

A Paleoclimate Perspective on Atlantic Multidecadal Variability

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Traces of environmental conditions found in natural archives can serve as proxies for direct climate measurements to extend our knowledge of past climate variability beyond the relatively short instrumental record. Such paleoclimate proxies demonstrate significant multidecadal climate variability in the Atlantic sector since at least the mid 1700s. One potential cause of multidecadal climate variability in the Atlantic is heat transport fluctuations caused by modulations of Atlantic meridional overturning circulation. If this is indeed the primary cause of Atlantic multidecadal climate variability, then sea surface temperature (SST) is a primary variable for understanding this process, but the proxy evidence comes from a variety of sources, many of which are terrestrial and are not directly recording sea surface temperature. Further analysis into the causes and consequences of Atlantic multidecadal climate variability requires development of a spatial network of decadal resolution proxy SST records with both low and high latitude contributions. An initial attempt at a low-latitude Atlantic SST reconstruction presented here found only 4 sites with ≤ 5 year resolution data, demonstrating the paucity of appropriate data available. The 4-site average correlated significantly with instrumental average SST and the Atlantic Multidecadal Oscillation Index. The full record, 1360-2000 C.E, and a shortened version 1460-1850, had significant multidecadal variability centered at a 60-year period. Comparing our reconstruction with reconstructions of hemispheric SST anomalies in the Atlantic shows that there is no consensus yet on the history of Atlantic multidecadal variability.