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Bathymetric evolution of the Mersey Estuary (UK)

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We assess the capabilities of a Lagragian sediment model for indicating future morphology of the Mersey. The broad aim is to develop modelling strategies for estuaries of varying sizes, shapes, morphological stage and exposure to, for example, tides, storminess, river flow.

The model comprises a high resolution 3-D hydrodynamic model (with turbulence closure) and a simplified random-walk particle tracking module to describe erosion, transport and deposition of up to a million particles. We examine the model responses to changes in sediment sizes and supply, their subsequent distribution within estuary and model parameters (e.g., bed friction, saline intrusion).

Comparisons with results of observational studies indicate that the model is effective in reproducing the character and magnitude of: suspended sediment concentrations, net tidal fluxes and long-term deposition. However, it is the flexibility of the model's Lagrangian approach that gives it potential for simulating mixed sediments and flocculation.