



## **Sediment Dynamics in Tidal Basins: From Individual Processes to State Estimates**

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We review here theoretical concepts, novel observations and results of numerical simulations for German Bight and East Frisian Wadden Sea. The data base includes ADCP observations, continuous measurements on data stations and satellite data originating from the Medium Resolution Imaging Spectrometer (MERIS) onboard the ESA satellite ENVISAT. Numerical simulations use nested 3-D numerical model coupled with a suspended matter transport model. It is demonstrated that combining theory and observations facilitates understanding some basic processes, such as stokes-drift induced vertical circulation, effects of breaking wind waves, interplay between turbulence and transport. The good agreement between observations and simulations provides convincing evidence that model simulates basic dynamics and sediment transport. This motivates further use of developed tools for hindcasting dynamics of tidal basins.