3-D Modeling of Subsurface Stratigraphy in the Lower Mississippi River Delta Plain

Presented by

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ABSTRACT

The Mississippi River Delta Plain (MRDP) is one of the largest delta plains in the world and is socially and economically imperative to Louisiana and the rest of the United States; however, the delta plain has been suffering from a high rate of land loss due to multiple reasons such as sea level rise, land subsidence and coastal erosion. Coastal protection and restoration projects have been planned and implemented to mitigate the land loss problem. Many studies have been conducted to understand physical processes and optimize efficacy of the projects, but the importance of subsurface components, such as stratigraphy and groundwater, have been underrated. Though extensive subsurface investigations were conducted in the delta plain, very few regional-scale 3-D models were constructed to estimate spatial distribution of different soil types and to simulate groundwater flow and subsidence. This study uses geostatistical methods to regionalize geotechnical boring data collected by multiple agencies and scattered in an area of ~1,800 km^2 on the delta plain. A three-dimensional stratigraphic model was built covering the lower MRDP and extending from 3.0 m to -45.7 m in elevation. An integrated groundwater-subsidence model will later be constructed upon the stratigraphic model to give insight into groundwater flow, groundwater surface-water interaction, pore-pressure-change related subsidence, and how these processes link to land loss in the region.

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BIOGRAPHY

An Li is a Ph.D. candidate in Civil Engineering from the Department of Civil and Environmental Engineering at Louisiana State University. He conducts research under supervision of Dr. Frank Tsai in the area of water resource engineering (groundwater). His research topics include:

- 3-D modeling of subsurface stratigraphy in the lower Mississippi River delta plain
- Integrated simulation of groundwater flow and subsidence in the Mississippi River delta plain
- Interactions between groundwater and river-water in the Mississippi River delta plain
- Modeling 3-D soil stratigraphy using subsurface boring and cone penetrometer tests in the Inner Harbor Navigation Canal, New Orleans, Louisiana
- Modeling 3-D soil texture of river deltaic wetlands using compositional kriging method
- Groundwater pumping induced land subsidence in the Baton Rouge, Louisiana

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Prior to groundwater related research, he was involved with research in early earth tectonics in western Australia, and structural geology of the Himalayan thrust belt in western Nepal. He received his MS degree in

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