

## Intraseasonal to interannual variability of the AMOC from eddy-resolving simulations and observations

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Results from two  $1/12^\circ$  eddy-resolving simulations, together with data-based transport estimates at  $26.5^\circ\text{N}$  and  $41^\circ\text{N}$ , are used to investigate the temporal variability of the Atlantic meridional overturning circulation (AMOC) during 2004-2012. There is a good agreement between the model and the observation for all components of the AMOC at  $26.5^\circ\text{N}$ , whereas the agreement at  $41^\circ\text{N}$  is primarily due to the Ekman transport. We found that 1) both observations and model results exhibit higher AMOC variability on seasonal and shorter time scales than on interannual and longer time scales; 2) on intraseasonal and interannual time scales, the AMOC variability is often coherent over a wide latitudinal range, but lacks an overall consistent coherent pattern over the entire North Atlantic; and 3) on seasonal time scales, the AMOC variability exhibits two distinct coherent regimes north and south of  $20^\circ\text{N}$ , due to different wind stress variability in the tropics and subtropics. The high AMOC variability south of  $20^\circ\text{N}$  in the tropical Atlantic comes primarily from the Ekman transport of the near-surface water, and is modulated to some extent by the transport of the Antarctic Intermediate water below the thermocline. These results highlight the importance of the surface wind in driving the AMOC variability.