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# A stochastic extreme sea level model for the German Baltic Sea coast

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Coastal flood risk assessments require estimates on the impact of extreme sea levels (ESL) and their associated probabilities. However, large uncertainties in the calculation of flood impacts may arise due to variability within the durations of such events. Quantifying these uncertainties is possible through sensitivity analyses, where several scenarios are considered when mapping flood extent. Providing a sufficiently large sample of ESL events for these analyses is difficult however, as extreme events in empirical data are rare and numerical modelling approaches can be computationally expensive and time consuming. Therefore, we have developed a stochastic ESL model capable of generating many thousands of ESL events while remaining computationally inexpensive. Each event is produced as a time-series of water levels, allowing for analyses which consider not only peak water level, but the temporal variability of the water level curve as well. Currently, the model has been developed for the micro-tidal German Baltic Sea coast, and has been applied at 45 locations. The model utilizes parametric distribution functions and a multi-dimensional Gaussian copula to generate artificial events through Monte-Carlo-Simulations, and is driven by high-resolution water level data. As such, it is limited by the availability, length and quality of such data, but is capable of incorporating additional information, such as historical ESL measurements, to improve model output.