ABC News

Southern Ocean current flows faster than Amazon

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Scientists have measured the most powerful current that helps drive the circulation of the Southern Ocean, paving the way for more accurate climate models.

Australian oceanographer Steve Rintoul from the Centre for Australian Weather and Climate Research in Hobart says the current is impressive.

"The current carries about 8 million cubic metres per second of water to the north and that's about the equivalent of 40 times the flow of the world's largest river," Dr Rintoul said, referring to the Amazon River.

Scientists have known there are three currents that transport water from Antarctica towards the equator.

These currents are driven by cold, oxygen-rich water that sinks to the deep ocean at Antarctica and flows northwards.

"This current that we've measured is part of a global pattern of ocean currents, which we often call the 'overturning circulation' or sometimes the 'ocean conveyor belt'," Dr Rintoul said.

Such currents are important in revitalising the oceans with oxygen. They also affect the climate system because they determine how much heat and CO2 are stored and transported by the ocean.

The slower the current, the less heat and carbon dioxide they can transport.

The current measured by the scientists flows at a depth of about 4 kilometres along the coast of Antarctica from Ross and Adelie before heading north around the edge of the Kerguelen Plateau, which supports Herd Island.

Dr Rintoul says it flows at an average speed of 22 centimetres per second, which is 10 to 20 times larger than the greatest average speeds ever measured in water of this depth.

Climate models

Dr Rintoul says the new measurements will serve as a "benchmark" by which global climate models can be fine-tuned.

"Climate models will need to reproduce this current if they're going to capture correctly how the ocean transports heat and therefore be able to provide reliable climate predictions," he said.

Dr Rintoul says current climate models have assumed a much weaker current.

"A stronger overturning circulation would transport more heat from the lower latitudes towards the poles," he said.

But he says it is not possible to tell how exactly inclusion of these updated figures will impact on climate because of the complexity of the climate system.

The researchers measured speed, salinity and temperature over a period of two years.

They used measuring devices attached to a 3-kilometre-long wire that was anchored to the ocean floor by old train wheels, along the path of the current.

Speed and salinity measurements helped them to identify the source of the currents in Antarctica.

Salinity measurements will also help to verify other scant data suggesting that oceans have become less salty since 1970s.

Dr Rintoul says that as water becomes less salty it becomes less dense and is less likely to sink, slowing down the currents.

Dr Rintoul and his colleagues report on the current today in Nature Geoscience.

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