What should you know about atmospheric reanalysis products, examples based on historical severe storm tides

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We show how well different atmospheric reanalysis products are suited to force the simulations of historical severe storm tides with a hydrodynamic model. Severe storm tides are the main hazard to the coast of the German Bight and forecasting them is a key issue. We have used a hydrodynamic model forced by atmospheric century reanalysis data (20CR-ensembles, ERA5 and UERRA-HARMONIE) and FES-tides to simulate and compare the highest observed water levels in the German Bight. In general, storms with a track over the central North Sea show a higher variability in the water level simulations than storms with a strong pressure gradient over the central North Sea due to a low over Scandinavia and a high over the Bay of Biscay. The highest observed water levels in the German Bight (e.g. in Cuxhaven and Husum) could not be simulated with any of the considered atmospheric forcings. The individual weather situations with corresponding storm tracks are analysed to better understand their different effects on the peak storm tides, their variability and predictability.