



Energetics of the Southern Ocean Mode

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We investigate the mechanical energy balance of a mode of multidecadal variability in an synoptic resolution global ocean circulation model. The recently discovered Southern Ocean Mode (SOM) is located in the Atlantic sector of the Southern Ocean and was first described for the ocean heat content but is expressed in many physical fields. The Lorenz energy cycle analysis reveals time dependent energy pathways that support a hypothesis for the mechanism that is based on the interaction between mesoscale eddies and the mean flow resulting in variable kinetic energy input by the wind. Furthermore, the stratification in the Weddel Gyre is affected and vertical mixing switches between shallow and deep convection leading to multidecadal Antarctic Bottom Water and Atlantic Meridional Overturning Circulation variability.