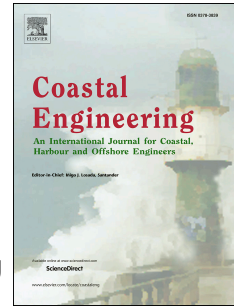


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Numerical investigation of excessive surge induced by wave overtopping in an inlet-bay system

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Abstract

During Hurricane Sandy, wave overtopping occurred along the barrier beach in front of the Rehoboth Bay, one of the Delaware Inland Bays, as indicated by field observations and the morphological profile model CSHORE. CSHORE estimated a total overtopping volume of about $9.7 \times 10^7 \text{ m}^3$ which is close to the storm surge-induced water volume entering the bays through the inlet (about $1.3 \times 10^8 \text{ m}^3$). In this study, we incorporated the wave overtopping result from CSHORE into the nearshore community model, NearCoM-TVD, to investigate the wave overtopping-induced excessive surge (OIS) in the Delaware Inland Bays. With the wave overtopping applied in the flux boundary condition, the model successfully reproduced the high water level measured at the station located in the Rehoboth Bay. Additional numerical experiments for the separate effects of wave forcing and local winds are also carried out. The results show that wave forcing has a minimal effect on the

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