Atlantic Multi-decadal Variability Without a Role for Ocean Circulation

Amy Clement, Katinka Bellomo, Mark Cane, Lisa Murphy

Abstract

Most previous explanations identify the driver of Atlantic Multi-decadal variability (AMV) as the ocean circulation, specifically the Atlantic Meridional Overturning Circulation (AMOC). Here we show that the main spatial features of the observed AMV are reproduced in models where the ocean heat transport is prescribed and thus cannot be the driver. Allowing the ocean circulation to interact with the atmosphere does not significantly alter the characteristics of AMV in the current generation of climate models. These results suggest that AMV in models is the response to stochastic forcing from the mid-latitude atmospheric circulation, with thermal coupling playing a role in the tropics. In this view, the AMOC and other ocean circulation changes would be largely a response to the same atmosphere driving as the AMV.