

Signature of the Atlantic Meridional Overturning Circulation in the North Atlantic Dynamic Sea Level

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The dynamic sea level (DSL) is closely linked to the Atlantic Meridional Overturning Circulation (AMOC) through the geostrophic balance, and is an important fingerprint of the variability and change of the AMOC. We systematically investigate the AMOC-DSL relationship in various model integrations, including control, historical and projection runs of the CMIP5 atmosphere-ocean general circulation models, and hindcast runs of ocean models forced by observed atmospheric conditions. Robust patterns of the DSL in the North Atlantic and along the East Coast of the U.S. associated with the AMOC variability and change are identified between different models and under different forcings. In combination with long-term high-quality DSL data from tide gauges and satellite altimetry, the AMOC-DSL relationship provides an important method to reconstruct past variability and change of the AMOC on decadal to centennial time scales.