

Atlantic Meridional Overturning Circulation slowdown causes widespread cooling in the Atlantic

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Observations show that beginning in 2010 the subtropical North Atlantic Ocean cooled through the upper 2 km of the water column. We show that the observed cold temperature anomalies in the seasonally active mixed layer are not only a result of anomalous air-sea exchange, but more surprisingly, due to extreme interannual variability in the ocean's northward heat flux at 26.5°N. Re-emerging sea surface temperature patterns in the subtropical gyre have recently been linked to anomalies in the North Atlantic Oscillation – a dominant atmospheric mode of climate variability around the North Atlantic. Here we link, for the first time, variability in the northward heat flux carried by the Atlantic Meridional Overturning Circulation to widespread sustained cooling of the subtropical North Atlantic, challenging the prevailing view that the ocean plays a passive role in the coupled system on monthly-to-seasonal time scales.