

ASSESSEMENT OF EXTREME STORM SURGE HYDROGRAPHS

FOR THE SOUTH-WESTERN BALTIC COAST USING UNIVARIATE AND BIVARIATE STATISTICAL MODELS

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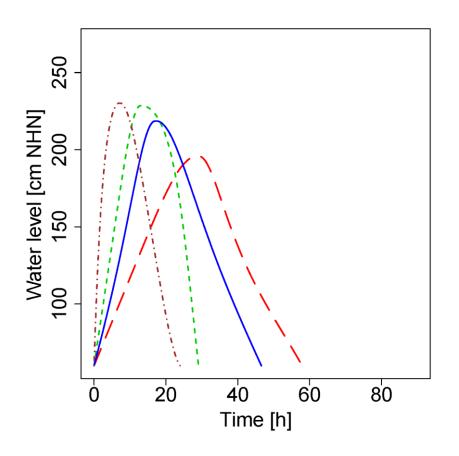


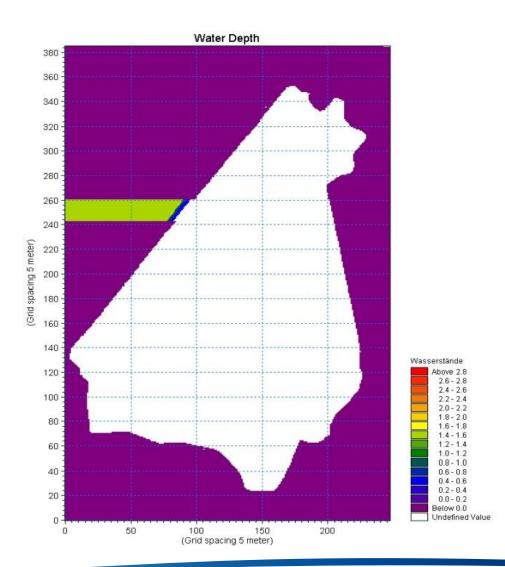
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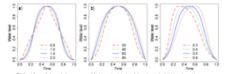
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Introduction

When designing food protection structures it is common practice to define storm surge water levels with certain return periods that The excellent region whereas is answer to provide the end proved. A common consult imprevents provide special probabilised constructions are in the support a first end provide in the provided to do provide special provide probabilised constructions are in the support and the provided the top constructions to do provide special provide the probabilised constructions are provided as a support of the provided to do provided the top constructions the provided the support of the provided as a support of the provided to do provided the provided to the provided the

Therefore storm surge hydrographs, being the progression of rater levels over the time, are needed to design these protector structures or to assess their reliability.



Warnemunde

Fig.2 Influence of charges in the parameters a (M), b (series) and the time of the peak wave rise all (tight) or the resulting communge hydrograph where **Diversity Statistical Analysis**

Dimensionless Storm Surge Hydrographs — To generate random hydrograph shapes (1g. 5) both passmeles (a und b) of eq.1 are generated — randomly The tree of the peak water level varies within the imits of actually measured trees for each location

Greitevold

Application

Samplariy for the locations Warnemürcle and Gerlandid bur dimensionless storm surge hydrograph shapes are simulated (19, 5). These

samples.

Fig.1

Data and Hethod

University Statistical Analyses

Incut data

Selected gauging sites along the Gentur Bable Sea coast

Hourly measurements of water levels at selected gauging size (3g. 1); water levels of the highest storm surges recorded

 $\tau(0)$

Probabilities of occurrence are assigned to water level and fullness

(and under he storm surge hydrogoph) sampleausing he Gumbel clothouton for water level samplea and the Generalized Externe Value Clothouton sawelliss the Log-Normal Clothouton for University

The relation between high water levels and corresponding Ulineas of storm surge hydrographs is modeled using the Gumbel copula(1g. 3) 4

2

35

1.

2

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 $\sqrt{(\cos(\Theta \pm b))^2}(a \sin(\Theta \pm b))^2$

BQ.

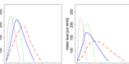


Fig.8: Scaled com suge hydrogopic with a recim period of 210 years for the location: Traventine Technical Geflorad Intel

shapesare being soled in heightand width by cintof combinations of water levels and Univers with a requested probability (colsin tg. 4) in a first step the height of the storm surge hydrograph tabeing soled by multiplying the desired peaks also level. In a second step the storm surge hydrograph is scaled in with by multiplying the ratio of the desired to the actual fullness. In fig. 5 the dimensionless hydrograph shapes are scaled to real values. With respect to their peak water level and their Ulness and under the assumption that all generated storm surge hydrograph shapes have the same probability of courrence all scaled hydrographs shown have a probability of courrence of p=0.005. This equals a return period of 200 years. 88 Fig.2 Comprises of measured and elimitated data pains of water levels and follows and Time of equal potability of accountries for the locations illumeratives and Genteratid 8 1/ 60 62 64 68 68 10 Fig.4 Black Inter SUBSidnes for your leads and times and interfaced backets (factors between the backets (backets) backets the backets between the backets) Fig.2 Parties diversionless stages of stars same hydrographs for the locations Harventints (left) and Gertansta (type) decreasible with the landow) Bits Trace Insertions (1005-lacines to randowness slong the case white this pages; Colored door: Examples for randow) of these days pix of your levels and threas of a £ 8. contribut protability of accurates of profiles for the lacations Transmittee and Genforedd 88 Conclusion Som surge hydrographs halvary in heir peak waler level and their duration as well as heir shape can be generated. The plausbilly of the results was proved by comparison of generaled storm surge hydrographs and actually measured storm surge hydrographs. A present the presented method is not appropriate to simulate more complex shapes its storm surge hydrographs with two or more peak water levels. It is assumed that hydrograph shapes are equipolable. This assumption has not been protect, yet,