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# Glacial reduction in Drake Passage throughflow and millennial-scale variations

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The Drake Passage is a major geographic constriction for the Antarctic Circumpolar Current and controls the exchange of physical, chemical, and biological properties between the three major ocean basins. Resolving changes in the flow of circumpolar water masses through this gateway is therefore crucial for advancing our understanding of the Southern Ocean's role in ocean and climate change on a global scale. Here we reconstruct changes in Drake Passage dynamics over the past 65,000 years based on grain-size and geochemical properties from sediment records from the southernmost continental margin of South America. We reveal an up to ∼40% decrease in flow speed along the northernmost Antarctic Circumpolar Current pathway entering the Drake Passage during glacial times. In combination with published sediment records from the Scotia Sea, we argue for a considerable total reduction of Drake Passage transport during the last glacial. Superimposed on this long-term decrease are high-amplitude millennial-scale variations, which parallel Southern Ocean and Antarctic temperature pattern. Strengthened flow occurs during Antarctic warmings. Our results point to a critical role of Drake Passage transport for the global meridional overturning and interbasin exchange in the Southern Ocean most likely regulated by variations in the westerly wind field and changes in the extension of Antarctic sea-ice.