

Diversity And Diversification in The Southwest Indian Ocean¹
(Program Anr Biotas)

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Biological diversity is unevenly distributed across the world. Both species richness and endemism vary greatly across land and sea and often show localized peaks in geographically restricted "hotspots". Eight of 10 marine hotspots lie adjacent to terrestrial hotspots, suggesting that similar processes may be responsible for their origin and/or maintenance. The Southwest Indian Ocean (SWIO) region is both a marine and terrestrial biodiversity hotspot. It represents a varied terrain for evolutionary processes, encompassing old as well as young island groups (e.g. Madagascar, the Mascarenes, Seychelles and Comoros). We are examining patterns of diversity, differentiation, and diversification in this region using integrative taxonomy and phylogenetic analysis of rapidly evolving DNA markers in marine (invertebrates and fish) as well as terrestrial organisms. Field work begun on Reunion Island, where new collections include ~400 species of molluscs, ~250 crustaceans, ~100 echinoderms, ~250 reef fishes, and ~100 species in other phyla. Approximately 30% of species collected are new records for Reunion. An estimate based on echinoderms suggests that >5% represent new species. About 60% of the species collected at Reunion are also represented by the same form or sister species in recent collections from Pacific Oceania, allowing fauna-level comparisons of differentiation on the scale of ocean basins. Species that show differentiation on this scale will be subjected to detailed phylogeographic analysis within the SWIO. Such a taxonomically-wide approach allows us to test what factors are associated with different types and levels of differentiation.