



Amplification of the Atlantic Multidecadal Oscillation associated with the onset of the industrial-era warming

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North Atlantic sea surface temperatures experience variability with a periodicity of 60-80 years that is known as the Atlantic Multidecadal Oscillation (AMO). It has a profound imprint on the global climate system that results in a number of high value societal impacts. However the industrial period, i.e. the middle of the 19th century onwards, contains only two full cycles of the AMO making it difficult to fully characterize this oscillation and its impact on the climate system. As a result, there is a clear need to identify paleoclimate records extending into the pre-industrial period that contain an expression of the AMO. This is especially true for extratropical marine paleoclimate proxies where such expressions are currently unavailable. Here we present an annually resolved coralline algal time series from the northwest Atlantic Ocean that exhibits multidecadal variability extending back six centuries. The time series contains a statistically significant trend towards higher values, i.e. warmer conditions, beginning in the 19th century that coincided with an increase in the time series' multidecadal power. We argue that these changes are associated with a regional climate reorganization involving an amplification of the AMO that coincided with onset of the industrial-era warming.