(Palaeo)-Geomorphology of Carbonate Platform Slopes and Deepwater Coral Reefs

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The deep water surrounding modern carbonate platforms hides the morphology of their slope and adjacent basin. New multibeam data documents geometries of the lower slope and the adjacent basin with unprecedented accuracy. Likewise 3-D seismic data is capable of displaying these morphologies with a resolution that makes a direct comparison possible. Combined they document the platform basin transition that typically consists of a near-vertical wall and a steep cemented upper slope. Below the slope is dissected by channels that widen down slope and are perpendicular to the margin. Slope failure occurs on all portions of the slope, producing scars and debris flow deposits at the toe-of-slope. In water depths of 450 – 650 m, deep water coral mounds occur in many places. These ahermatypic coral reefs reach impressive heights of 70 m and width of over 500 m. Along the margin they are typically aligned with the slope channels. Farther basinward they colonize drift deposits and their distribution seems to be mostly influenced by the underlying sand wave pattern. Seismic attributes display the geometry of the channelized lower slope and the orientation of its deposits at the toe-of-slope from an older platform. Deep-water coral reefs are seismically imaged at the present-day sea bottom showing a decrease in abundance as water depth increases. Body checking performed within the Oligocene shows seismic bodies that can be interpreted as deep water coral mounds. Modern and ancient geometries are similar, indicating that slope-basin transition has not changed through the Tertiary.