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Downscalling dynamics and sediment dynamics from regional to coastal: The East-Frisian Wadden Sea

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Resolving ocean regions very near the coast in numerical models means resolving the coastal boundary layer that requires complex physics and very fine resolution. With approaching the coast the overall role of near bottom turbulence and sediment dynamics increases the latter controlling coupling between water- and morpho-dynamics. In this paper we describe downscaling from regional to shelf for the area of German Bight and East-Frisian Wadden Sea. The employed methods include data analysis, numerical simulations and validations of model against data. Data base includes ADCP transects and localised observations, continuous measurements on data station in the tidal basin of Spiekeroog and satellite data originating from the Medium Resolution Imaging Spectrometer (MERIS) onboard the ESA satellite ENVISAT with a spatial resolution of 300 m. The numerical model is based on the General Estuarine Transport Model (GETM) and is coupled with a suspended matter transport model. The horizontal resolution is 200 m. Data analysis and simulations reveal new patterns of sediment controlled by transport and turbulent kinetic energy. We demonstrate that resolving the tidal flats and transports in the straits connecting the intertidal basins with the North Sea is of utmost importance for the quality of simulations.