

STRATIGRAPHIC ARCHITECTURE AND DIAGENESIS OF MIDDLE TO LATE PALEOZOIC REEFS AND MOUNDS OF THE BOLSHOI KARATAU MOUNTAINS, KAZAKSTAN AND THE SOUTHERN URALS, RUSSIA: AN EXAMPLE OF BIOTIC DEMISE AND RECOVERY

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Facies analysis and laboratory study has been completed on Upper Devonian to Lower Permian reefs and mounds of southern Kazakstan and Russia. Famennian reefs are composed of Girvanella-Renalcis-sponge-brachiopod boundstone and calcitic cementstone and form reef-rimmed platforms. Tournasian and Lower Visean carbonates lack an organic margin and form ramps that contain Waulsortian mud mounds rich in crinoids, sponges, and rugose corals. Middle Visean through Serpukhovian carbonates consists of grainstone-rimmed platforms and slopes. Waulsortian mounds located in slope settings are composed of bryozoan-sponge-Tubiphytes-algae boundstone and calcitic cementstone. Bashkirian shelf margins consist of Donazellid-Archaeolithoporella-brachiopod boundstone and aragonitic cementstone. Lower Permian shelf margins and slope mounds are comprised of bryozoan-Tubiphytes-algae boundstone and calcitic cementstone and Palaeoaplysina rudstone. Devonian through Lower Carboniferous reefs and slope mounds are tight due to cementation; dolomitization and karsting enhance porosity in shelf margins and interiors. Middle Carboniferous and Lower Permian slope mounds and margin facies are porous due to exposure related diagenesis.

These data suggest that: 1) following a Late Devonian extinction event, major shifts took place in the composition and spatial distribution of reef and mound biota as carbonate benthos became re-established, and 2) the distribution of reservoir-grade porosity is strongly influenced by early-marine cementation, dolomitization and meteoric-related diagenetic processes. Corresponding shifts in the morphology of carbonate platforms, and the spatial distribution of potential reservoirs, suggest a strong biotic and abiotic influence on platform architecture and reservoir development. Comparisons with study of Karachaganak and Tengiz Fields confirm these observations.