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Introduction

Significant declines in Sooty tern (*Sterna fuscata*) populations have been recorded at Michaelmas Cay over a 15-20 year period. The cause of these declines is unknown.

Recently, decreased provisioning rates, meal sizes and the reproductive failure of seabirds on the southern GBR has been attributed to day-to-day variation in sea-surface temperature (SST) (Peck et al. 2004). A similar phenomenon may be responsible for declines at Michaelmas Cay, as recent SSTs on the reef are the warmest in a century of instrumental record (Lough 2000).

The aim of this study was to investigate the relationship between Sooty tern reproduction and short-term fluctuations in SST at Michaelmas Cay.

Methods

Data on daily foraging success and SST at Michaelmas Cay were collected for 16 days in September-October 2004 and 19 days in April-June 2005. Adult feeding rates of chicks were monitored continuously for three hours each day; relative meal size, feeding frequency and meal composition were recorded. Relative daily mass changes were calculated based on three days when chicks were weighed in the morning prior to their first meal and in the afternoon following a day of visual monitoring. Data loggers were used to measure SST at Michaelmas Reef.

Results

For the later two-thirds of both breeding seasons there were consistent significant negative relationships between both the amount of food delivered to chicks and chick feeding frequency with increasing daily SST (Figure 1a, 1b). These relationships suggest that as SSTs increase, adult Sooty terns are less able to successfully capture prey and spend more time searching for prey.

Discussion

This study provides evidence that *Sooty tern foraging success is limited by day-to-day fluctuations in SST*, and implies a significant negative effect of forecasted climatic changes (GBRMPA 1998) on Sooty tern reproduction.

The results highlight that other short-term within-season mechanisms, such as the distribution of sub-surface predators, must also significantly influence foraging potential.

To date, most research has focused on larger-scale inter-annual effects of increasing SST on seabird reproduction. However, by identifying the effects of short-term fluctuations in SSTs, managers may be able to use SST as an immediate warning signal of the potential detrimental impacts of climatic fluctuations.

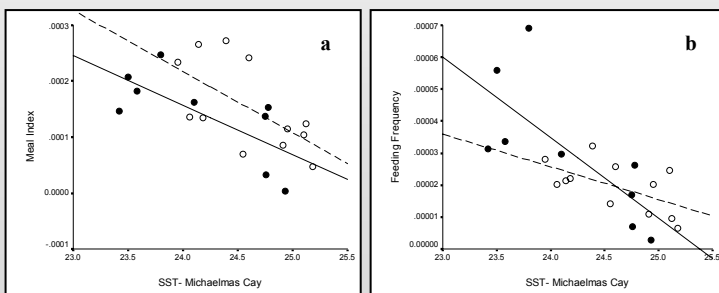


Figure 1. Effect of SST on (a) the amount of food (meal index) during 'foraging regime one' (15 September – 3 October) of 2004 (●) and (20 May – 22 June) of 2005 (○) and on (b) age adjusted feeding frequency in foraging regime one of 2004 (●) and 2005 (○).

References

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