Addendum to Supplementary Form A – Whales and Dolphins (Cruise SO 292)

4. Description of the action

A. Equipment and methods used to comply with the EPBC Act Regulations

Hydroscience Technologies Inc. 144 channel digital streamer with an active length of 600 m and total towing length of ca. 900 m.

1 x Sercel Mini GI gun 45 cinch, 1 x standard Sercel GI gun 150 cinch.

The array will be used with 140 bar and has the following characteristics:

Sound Pressure Level and Sound Exposure Level at 500 m for 10 Hz to 25 kHz are 188.1 dB re 1muPa (peak) and 139,7 dB re 1muPa^2-s (Mxx), respectively (see attachment for mitigation radius of 1 km to 10 km).

Regarding the EPBC Act Policy Statement it can be demonstrated through sound modelling or empirical measurements that the received acoustic signal at 1 km will not likely exceed 160 dB re 1muPa^2-s for 95% of the time, accordingly the following safety zones will be respected:

• Observation zone: 3+ km horizontal radius from the acoustic source,

• Low power zone: 1 km horizontal radius from the acoustic source,

• Shut-down zone: 500 m horizontal radius from the acoustic source,

We expect a low likelihood of encountering whales in the designated study area of the Cruise SO292. This assessment relies on the data provided under http://environment.gov.au/webgis-framework/apps/ncva/ncva.jsf showing that the breeding and calving area of the Humpback Whale is outside of the planned research area.

B. Minimizing impacts on cetaceans

It is planned that four professional mammal observers from the company Ocean Ecology will join the cruise. Use of acoustic sources will be accompanied by these persons 24/7, and operations only will be conducted when there are no objections from the mammal observers.

C. Objectives and purpose of the action

The project objective is to verify the hypothesis that tropical carbonate platforms are strongly controlled by ocean currents. By linking seismic reflection with stratigraphic data from Ocean Drilling Program (ODP) Leg 133 sites at the Queensland Plateau carbonate platform, the backstepping of buried carbonate bank margins will be understood. The focus is on the mapping and correlation of current features such as submarine dunes, drift bodies or current

moats. Recent and youngest depositional processes of the carbonate banks will be analyzed with multibeam and sediment echosounder (Parasound) determining ocean current impact (e.g. sediment thickness distribution, slope instabilities). Sedimentary variations will be analyzed via sediment composition. To assess how the carbonate banks exposed to ocean currents disturb the water mass stratification, CTD stations will be measured upcurrent and downcurrent of the banks. The specific research objectives are: (1) To understand the evolution of the carbonate bank margins. Cores from several ODP Leg 133 Sites provide a solid stratigraphy for the middle Miocene to Pliocene (last 13 million years). This record, however, is not linked to any detailed and systematic sequence stratigraphic and seismic facies reconstruction. To fill this gap we will use high-resolution multichannel seismics to investigate the depositional geometries of the drowned carbonate bank margins and to correlate this to the available stratigraphic framework at the ODP sites. (2) To investigate the Recent and youngest depositional processes. Mapping (multibeam, sediment echosounder) the flanks and toe of slope of the active carbonate banks will determine the ocean current impact on the carbonate source to sink system (sediment thickness distribution, slope instabilities, sediment pathways) filling the gaps and building on the former RV FALKOR 2020 cruises. We will investigate windward – leeward slope variations, toe of slope and basinal successions at the seafloor and in the shallow subsurface. Hydroacoustic data will be backed up and ground-truthed by visual data acquisition via ROV and OFOS (towed frame with video and still camera). (3) To investigate the sedimentary variations with regard to the exposure of the carbonate banks to currents and wind. Sediment composition (grain size, texture, components) varies in function of the depositional processes. Current impact on slope sedimentation has been shown to override gravitational downslope sediment sorting (grain size). A dedicated sedimentological sampling with Van Veen grabs and box corers will be performed to calibrate the multibeam and backscatter data acquired at the distinct flanks of the carbonate banks with different orientations with respect to wind and currents. Gravity coring (6 m) will be performed at locations previously defined in the sediment echosounder data. (4) To assess the water mass stratification and dynamics. Isolated carbonate platforms and their banks in the flow of a current induce turbulence, upwelling, and downwelling at the bodies flanks. Such variations of the depth position of the water mass boundaries will be measured through CTD stations and via ADCP along the ship track.

5. Description of Research

A. A copy of the research proposal is attached.

B. Names of researchers

Christian Betzler, Prof. Dr.

Sebastian Lindhorst, Dr.

Thomas Lüdmann, Dr.

Christian Hübscher, Prof. Dr.

C. Relationship of the researchers

All researchers are faculty members and there is no personal relationship between any of the persons.