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Energetics of Multidecadal Atlantic Ocean Variability

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Oscillatory behavior of the North Atlantic meridional overturning circulation is thought to cause Atlantic multidecadal climate variability. In this paper we study the energy conversion processes associated with this variability in an idealized North Atlantic ocean model. The term representing the conversion of available potential energy to kinetic energy is shown to play a crucial role in the oscillatory behavior. The analysis of the different terms in the available potential energy balance precisely shows how the magnitude and phase of the conversion term is determined by the changes in stratification in the flow.