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Extreme changes in the thermohaline stratification in tidal basins: a case study for the German Bigh

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In this study we present analyses of the thermohaline stratification of tidal basins during extreme weather events from numerical simulations and observation using the German Bight basin as a test case. The time and spatial variability of the vertical stratification and mixing is simulated by parallel using of two numerical models: General Estuarine Transport Model (GETM) and BSH circulation model (BSHcmod). Atmospheric forcing and tides play an essential part in the synoptic and neap-spring variations of SST, stratification and tidal fronts. Processes that influence the mesoscale variability of the thermal stratification have been quantified. The response of circulation and vertical stratification to surface forcing is studied as well. The model results are further compared with data from observations. The observational data base includes ADCP observations, continuous measurements on data stations and satellite data. We demonstrate the model capability to realistically simulate the frontal dynamics of shelf seas.