



Deltaic System in the Southern Shelf of the Ulleung Back-Arc Basin, East Sea, Korea

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The Ulleung basin is one of back-arc basins in the East Sea of Korea with the Japan and Yamato basins, formed as a result of extension behind the Japanese island-arc in Miocene. Its shelf basin was constructed by stacked prograding deltaic sequences over 10 km in thickness. The basin is platformal in the northwest, and folded and faulted by thrusts in the southeast. Deformation occurred around 12.5 Ma, the timing of which is related to collision of the Izu-Bonin arc against the Japan Island. The deformed and uplifted blocks were peneplained in 6.3 Ma. N-S trending broad folding occurred recently in the platformal shelf area.

Three depositional sequences, separated by unconformities of 12.5 and 6.3 Ma, represent the major transgressive-regressive-transgressive cycles of the Ulleung back-arc shelf. Each cycle corresponds to opening and continuous subsidence, destruction of back-arc due to compression, and post-closure regional subsidence, respectively. The deltaic system consisting the depositional sequences includes coastal, delta plain, delta front, prodelta and deep water facies, each being distinctive in log and seismic characteristics. The coastal facies are characterized by serrated gamma log responses and discontinuous seismic reflectors suggesting fluvial formation: delta plain by association of fining-upward cycles and shale-filled distributary channels: delta front by blocky or coarsening upward log responses: prodelta by shale dominance and low seismic impedance: and deep water by thick sandstone-shale combinations interpreted as submarine fan complexes.