Title/Name of the area:

Southern Madagascar (part of the Mozambique Channel)

Presented by (*names, affiliations, title, contact details)*

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Abstract (*in less than 150 words)*

The highly productive waters of Madagascar's 'Deep South' are critical feeding grounds for the highly migratory species of the region, including seabirds and cetaceans. It is characterized by large coastal dunes, lagoons and coastal ponds, forming unique coastal habitats and wetlands; shallow benthic communities dominated by hard substrate communities, with small isolated coral reefs at the extremities.

Introduction

Because of its southerly location, this is a transition zone (ecotone) in the Indian Ocean between the tropical waters and the temperate waters, at the crossroads of the fauna of South Africa and that of the Indo-Pacific, with an African affinity as one approaches the Mozambique Channel. There are very specific communities adapted to local conditions - high energy, upwellings, cooler waters. High levels of endemism have been found, 25% for mollusks, with many new species likely to be described in coming years.

Location

Extending south from Madagascar, an extensive underwater plateau or ridge varies from about 1000 to 2500 m deep, for a distance of nearly 1000 km. At its southern end it forms a shallow platform that reaches to 100 m below the surface. The platform was formed by basaltic extrusion from the Marion hotspot during the Cretaceous, as Antarctica and Madagascar moved apart. The region experiences complex oceanography caused by the strong boundary current of the East Madagascar Current impinging on the undersea Plateau, resulting in strong coastal and offshore upwelling, eddies and turbulence. These cause a large phytoplankton bloom in the austral summer that fertilizes waters downstream and into the southern Mozambique Channel. Eddies generated over the plateau may progress into the Mozambique channel, interacting with those of the channel and potentially move north up the west coast of Madagascar.

The shallow marine habitats of the coast are mainly rocky and experience very rough conditions exposed to the south. There is minor coral reef development at the east (Lokaro, Ste Luce) and the west (Androka, banc de l'Etoile) extremities. Coastal habitats are varied, with distinctive coastal dune formations, such as at the Mangoky delta.

The plateau extends southwards into temperature waters and ecoregions, resulting in mixed tropical and subtropical species and habitats. Even on land and in shallow waters, this region is poorly documented.

The Madagascar plateau extends southwards for 1,000 km into the High Seas. Whether to limit the EBSA to national jurisdiction, or on the other hand, to areas beyond national jurisdiction, is more of a political than ecological decision. Two hundred km north of the point where the western edge of Madagascar Plateau, a submarine canyon leading into the Bay of St. Augustin (at Toliara) results in high diversity of cetaceans due to accessibility of deep water, offshore species. The canyon is also an important site for coelacanths. These may justify extending the boundary of this site to include the Bay of St Augustine

Feature description of the proposed area

Leatherback, loggerhead and green turtles are found in the region, one of the few locations important for leatherbacks in the WIOA.

A recent expedition 'Atimo Vatae', focused on the algae and invertebrates of the shallow and upper-slope marine fauna, has already shown preliminary results reporting kelp beds and over 500 species of algae, richer than the tropical algal flora of Mozambique. By contrast, diversity of animal species is lower than in tropical areas, but with extremely high levels of endemism and shared species with subtropical South Africa. Ascidians are among the first groups analysed, revealing 20% new species, 26% shared with S. Africa, and 31% shared with tropical areas. Other groups with preliminary numbers include molluscs (1200-1500 species), decapod crustaceans (766 species) and fish (253 species).

Offshore, the undersea Plateau, because of its upwelling and productivity, provides critical feeding grounds for multiple marine species, including seabirds, large fish and marine mammals. The red-tailed tropicbird and Barau's petrel (endemic to and nesting on Reunion) feed on the plateau, indicative of a high number of species that also do this. Blue, sperm and humpack whales aggregate in these waters due to its raised productivity, with estimated population sizes of about 450 individuals for pygmy blue whales. Humpback whales also use the SW and SE coasts (near Toliara and Lokaro, respectively) as breeding grounds, and for nursing by mothers and calves.

Feature condition and future outlook of the proposed area

Threats – the area is highly remote, with little development on land. Thus offshore fisheries by commercial fleets, targeting fish that feed on the high productivity off the plateau will likely develop as other fishing grounds become depleted.

Management status - there is currently no management structure for the overall area, though one coastal site, Faux Cap is a Ramsar site.

