



Analysis of tide-gauge data from Esbjerg Denmark: is there non-stationarity in the surge extremes?

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Climate-change mitigation requires timely planning of coastal sea-defences in the face of expected climate changes. It depends on long-range insights based on statistical analysis of observed sea-level data and models of expected sea-level changes, as well as an understanding of the evolution of tides and wind-driven storm surges. In this poster we focus on the statistical analysis of observations with a view towards understanding how a predictive model for sea-level, including sea-level changes, changes in tide constituent's ranges, and storm surges, can be formulated.

We have analyzed the 129-year long time-series of hourly tide-gauge observations from the North Sea port city of Esbjerg, in Denmark. We describe results relating to the mean sea level changes observed, and describe a harmonic analysis we have performed which reveals non-stationarity in various tidal constituents, and expose the residuals - that is, when sea-level and tide have been removed - i.e. the storm surges - to an extreme value analysis.

We discuss how the elements of such a model could be projected into the future, and a simple sea-level model for the 21st Century is proposed.