



**Puglia 2003 - Final Conference
Project IGCP 437**

Coastal Environmental Change
During Sea-Level Highstands:
A Global Synthesis with implications
for management of future coastal change

Otranto / Taranto - Puglia (Italy) 22-28 September 2003
Quaternary coastal morphology and sea level changes



Project 437

Woodroffe S. A.¹, Horton B. P.¹, Larcombe P.², Shennan I.¹, Smithers S.³, Bryant C.⁴,
Whittaker J. E.⁵

**Contemporary intertidal foraminifera distributions
of mangrove environments from Cleveland Bay,
Central Great Barrier Reef Shelf, Australia:
implications for sea-level reconstructions.**

¹Environmental Research Centre, Department of Geography, University of Durham, South Road, Durham, DH1 3LE, UK. Fax +44 (0)191 334 1801, E-mail: s.a.woodroffe@durham.ac.uk, b.p.Horton@durham.ac.uk, ian.shennan@durham.ac.uk

²Centre for Environment, Fisheries and Aquaculture Science, Pakefield Road, Lowestoft, Suffolk, NR33 0HT, UK.
E-mail: p.larcombe@cefas.co.uk

³School of Tropical Environmental Studies and Geography, James Cook University, Queensland 4811, Australia.
E-mail: scott.smithers@jcu.edu.au

⁴NERC Radiocarbon Laboratory, Scottish Enterprise Technology Park, Rankine Avenue, East Kilbride, Scotland, G75 0QF, UK. E-mail: cbryant@nercrl.gla.ac.uk

⁵Micropalaeontology Research, Department of Palaeontology, The Natural History Museum, London SW7 5BD, UK, E-mail: j.whittaker@nhm.ac.uk

Keywords: *Foraminifera, mangroves, Australia.*

Abstract

Previous studies into the ecology of contemporary foraminifera distributions have shown salinity to be the dominant control (Scott & Medioli 1978). Salinity is directly related to elevation and duration and frequency of tidal inundation in tidal marshes. A vertical zonation of foraminifera assemblages exists across temperate saltmarshes, with individual assemblage zones having very small vertical ranges (as little as +/- 10cm) (Edwards and Horton 2000, Horton et al. 2000).

New contemporary foraminiferal samples and associated environmental information were collected from Saunders Creek, an estuarine mangrove environment, and Sandfly Creek, a fringing mangrove environment, in Cleveland Bay on the tropical Great Barrier Reef (GBR) coastline, Australia.

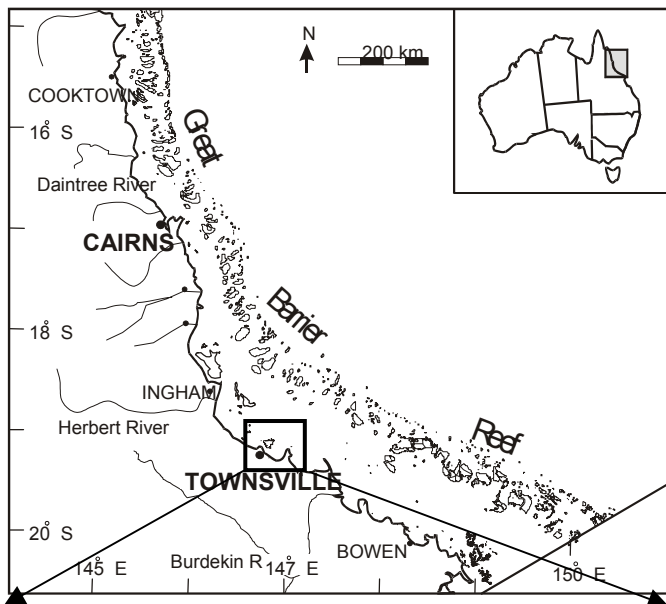
They were collected to elucidate the relationship of the foraminiferal assemblages with the environment.

There is a statistically significant relationship between elevation and foraminiferal assemblages, a relationship best developed where the mangrove fringe is well formed and is not prevented from lateral expansion by geomorphological features (such as chenier ridges).

