



Cessation in the decline of dense Antarctic water supply to the Atlantic Ocean overturning circulation

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The lower limb of the Atlantic overturning circulation is resupplied by the sinking of dense Antarctic Bottom Water (AABW) that forms via intense air-sea-ice interactions adjacent to Antarctica, especially in the Weddell Sea. In the last three decades, AABW has exhibited a pronounced warming, freshening and decline in volume across the Atlantic Ocean and elsewhere, interpreted to signal an on-going major reorganization of oceanic overturning, and widely hailed as a hallmark signature of global climate change. Here, we use observations of AABW in the Scotia Sea, the most direct pathway from the Weddell Sea to the Atlantic Ocean, to show that there has been a recent cessation in the decline of the AABW supply to the Atlantic overturning circulation. The strongest decline was observed in the volume of the densest layers in the AABW throughflow from the early 1990s to 2014; since then, it has stabilised and partially recovered. We link the changes in AABW within the Scotia Sea to variability in the densest classes of abyssal waters upstream. Our findings indicate that the previously observed decline in the supply of dense water to the Atlantic Ocean abyss may be stabilizing or reversing, and thus call for a reassessment of Antarctic influences on overturning circulation, sea level, planetary-scale heat distribution, and global climate.