

# South African Reefs: Current Status and Research

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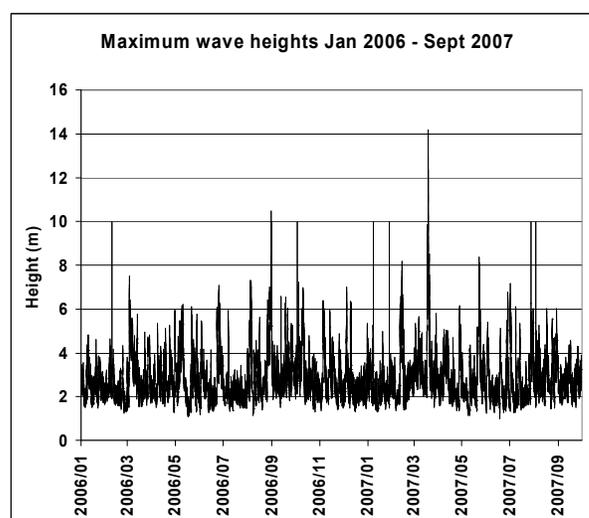
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## INTRODUCTION

South Africa's East Coast subtropical reefs are nodes of biodiversity that are subjected to extractive and non-extractive recreational use. Coral reefs comprise a third of these and lie principally within the Greater St Lucia Wetland Park (GSLWP), a World Heritage Site of great value and importance. Research on the East Coast reef resources has advanced to a point where modelling reef habitat, processes such as accretion vs bio-erosion and connectivity has become possible within the context of climatic and environmental change. A five-year research programme has thus been initiated that will supplement earlier reef studies, making them more cohesive. The results will be integrated with earlier findings to elucidate reef processes, latitudinal gradients in coral population genetics, zooxanthellar cladal resilience to coral bleaching, the usefulness of indicators of reef health and aspects of reef modelling.

## CURRENT REEF STATUS

Reef mapping and modelling of zonation for use has been completed (Ramsay et al., 2006), providing information on the rich biodiversity on the reefs. Ongoing reef monitoring has yielded results that reveal subtle changes in reef community structure and dynamics (Schleyer et al., submitted). The combined



**Figure 1.** Maximum wave heights recorded between January 2006 and September 2007 at Richards Bay, just over 100 km south of the GSLWP coral reefs. Nine of the ten storms that have generated waves in excess of 8 m occurred in the last twelve months, causing considerable damage to shallow and exposed coral communities. (Data courtesy of National Ports Authority – Richards Bay).

results indicate that the reefs and associated fauna remain in excellent condition and, thus far, have been little affected by ENSO-related bleaching. However, severe storms have lashed the KwaZulu-Natal coastline over the past twelve months (Figure 1). These caused considerable damage to shallow and exposed coral

*Obura, D.O., Tamelander, J., & Linden, O. (Eds) (2008). Ten years after bleaching - facing the consequences of climate change in the Indian Ocean. CORDIO Status Report 2008. Coastal Oceans Research and Development in the Indian Ocean/Sida-SAREC. Mombasa. <http://www.cordioea.org>*

communities on reefs subsequently examined in the GSLWP (Schleyer, pers. obs.). Part of the current research programme will focus on this during an assessment of the usefulness of biological and physical indicators of reef health.

## CURRENT RESEARCH

The following are currently under investigation:

1. Whether South African reefs are undergoing net biogenic accretion or erosion. This component will include the effect of the major physico-chemical parameters (temperature, pH, aragonite saturation and PAR light availability) on local reef accretion, relative to coral calcification and other physiological processes.
2. Whether biological and physical parameters could serve as indicators of reef health, and threshold levels of these parameters at which intervention would be necessary.
3. Whether an underwater visual census technique can be developed to compare fish populations under different harvesting and environmental pressures.
4. The genetic resilience within clades of the coral-algal symbiosis and whether large scale genetic transfer is taking place between the major reefs. The corals under study are *Acropora austera*, *Platygyra*

*daedalea*, *Pocillopora damicornis* and *Sarcophyton glaucum*.

5. The level of zooxanthellar cladal resilience to coral bleaching amongst South African corals.
6. Whether predictive spatial modelling of reef habitats and ecosystem processes is possible, elucidating reef function and providing a tool for improved resource management.

## REFERENCES

Ramsay PJ, Schleyer MH, Leuci R, Muller GA, Celliers L, Harris JM (2006). The development of an expert marine geographical information system to provide an environmental and economic decision-support system for coastal tourism and leisure developments within the Lubombo Spatial Development Initiative. Department of Arts, Culture, Science and Technology of South Africa Innovation Fund Project – 24401. Pp 93.

Schleyer MH, Kruger A, Celliers L (submitted) Long-term community changes on a high-latitude coral reef in the Greater St Lucia Wetland Park, South Africa. Marine Pollution Bulletin.