Driving a Mechanism for AMOC decadal variability using HadGEM2-AO

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Atlantic meridional overturning circulation (AMOC) is driven by denser water sinking around Greenland and plays an important role in the transport of heat and materials. We analyzed the mechanism of AMOC decadal variability by simulation using the HadGEM2-AO model. The results showed that AMOC can be considered to have self-sustained variability, which means that AMOC originates from the phase difference between the meridional temperature gradient and ocean circulation variability. AMOC transfers heat from low latitudes to higher latitudes, causing the temperature anomaly in low latitudes to decrease. Although strengthening of AMOC showed a gradual decrease, the salinity anomaly showed an increase in higher latitudes, because more saline water moves northward with AMOC. In this mechanism, the salinity anomaly appeared to be maximal at high latitudes when the strength of AMOC is minimal. In this study, decadal variability of AMOC was thermally driven rather than being driven by salinity.

Key words: Atlantic meridional overturning circulation (AMOC), decadal variability, self-sustained variability, thermally driven

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