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Depositional Environment of Neogene Reservoir Succession of Bengal Basin, Bangladesh constrain from lithofacies and electrofacies analysis

M. A. Islam

Department of Petroleum Geoscience, Faculty of Science, University of Brunei Darussalam, Brunei
(aminul.islam@ubd.edu.bn)

The present study has been carried out to integrate the study of core and well log data to reconstruct the depositional environment of Neogene Reservoir Succession of Bengal Basin, Bangladesh. In this regard, lithofacies and electrofacies analysis has been carried out using core and well log data from four gas wells of Bengal Basin. The study confirmed twelve distinct lithofacies grouped into four major facies associations. The facies and facies succession analysis of the core samples reveal that the detrital influx was contributed by a large fluvial system with strong evidence of tide dominated depositional processes. Multistory sand bodies, channel avulsion, erosional base sandstones reflect distributary channel sands of fluvial origin. Sharp base sandstones within siltstone and sandstone interbeds represent deposition took place in crevasse splay within interdistributary bay. Planar and cross bedding represent fluvial environment of deposition, how ever lenticular, flaser, wavy bedding, mud drapes, bioturbation, bidirectional ripples and herring bone cross strata reflects strong tidal influence within the depositional setting. Over all coarsening upward sequences represent deltaic progradation.

It reveals from this study that bell, funnel, egg/bow, linear shape electrofacies are common whereas cylindrical shape appears as less common. Bell shape represents fining up successions and funnel shape indicates coarsening up successions. The log cycles indicate over all deltaic progradation. Small scale fining and coarsening upward cycles indicate autocyclic change of deposition due to lateral migration of depositing medium within the basin. Large scale fining and coarsening upward cycles indicate allocyclic change of deposition due to tectonic subsidence and eustatic sea level changes. The depositional model for the sediments encountered in the studied wells has been considered to be that of a lower delta plain to outer shore face with a range of facies typical of fluvio-deltaic to tide dominated environments. Potential reservoir sandstones were the characteristic deposits of fluvio-deltaic distributary channels, crevasse splay, distributary mouth bars, tidal sand flat, tidal channels and tidal ridges. Bell, funnel and egg/bow shape indicate good quality reservoir rocks are located at the base, top and middle of the electrofacies respectively. Deltaic prograding successions are reservoir sand dominating and retrogradational or transgrassive successions are shale dominating.