TIMING AND COMPOSITION OF CARBONATE DRIFTS IN THE BAHAMAS, NE AUSTRALIA AND THE MALDIVES – IMPLICATIONS FOR CARBONATE PLATFORM ARCHITECTURE

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PROJECT OBJECTIVES

- Investigate the timing of the onset of Neogene ocean circulation based on the contourite drift deposits in the Bahamas, NE Australia and the Maldives.
- Relate composition, shape and dimension of the various drifts to current processes.
- Assess the importance of oceanographic factors relative to sea level and tectonics on the evolution of carbonate platforms.

PROJECT RATIONALE

In the Middle Miocene, the modern ocean circulation pattern was established with the onset recorded in contourite drifts in the Atlantic, Pacific and Indian oceans. Ages in cores from these drifts indicate a near simultaneous onset of these currents in all three oceans. However, a refined age model is needed to confirm this initial assessment. With the onset of the currents an additional factor shaping platform architecture was introduced. Isolated platforms are large obstacles for bodies of water to navigate and their interaction with the currents produces three types of carbonate-specific contourites around carbonate platforms (Eberli and Betzler, 2019). Although sea-level control is still dominant on the platform top, the effect of current control needs to be taken into account in the adjacent slope and basin to explain the geometries of Neogene platforms (Betzler and Eberli, 2019). This study investigates the current-related platform architecture at three locations (Bahamas, Marion Plateau, Maldives).

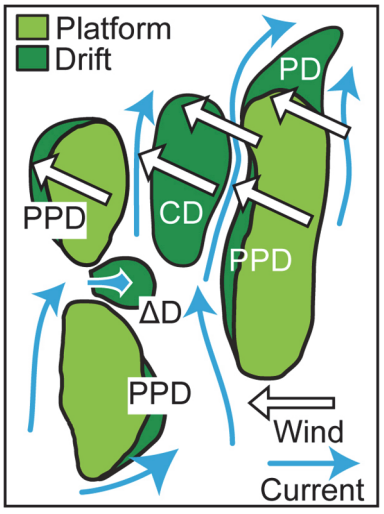


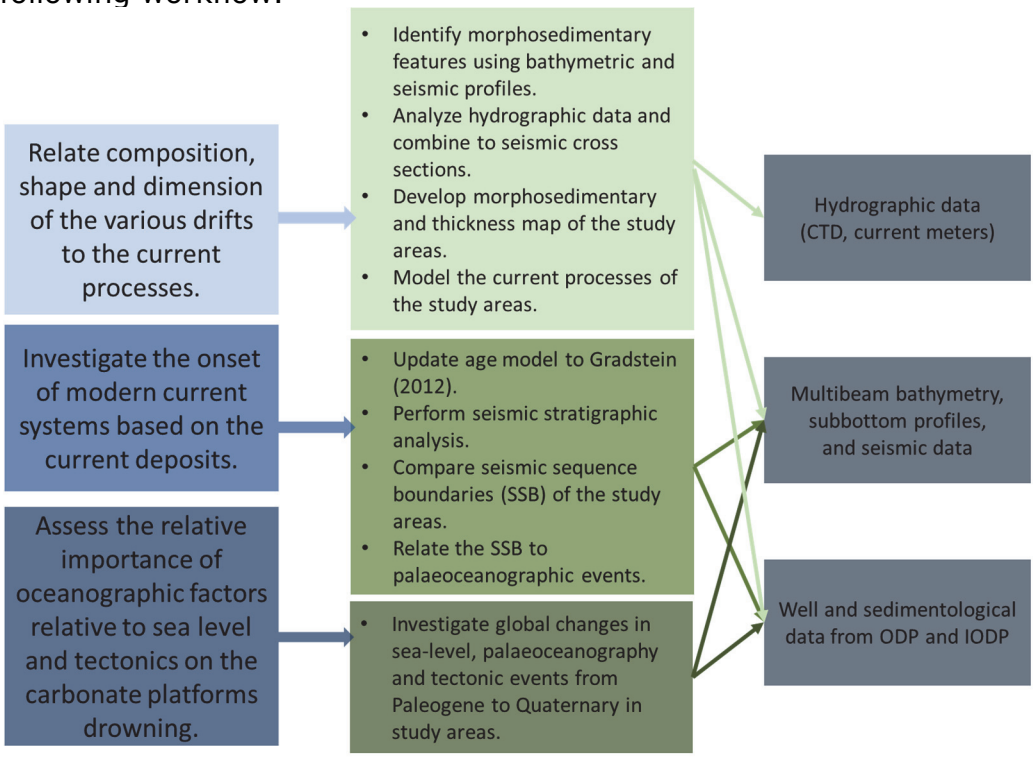
Figure 1: Schematic map view of drift types around isolated carbonate platforms. Periplatform drifts (PPD) form where particles shed from the platform along a line source are reworked and deposited along the slope by contour currents. Patch drifts (PD) occur at the downcurrent edges of carbonate banks and atolls. Delta drifts (ΔD) form on the downcurrent mouth of passages and seaways separating carbonate banks or atolls. Confined drifts (CD) are located along the axis of seaways located between individual carbonate banks (from Eberli and Betzler, 2019).

DATA SETS

For this study three data sets, consisting of seismic, core and log data, from two ODP legs and one IODP expedition are analyzed. The first data set is from the Bahamas (ODP Leg 166) where confined and separated drifts, platform edge drifts and confined drifts are found in the seaways. Along the Marion Platforms (NE Australia), separated and platform edge drifts formed. The Maldives are an example of delta drift formation.

APPROACH AND WORKFLOW

Identification of the onset and composition of the contourite deposits, and their influence on the platform architecture, will be accomplished by employing the following workflow.



SIGNIFICANCE

The outcome of this study will add information towards a comprehensive understanding of the influence of the currents on platform architecture. This knowledge potentially helps discriminate current-influenced platforms from those evolving during times with less ocean circulation.

REFERENCES

Betzler, C. and Eberli, G.P. (2019) The Miocene start of modern carbonate platforms. *Geology,* submitted

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