Field Studies of Lobe Evolution of Active Shelf-Edge Delta at a Rift Basin Margin

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ABSTRACT

Under the present conditions of sea level high-stand, flooding of continental shelves has, for the most part, prevented the formation of shelf-edge deltas, which are situated on the continental shelf-slope break. However, as has been shown with seismic records from continental margins, fluvial-deltaic systems were ubiquitous near the shelf-slope break during past glacial intervals, due to lower sea level conditions. Geometry of shelf-edge deltas is therefore almost exclusively assessed via seismic data, numerical and physical (flume) experiments. Thus, the physical processes that build shelf-edge delta remain elusive due to a lack of modern field studies. This research proposes to conduct field surveys of an active shelf-edge system: the Selenga River delta, Russia, to document the physical processes that are responsible for partitioning water and sediment, and therefore growing its lobes. Covering ~ 600 km2, this system is located on the margin of Lake Baikal, a deep (~ 1600 m) water body created in the active Baikal Rift Zone, southern Siberian. The aim of study is to elucidate the role that sediment dispersal processes play for building shelf-edge systems, by measuring water and sediment distribution within the channel network from low to bankfull flow conditions, to constrain the timescale of delta lobe development. Results of this study will improve existing numerical models of delta development by constraining spatiotemporal variability of sediment partitioning for a shelf-edge system. Furthermore, shelf-edge deltas are prolific petroleum-bearing systems, so this research could help hydrocarbon geoscientists by further constraining sedimentary processes that build stratigraphy of these systems.

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