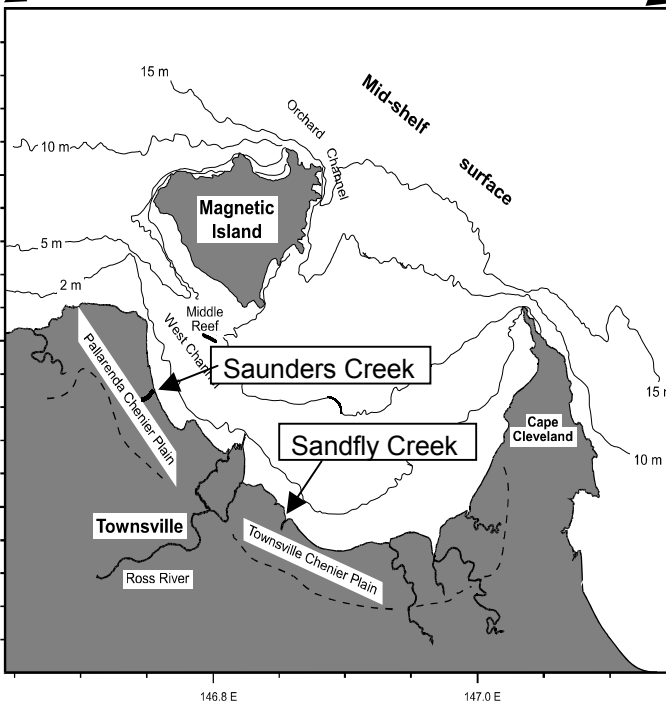
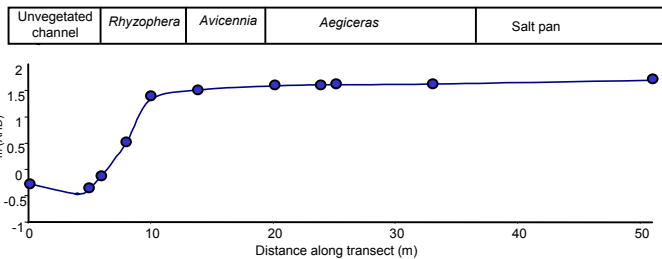
The data supports the vertical zonation concept, which suggests that the distribution of foraminifera in the intertidal zone is usually a direct function of elevation, with the duration and frequency of subaerial exposure as the most important factor. A regionally recognized *A. beccarii* dominated foraminiferal assemblage is found at both sites, existing between just above MLWNT and MHWNT. This assemblage is the most accurate sea-level indicator in this tropical location because of its presence at more than one site. The relationship between foraminiferal and floral mangrove zones is questioned. Mangrove zones are in equilibrium with the local environment, and their upper limit is determined by diverse factors including, but not solely tidal inundation.

References

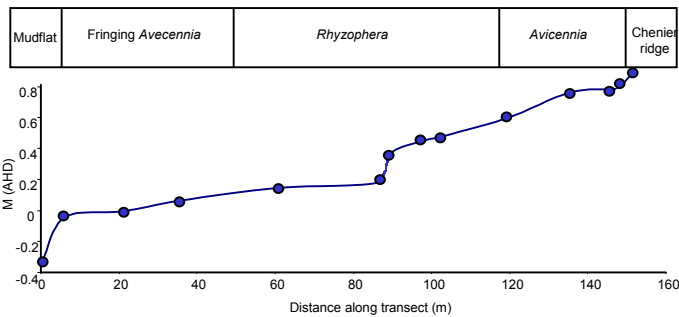
- Horton B. P., Edwards R. J., Lloyd J. M. (2000). *Implications of a microfossil-based transfer function in Holocene sea-level studies*. Geological Society Special Publication (166): 41-54.
- Edwards R. J., Horton B. P. (2000). *Reconstructing relative sea-level change using UK salt-marsh foraminifera*. Marine Geology, 169(1-2): 41-56.



Saunders Creek



Sandfly Creek Transect 1



Sandfly Creek Transect 2

