Past to Future South Atlantic Meridional Overturning Circulation: pathways and low-frequency variability

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This study investigates the pathways which compose the upper limb of the Meridional Overturning Circulation in the South Atlantic sector by employing the numerical results of the Community Earth System Model Large Ensemble project (CESM-LE). The CESM-LE is a tool for studying climate change in the presence of internal climate variability. The spatio-temporal evolution of the upper limb of the South Atlantic Meridional Overturning Circulation (SAMOC) is addressed, with focus on the low-frequency variability and the understanding of the competing roles of natural climatic variations and forced climate change. A single-model Large Ensemble approach, which allows us to determine the spread of trends across the ensemble members, is used for this purpose. Also to be explored is the connection of the SAMOC upper limb to the South Atlantic Subtropical Gyre, as its northeastern boundary. Since these systems are closely coupled, our hypothesis is that the anticyclonic circulation of the subtropical gyre responds to variations in the upper limb flow structure and vice versa. Given this circumstance, the interplay between these large scale oceanic features is analyzed.