

Newly-discovered coastal current has direct implications for fishing industry of Madagascar, SA

The existence of a coastal current off Madagascar has been discovered by South African, Malagasy and French researchers. Understanding the South-West Madagascar Coastal Current has direct implications for the management of local fisheries south of Madagascar.



"Revealing the existence of the new coastal current is an important discovery for South Africa as it adds to our understanding of the global ocean circulation and brings new insights about biological connectivity between the Madagascar and South African marine regions," says Dr Marjolaine Krug, CSIR senior researcher.

The study forms part of the PhD of Heriniaina Juliano Dani Ramanantsoa of the Nansen-Tutu Centre for Marine Environmental Research, hosted at the Department of Oceanography at the University of Cape Town, titled *Variability of coastal upwelling south of Madagascar*, which Krug supervised.

The research drew on the contributions of oceanographic experts from numerous institutions, including the CSIR, the University of Cape Town, the University of Western Brittany, in France, and the French Institute for Research and Development. The researchers combined in-situ and satellite observations with numerical model outputs to highlight the existence of a coastal poleward current located along the south-western coast of Madagascar. They found that the current is a relatively shallow (300 m) and narrow (100 km wide), warm and salty surface current with a transport volume comparable to that of the Leeuwin current, near Australia.

Ramanantsoa says he developed a strong interest in ocean dynamics and investigated the variability of upwelling south of Madagascar as part of his PhD studies. Upwelling is an upward motion of deep water bringing rich nutrients to the surface layer, promoting fertilisation.

Krug's research focuses on the Agulhas Current. "In my research, I make extensive use of satellite remote sensing observations to better understand how the Agulhas Current varies and how this variability impacts the coastal regions. Madagascar is similarly flanked by a boundary current called the East Madagascar current. Like in the Agulhas Current, the variability of the east Madagascar current impacts the productivity of the waters near the coast and shelf. One can use similar tools and approaches to study the two systems."

Very productive waters

Krug says the Southern Madagascar region is a transition zone between the tropical waters of the Indian Ocean and temperate waters off South Africa, with a high degree of endemism. She says the southern waters off Madagascar are very productive and support a wide range of migratory species, including seabird and cetacean and that, therefore, there is a direct biological link between the oceanic regions of Madagascar and South Africa.

Ramanantsoa says the new knowledge about the current has very specific value for players and decision-makers in the fishing industry. The fishing industry in South Africa and in a country like Madagascar is significant, with a huge impact on food security, employment and the ability to earn foreign exchange income.

"Countries have to manage their coastal and marine resources in a way that will ensure the safeguarding of ecosystems. Sustainability is closely linked to how well we manage our marine resources. The more we understand and know, the better we can manage our marine resources," he says.

A significant finding for the global ocean community

The research was recently published in the journal [Geophysical Research Letters](#) and selected as a Research Highlight by the editorial team to be featured on [EOS](#), as well as on the journal's website.

Krug says that it is not easy to prove that one has found a new current and that they had to provide strong evidence for it to be accepted in a peer-reviewed journal. "It is a rare opportunity to discover a new current in the 21st century. It is a significant finding for the global ocean community and a really amazing achievement for Juliano," she says.

"As a Malagasy who grew up along this coastline, I have an intimate relationship with the current. I grew up with this

current; it was such a big part of my life. Publishing the research was a truly emotional moment in my life," says Ramanantsoa.

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