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Depositional architecture and evolution of inner shelf to shelf edge delta systems since the Late Oliocene and their respone to the tectonic and sea level change, Pear River Mouth Basin, northern South China Sea

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The Pear River Mouth Basin is located in the northern continent margin of the South China Sea. Since the Late Oligocene, the long-term active fluvial systems (Paleo-Zhujiang) from the western basin margin bebouched into the northern continental margin of the South China Sea and formed widespread deltaic deposits in various depositional geomorphologies and tectonic settings. Based of integral analysys of abundant seismic, well logging and drilling core data, Depositional architecture and evolution of these delta systems and their respone to the tectonic and sea level change are documented in the study. There are two basic types of the delta systems which have been recognized: inner shelf delta deposited in shallow water enviroments and the outer shelf or shelf-edge delta systems occurred in deep water settings. The paleowater depths of these delta systems are around 30 to 80m (inner shelf delta) and 400-1000m (shelf-edge delta) estimated from the thickness (decompaction) of the delta front sequences. The study shows that the inner shelf delta systems are characterized by relatively thin delta forests (20-40m), numereous stacked distributary channel fills, relative coarse river mouth bar deposits and thin distal delta front or distal bar and prodelta deposits. In contrast, the outer shelf or shelf edge delta systems are characteristic of thick (300-800m) and steep (4-60) of deltaic clinoforms, which commonly display in 3D seismic profiles as “S” shape reflection. Large scale soft-sediment deformation structures, slump or debris flow deposits consisting mainly of soft-sediment deformed beds, blocks of sandstones and siltstones or mudstones widely developed in the delta front deposits. The shelf edge delta systems are typically associated with sandy turbidite fan deposits along the prodelta slopes, which may shift basinwards as the progradation of the delta systems. The delta systems underwent several regional cycles of evolution from inner shelf deltas to shelf edge deltas since the Late Oligocene in the study area, and this is consistent with relative sea level changes constrained by interplay of tectonic subsidence or global sea level change and sediment supply. The shelf-edge delta sandy deposits and the associated prodelta turbidite fan systems are the most important oil/gas bearing reservoirs in the continental slope area.