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Fish teeth and tectonic plates tell a new story about world's largest ocean current

Fossil fish teeth recovered from the ocean floor around Tasmania have shed new light on the origins of the world's largest ocean current, according to a paper released in Nature tomorrow (**Thursday 30 July 2015**).

Analysis of fish teeth recovered from drilling of the ocean floor, combined with the study of tectonic plate movements by Dr Joanne Whittaker of the University of Tasmania's Institute for Marine and Antarctic Studies and Dr Simon Williams from the University of Sydney, has revealed how the flow of water around Antarctica began.

"The Antarctic Circumpolar Current (ACC) is the world's largest ocean current. It flows clockwise around Antarctica because there are no land masses in the way and it plays a role in maintaining the large ice sheets on Antarctica because it keeps warmer ocean waters away," Dr Whittaker explained.

"Despite its role in stabilising Antarctic ice sheets, the onset of the Antarctic Circumpolar Current has been poorly understood.

"Tasmania separating from Antarctica about 35 million years ago created the Tasmanian

Different oceans have distinct chemical (termed isotopic) "fingerprints", and this difference in the seawater is recorded in fish teeth that settle on the ocean floor, with the isotopes in their teeth preserving the seawater composition at their time of formation.

The records show how Tasmania once formed a barrier between Pacific and Indian oceans, but as they moved apart water began to mix, first flowing from the Pacific towards the Indian Ocean, and then from the Indian Ocean to the Pacific, as it still does today.

These changes in ocean circulation are linked to global