Corals track strongest Indian Ocean current over 334 years

March 19 2014, by Jens Zinke

Natural variations in the warming and cooling cycles of the globally important Agulhas ocean current core region have been revealed in a new study of a Madagascar corals led by The University of Western Australia and published in Nature's *Scientific Reports*.

Assistant Professor Jens Zinke, who holds a collaborative fellowship with UWA's Indian Ocean Marine Research Centre, the Australian Institute of Marine Science (AIMS) and CSIRO, said the research findings were important for climate science in general, as well as small and large-scale fisheries in the Indian Ocean and marine conservation and climate adaptation planning agencies.

Professor Zinke said the Agulhas Current (which flows down the east coast of Africa) was the strongest western boundary current in the southern hemisphere.

"It releases a lot of heat into the atmosphere throughout the year and through that, it influences climate and agriculture in the countries of southern Africa," Professor Zinke said. "It is also a lifeline for a variety of marine life from plankton to fish and larger megafauna such as manta rays and whale sharks which travel between Antarctica and the Indian Ocean."

But the Agulhas Current's influence extended well beyond the local scale - it was also the gateway for warm and salty Indian Ocean water on its way to the far northern Gulf Stream of the US, he said.

"It takes 10-30 years to cross the Atlantic Ocean and when it arrives it changes the saltiness and density of water in the North Atlantic," Professor Zinke said. "This is really important, because in the north the dense and heavy water will cool and sink and start the cycle of the great conveyor belt that connects all our oceans.

"Our study used living corals to help us understand the long-term changes that have occurred in warming and cooling of the Agulhas Current during the past 334 years.

"There isn't an instrument that can measure these changes over such a long time so we used living massive corals that form large colonies which live for more than 300 years. We were able to record year-by-year the conditions of the ocean surrounding the corals."

Professor Zinke said the researchers used chemical changes in the coral skeleton, which altered with ocean temperature, to trace past ocean climate change.

"We teamed up with physical oceanographers from the University of Cape Town, GEOMAR Helmholtz Centre for Ocean Research Kiel and the University of Edinburgh, to unravel how the ocean currents between Madagascar and South Arica are connected," he said.

"We found that the Agulhas Current warming and cooling cycles follow slow, multi-decadal swings in the climate system and recent man-made warming only exceeded natural variability after the 1990s," he said.

"Our study also revealed a strong connection to the ocean temperatures off Western Australia, where long-term warming follows a fairly similar pattern."

Provided by University of Western Australia

Citation: Corals track strongest Indian Ocean current over 334 years (2014, March 19) retrieved 23 April 2024 from https://phys.org/news/2014-03-corals-track-strongest-indian-ocean.html