

The evidence of carbonate turbidites in Central Luconia

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Central Luconia has long been recognized as a prolific carbonate province with great oil and gas potential. Carbonate reefs were mainly growing on structural highs formed during the Late Oligocene rifting. Main phase of Carbonate growth occurred during the mid to late Miocene. Some of these carbonate build-ups are aerially very extensive and cover several hundred km². Eustatic sea level changes during the Miocene influence the growth rate of and facies distribution within carbonate build-ups.

It is well described in literature and observed in outcrops that during sea level highstands when the entire carbonate platform were flooded, the so called “highstand shedding” occurred. It has been long recognized in Central Luconia that carbonate talus and debris accumulated at the flanks of major build-ups. However, its distance of transportation is short and hence limited in distribution aerially. Recently, with the advent of high-resolution 2D seismic data, a different type of sedimentation mechanism has been studied and mapped in Central Luconia: “carbonate turbidites” which were transported a considerable distance into adjacent basins.

These widely distributed stacked turbidites have been identified based on anomalous seismic amplitudes. These seismic anomalies can be traced back to lows and canyons on the carbonate platform, which indicates that these are indeed the seismic response of carbonate sediments sourced and shed-off from the build-ups.

During sea level highstands, high carbonate growth rate caused the steep platform margins to prograde. Significant amount of carbonate grains and “sands” accumulated on the platforms and their fringes. Occasional storm events would then transport these carbonate “sands” further into the basinal area in the form of turbidites, which have a spectacular transportation distance of more than 50 km from the source. These turbidites are generally ponded in the lows between major build-ups. Sedimentation of individual fans and units seems to be controlled by syn-sedimentary faulting within the basins.

Carbonate turbidites have been found and described in many different geologic provinces of the world. Examples stretch from the modern analogues around the Great Bahama Bank to ancient deposits in the Permian Basin of West Texas.