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Changes of the Ems estuarine dynamics caused by human interventions

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River Ems estuary in the north west of Germany is a partially mixed estuary, which exhibits strong accumulation of cohesive fines by means of fluid mud as a result of several deepenings and straightenings that were conducted during the past decades. The driving phenomena is increased tidal asymmetry in velocities with a strong deformation of the tidal shape, which results in short, but strong periods of flood flow in combination with weaker ebb flow over longer durations. The project described in present study, deals with three dimensional hydro-morphodynamic simulations of an historical state from 1937 from the Ems estuary compared by a 2012 numerical model to analyse changes in baroclinic circulation and existing turbidity zone, due to human modifications. Results show an intensified baroclinic circulation and extended inland turbidity zone by means of fluid mud induced baroclinic effects. Therefore, the turbidity zone consists of fluid mud deposits of several meters and extends throughout the whole tidally influenced reach up to the most downstream located weir.