

Stability of AMOC and bipolar seesaw under different background climatic condition

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Millennial climate changes known as D-O cycles and AIM recorded in ice cores in both Hemispheres show a higher amplitude in the middle-level of a glacial cycle than in the interglacial state or severe glacial state. Here we investigate the stability of AMOC and climate by analyzing several sensitivity experiments using a coupled atmosphere and ocean GCM (MIROC4m). The stability under different climates are compared; modern climate state with the pre-industrial condition, middle glacial climate state and full glacial condition, mainly differing in the ice sheet configuration and the amount of Greenhouse Gases. The results under middle glacial condition show the largest cooling/warming response in North Atlantic and a reasonable bipolar warming/cooling signal, which are consistent to ice core data and deep-sea data. We show the stability diagram of AMOC in the model under different background conditions and discuss the implication on the mechanism of abrupt climate changes in the past.

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