

Editor's Summary

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Stirring the oceans

Ocean mixing in the current that flows around Antarctica plays a key role in global ocean circulation, as it influences the rate at which water sinking to the deep ocean at high latitudes returns to the surface in the Southern Ocean. But the rates of mixing in the Antarctic Circumpolar Current, and the extent of upwelling induced, remain poorly understood due to a lack of direct observations. A natural phenomenon, the release of helium from submarine volcanoes into the current near Drake Passage, provided an opportunity to fill in that observational gap. This natural tracer release experiment made it possible to measure both mixing and upwelling in the southwest Atlantic sector of the current, and the results indicate that the rough topography of the ocean floor there leads to rapid mixing across density surfaces and rapid upwelling along density surfaces. This creates a previously unrecognized 'short circuit' in the global oceanic overturning circulation, allowing cold waters sinking to the ocean abyss to return to the surface more rapidly than was expected.

Letter: Short-circuiting of the overturning circulation in the Antarctic Circumpolar Current

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