



### Salinity and Tides in Alluvial Estuaries

By H.H.G. Savenije



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The book describes an integrated theory that links estuary shape to tidal hydraulics, tidal mixing and salt intrusion. The shape of an alluvial estuary is characterised by exponentially varying width and the absence of bottom slope. This topography is closely related to tidal parameters, hydraulic parameters and parameters that describe 1-dimensional mixing and salt intrusion. Starting from the fundamental equations for conservation of mass and momentum, analytical equations are derived that relate the topography to tidal parameters (tidal excursion, phase lag, tidal damping, tidal amplification), wave celerity, lateral and vertical mixing and salt intrusion.

The book presents a review of the state of the art, a comprehensive theoretical background and ample case illustrations from all over the world. It provides tools with which human interference in estuary dynamics can be described and predicted, resulting from, for instance: upstream fresh water abstraction, dredging, climate change or sea-level rise. In describing the interactions between tide, topography, water quality and river discharge, it provides useful information for hydraulic engineers, morphologists, ecologists and people concerned with water quality in alluvial estuaries.

Although the book can be used as a text book, it is mainly a monograph aimed at graduate students and researchers.

- \* Provides new integrated theory for tidal hydraulics, tidal mixing and salt intrusion in alluvial estuaries
- \* Presents a consistent set of analytical equations to compute tidal movement, tidal mixing and salt intrusion, derived from the fundamental laws of conservation of mass and momentum
- \* Serves as a practical guide with many illustrations of applications in real estuaries



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