

SO292 ICECARB

Towards an understanding of carbonate platforms in the icehouse world



RV SONNE

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3rd Weekly report

23. – 29. May 2022

During the last week a dense program of hydroacoustic mapping, sediment sampling and OFOS surveys was performed. The hydroacoustic mapping aimed to unravel the source to sink pathways of the shallow-water components from the inner carbonate platform to the slope and basin, with a focus on the western platform slope of the Tregrosse Reefs carbonate bank. Figure 1 shows a part of the processed multibeam map produced during this survey which clearly shows the effects of the alongslope currents lining the platform margin. In water depths between 240 m and 310 m, a zone of submarine dunes is located with dune crests running approximately perpendicular to the bank slope. A close look at the dune pattern reveals that apparently two opposite current flows are shaping these bedforms, one running north (western part of the dune field) the other one south (eastern part of the dune field). Processing of the ADCP data, which were continuously recorded during the surveying will allow to test this observation. In any case this observation is important, as it supports our hypothesis of the current control on the carbonate platform margins. Mapping of further platform slopes on the Queensland Plateau in the next weeks will allow to expand this aspect.

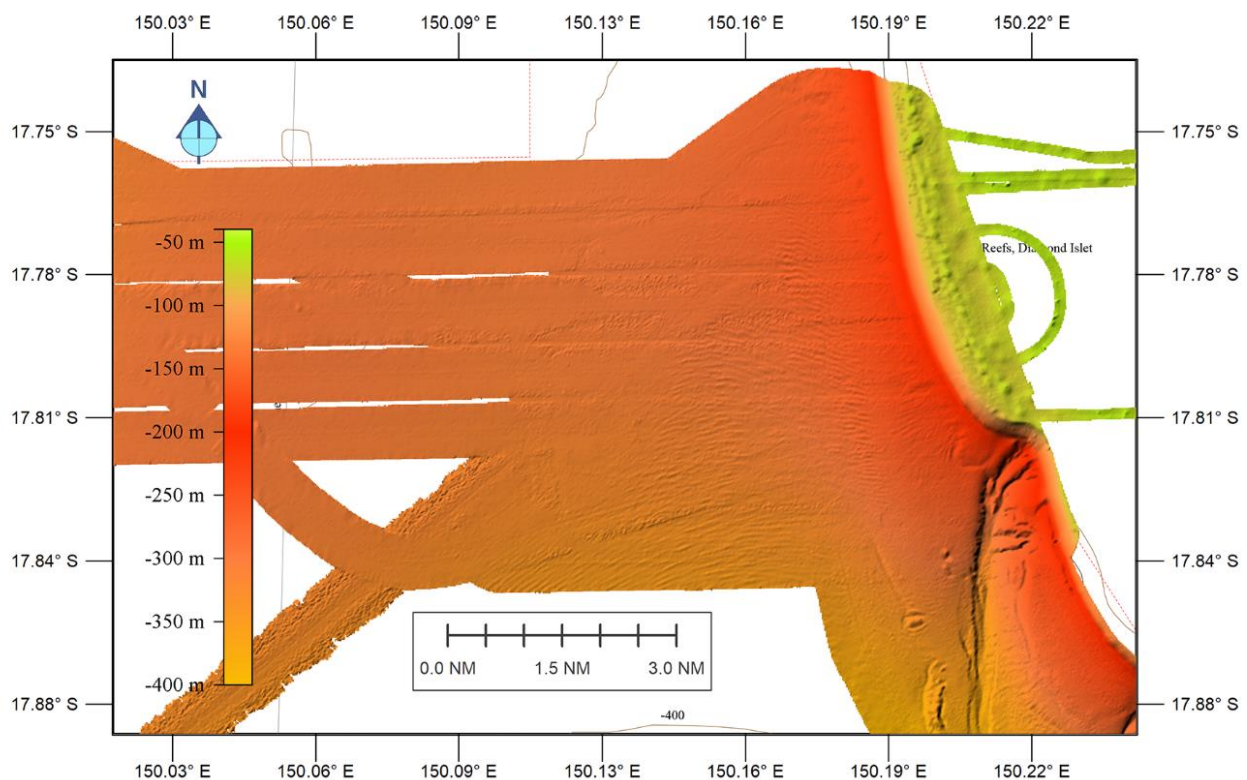


Fig. 1: Multibeam imagery of the western slope of Tregrosse Reefs carbonate platform with submarine dunes.

The sediment sampling performed last week relied on these hydroacoustic survey data and on subsequently acquired OFOS imagery. Data are currently being sighted and an overview will be presented in the next report.

While the hydroacoustic and sedimentological work progressed, the seismic team processed the previously acquired seismic lines. The data are of very good quality and nicely exhibit the features relevant for the understanding of the evolution of the Queensland Plateau carbonate platforms. Figure 2 shows an east to west running line. In front of the bank margin, a drift depositional system with a moat channel and current-controlled deposits develops which can be traced back in time. An exact correlation of the ODP Leg 133 data with the seismic lines is pending and will allow to pinpoint the onset of the current system which nowadays controls sedimentation on the Queensland Plateau. The contourite system, below a high-amplitude reflection, is underlain by a rimmed, flat-topped platform dissected by vertical structures interpreted as karst dissolution features. Some of these features also seem to act as conduits for gas migration. This is an unexpected result of our studies. The source of these ascending gas is, however, not resolvable with our data.

On the morning of the 29th of May, a new seismic survey started after the ramp-up procedure of the seismic sources, which will bring us northward of the first survey area.

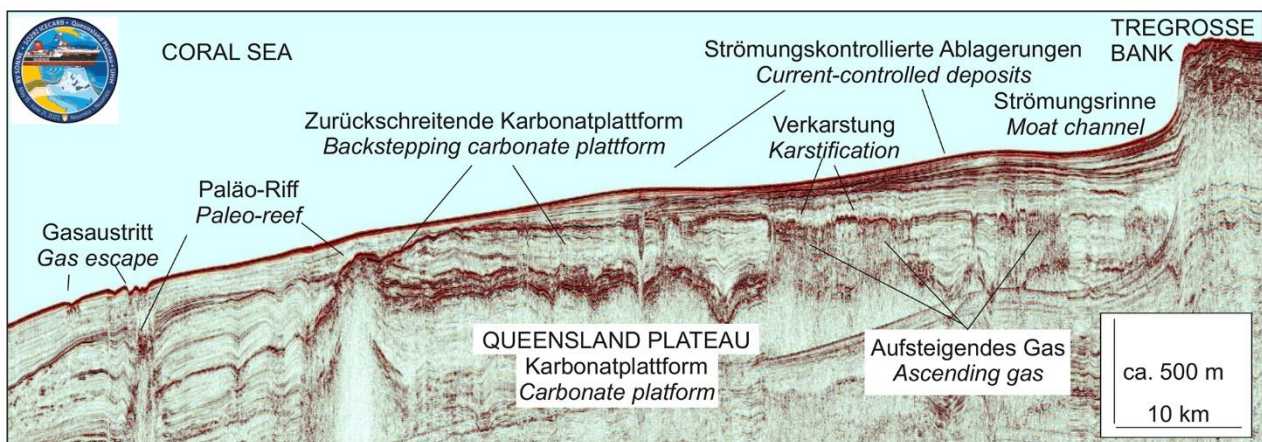


Fig. 2: East (right) to west (left) running seismic line from Tregrosse Reefs Bank towards the Queensland Trough.

Everyone is in good health and sends his greetings home.

Christian Betzler

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