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Mechanism on the short-term AMOC variability

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The continuous moored observation revealed significant variability in the strength of the Atlantic Meridional Overturning Circulation (AMOC). Cause of such AMOC variability is an extensively studied subject. This study focuses on the short-term variability, which ranges up to annual and interannual timescales. A mechanism is proposed from the perspective of ocean water redistribution by layers. Being able to explain four phenomena of AMOC variability in the subtropical and tropical oceans (seasonality, the meridional coherence, the layered-transport compensation at 26.5°N, and the 2009/2010 downturn at 26.5°N), this mechanism suggests at least the short-term variability of AMOC strength is dominated by an adiabatic process and therefore its observed variation so far is predominantly a reversible process. That is, AMOC may recover itself from a short-term weakening in a rapid and complete manner. The same mechanism was used to explain the seasonal variability of the meridional overturning circulation in the Indian Ocean in a former study of the author (Han, 2021 JPO).

Topic

Value of AMOC observing –what have we learned?

Author: HAN, Lei (Xiamen University Malaysia)

Presenter: HAN, Lei (Xiamen University Malaysia)

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