

MOZAMBIQUE SHELF CORE RESEARCH INITIATIVE

INTRODUCTION AND OVERVIEW OF CORE LITHOLOGIES

Gregor P. Eberli

KEY POINTS

- All cores from the two terraces offshore Mozambique have been cut and described, revealing some unexpected features.
- Initial results far exceed our expectations regarding the scientific impact on the following topics.
 - The cores cover a far longer time span than what was expected, reaching back to 258 ka
 - The tight spacing of the cores allows for assessing lateral variability
 - Coral diversity is very high and evolves during the sea-level rise
 - On the upper terrace, a reefal succession was exposed when sea level dropped to the last glacial maximum but was recolonized during the deglaciation
 - Microbialite distribution varies through time and is highest during the early sea-level rise
 - Petrophysical properties reveal high velocity of the microbialites but also unexpectedly easy breakage under pressure

SIGNIFICANCE

The cores through the reef offshore Mozambique are a unique data set as these cores with an excellent recovery of over 80% provide an unprecedented record of timing of the last two glacial maxima and the onset and rate of sea-level rise during the deglaciation. This expansive core coverage is most valuable for several reasons. First, the five long cores through the fringing reef will help to construct a robust time frame of the reef development during the LGM and the early deglaciation. Furthermore, the five-fold coverage of the LGM reef allows us to address questions regarding the evolution of the reefal community and the changes of the reef-building community towards the drowning, as well as the onset of microbial coating that is typical for LGM reefs.

RESULTS

The results are given in presentations that will cover the key points of this year's research. Good U-Th dates allow us to place a robust stratigraphic age model onto these cores. Sam Goldberg and Merrilee Rivers will use these ages to put the Mozambique sea-level record into a global context.

William Wright will give an overview of the lithofacies in the cores and propose an evolutionary model that takes into account the geometries observed on the seismic data.

One of the characteristics of the reefs growing during the LGM and early deglaciation is the intimate relationship between the coral framework and microbialites growing in the intraframe porosity. Paulina Manekas has identified and logged the different microbialites and found a stark increase in diversity with the onset of deglaciation.

Likewise, the coral diversity has changed dramatically from the LGM to the deglaciation and the final drowning. James Klaus analyzed all the cores and will present a comprehensive data set outlining the evolution of the coral communities.

One of the unexpected findings was the discovery that the upper terrace consists of two reefal successions that differ in age. The reef in the lower portion grew more than 100 kyr ago and was subsequently exposed when sea level dropped further to the LGM. During the Holocene sea-level rise, the exposed terrace was flooded again (about 92 kyr later) and reefs recolonized the terrace. The exposure horizon separating the two reefal successions has a different signature in each of the cores. William Wright will show this variable expression of the exposure.

The microbialites and abundant micritic cementation provide stability to the reef framework, but the rigid nature of the microbialites also results in breakage under little overburden pressure. In addition, microbialites maintain a lot of primary porosity on a core and plug scale with sharp edges that pose a technical problem.

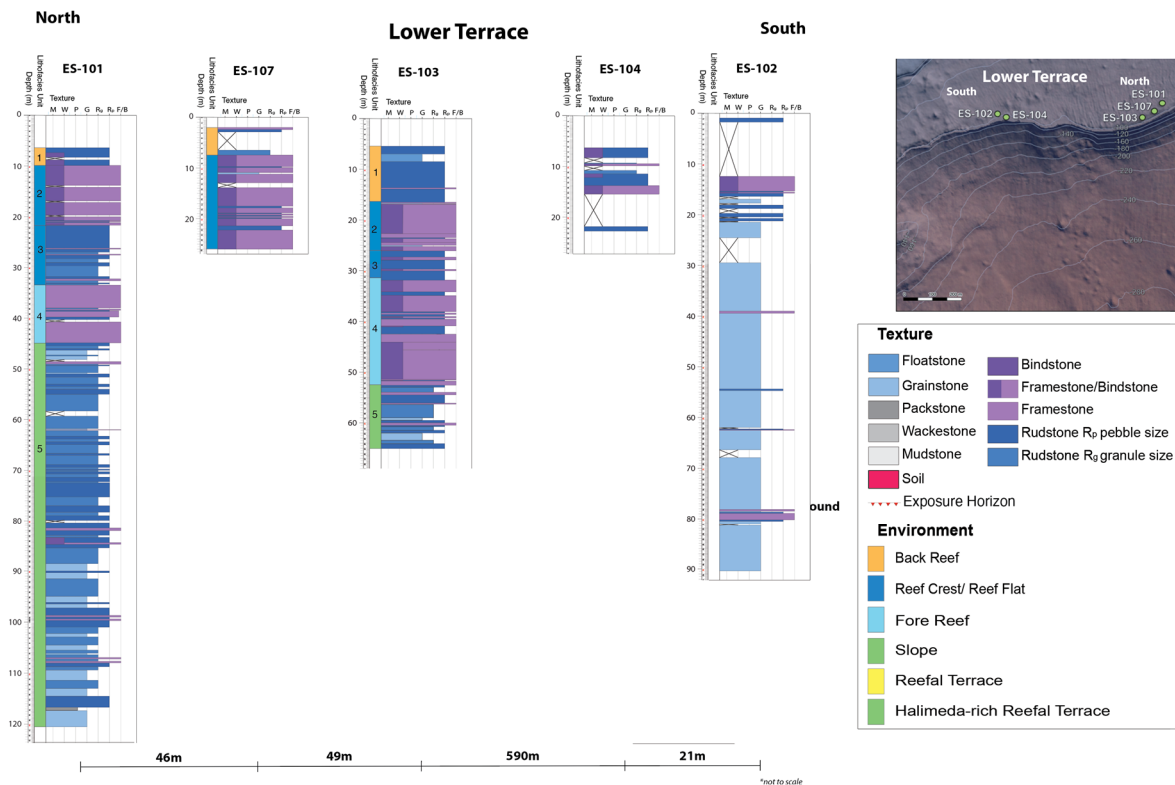


Figure 1: Cross section of the five cores from the Lower Terrace that retrieved the reef succession of the lowstand reef and the underlying slope section. Note how the southern sections have a thinner coral packages and finer-grained slope sections.