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INTERACTION BETWEEN RIVER FLOW, TIDAL DAMPING AND TIDAL PROPAGATION IN ESTUARIES

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Tidal damping and tidal wave propagation in estuaries are closely interlinked. In estuaries where tidal amplification occurs (e.g. the Thames or the Schelde) the tidal wave travels much faster than the classical wave celerity; in estuaries where the tidal wave is damped (e.g. the Pungue, the Incomati), the tidal wave travels substantially slower. The river discharge enhances tidal damping, slowing down the wave celerity. In this paper analytical equations, derived from the full St. Venant equations, are presented that relate river discharge to tidal damping and tidal damping to wave celerity. They can be solved in a coupled analytical model. Case studies are presented of the Schelde and Incomati estuaries.