



## **Southern Ocean Winds, Atlantic MOC and Pacific Compensation**

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A series of experiments with the latest version of the fully coupled Community Climate System Model is analyzed to quantify the dynamic effect of Southern Ocean (SO) winds on the Atlantic Meridional Overturning Circulation (AMOC). The study complements previous work by others that provide analytical treatments or highlight the importance of eddy fluxes. The surprising finding here is that, when taking into account full thermodynamics and basin geometry, the AMOC strength is mostly independent on SO winds: in the limit of weak SO winds the North Atlantic Deep Water simply upwells in the tropical Indo-Pacific. In fact, through their effect on sea-ice, weaker SO winds lead to less production of Antarctic Bottom Water and therefore a deeper and stronger AMOC. Conceptually, a key finding is that at mid-depths (above the AABW) information flows from the North Atlantic to the global ocean, but not the other way. This significantly complicates the analytical treatment of the global deep circulation, and calls in doubt results of simpler climate models that show a sensitivity of global climate on SO winds.