



Depositional and Stratigraphic Architecture evolution of Deltaic Successions in Different Tectonic Stages: Palaeogene Kongdian and Shahejie Formations, Baxian Sag, East China

Li Xiaopeng (1) and Wang Hua (2)

(1) Faculty of Earth Resources, China University of Geosciences(Wuhan), Wuhan,China (lixiaopeng@cug.edu.cn), (2) Faculty of Earth Resources, China University of Geosciences(Wuhan), Wuhan,China (wanghua@cug.edu.cn)

Predicting the distribution of favorable reservoir and evolution of ancient deltaic successions requires the evaluation of the depositional processes and its vertical architecture based on sedimentary facies analysis. This has been applied to a core-based subsurface facies analysis of a deltaic succession in the early to late Palaeogene of Baxian Sag, Bohaiwan Basin, East China. Evolution of three genetically successions with a total thickness of 1000-4000m comprising three depositional systems including fan delta, braid delta and shallow water delta record initial rift phase, rapid rift phase and post rift phase. The initial rift phase consist of several coarsening upward successions, which are mainly conglomerate, pebbly sandstone and coarse sandstone that deposited from root segment, middle segment to front segment of fan delta. The rapid rift phase consist of several fining upward successions developed individual or associated with coarsening upward successions, the former one mainly developed as fluvial-dominated channel fills in deltaic plain and delta front, and the latter one mainly developed in the intersection of distributary channel fill and mouth bar, mainly dominated by wave and influenced by fluvial, with the feature of fine grained sandstone. The post rift phase consist of fining upward successions, interpreted as fluvial-dominated coarse-grained distributary channel fills, and coarsening upward successions, interpreted as wave dominated, fluvial influenced fine-grained sandstone in mouth bar. Delta plain occupied more than 70% of the development area of delta, with features of large-scale cross-bedding, massive bedding. The fan-deltaic to braid-deltaic evolution is represented by an overall upward increase in the distance of progradation, decrease in grain size and increase in wave influence. The following evolution to shallow water delta is represented by an overall upward increase in aggradational succession developed, decrease in paleoslope angle, which is less than 1°, increase in distributary channel fills in deltaic plain and decrease in the scale of delta front development. The evolution of the three phases is attributed to the decrease in tectonic activity. Stratum deposited in initial rift phase showing a large scale unconformity with Mesozoic, and its spatially distribution is restricted by the buried hills exist before Palaeogene. The fan deltas widely developed in this phase with a feature of relatively small scale expanding in each fan. The vertical stratigraphic architecture of this phase shows a feature of progradation restricted by buried hills, and the fills all together flatten the basement of basin. The vertical stratigraphic architecture of successions in rapid rift phase is represented by a serious of relatively long distance progradation, displaying more complex facies relationships. In post rift phase, aggradational stacking pattern is widely developed, with the feature of discontinuous distributary channel fills reciprocal overlying vertically and occur in belts regionally. The coarse-grained sandstones in front of fan delta in the initial rift phase, the fine-grained sandstone reach to front delta which is reworked by wave processes and the discontinuous distributary fills in shallow water deltaic plain can be the favorable reservoir considering their property and condition of hydrocarbon accumulation.