Assessment of the area against CBD EBSA Criteria

CBD EBSA Criteria (Annex I to decision IX/20)	**Description** (Annex I to decision IX/20)	**Ranking of criterion relevance** (please mark one column with an X)			
		Don't Know	**Low**	**Some**	**High**
Uniqueness or rarity	Area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features.				**X**
Unique mix of subtropical currents, a deep plateau and upwelling/turbullence. Unique in the region.					
Special importance for life-history stages of species	Areas that are required for a population to survive and thrive.				**X**
Many species are restricted to this site, or shared only with temperate South Africa					
Importance for threatened, endangered or declining species and/or habitats	Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species.				**X**
Many threatened and endangered species (turtles, mammals, birds), high productivity makes it one of the most important feeding grounds.					
Vulnerability, fragility, sensitivity, or slow recovery	Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery.	**X**			
Biological productivity	Area containing species, populations or communities with comparatively higher natural biological productivity.				**X**
Part of the eddy / upwelling systems of the Mozambique Channel. Very high in this southern region.					
Biological diversity	Area contains comparatively higher diversity of ecosystems, habitats, communities, or				**X**

	species, or has higher genetic diversity.				
Very high, especialy with endemics and mixed ranges (ecotone)					
Naturalness	Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation.				**X**
Relatively undisturbed due to remoteness and roughness					

Sharing experiences and information applying other criteria (Optional)

Other Criteria	**Description**	**Ranking of criterion relevance** (please mark one column with an X)			
		Don't Know	**Low**	**Some**	**High**
Add relevant criteria					
Explanation for ranking					

References

Battistini R., 1996. Paléogéographie et variété des milieux naturels à Madagascar et dans les Iles voisines : Quelques Données de base pour l'étude Biogéographique de la région malgache. Biogéographie de Madagascar, 1996 : 1-1 7

Best, P. B., Rademeyer,R. A., Burton, C., Ljungblad, D., Sekiguchi, K., Shimada, H., Thiele, D., Reeb, D. & Butterworth, D.S. 2003. The abundance of blue whales on the Madagascar Plateau, December 1996. Journal of Cetacean and Research Management: 253-260.

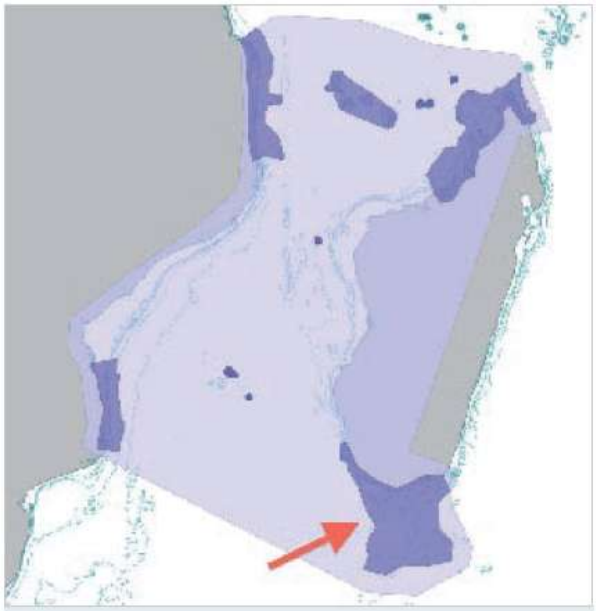
Bouchet P. (2012) The "Atimo Vatae" expedition. http://www.laplaneterevisitee.org/fr/87/accueil. Museum of National History of Paris.

de Ruijter, WPM, Hendrik M. van Aken, Emilio J. Beier, Johann R.E. Lutjeharms, Ricardo P. Matano, Mathijs W. Schoutena, 2004.Eddies and dipoles around South Madagascar: formation, pathways and large-scale impact. Deep-Sea Research I 51 (2004) 383–400

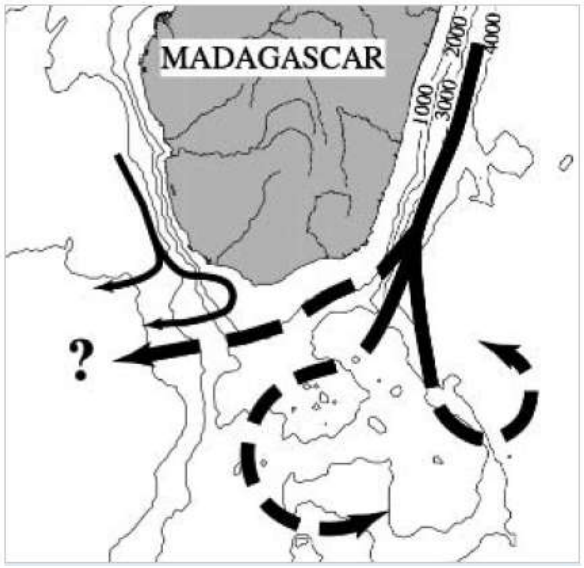
Di Marco SF, Piers Chapman, and Worth D. Nowlin, Jr., 2000. Satellite observations of upwelling on the continental shelf south of Madagascar. Geophysical Research Letters, VOL. 27, NO. 24 : 3965-3968

Maps and Figures

Figures below can be provided in higher resolution.



The southern tip of Madagascar, showing the site extending as far as the EEZ, and the peak of the platform at 100m below the surface some 1,000 km south of the coastline. ©David Obura



Complex currents affected by the submarine plateau result in eddies and upwelling. To the west, the shallow currents feed into the Mozambique channel and to the Agulhas Current in South Africa. ©diMarco et al 2000

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