

## Accepted Manuscript

Numerical simulation of nonlinear long waves in the presence of discontinuous coastal vegetation

Amir Zainali, Roberto Marivela, Robert Weiss, Yongqian Yang, Jennifer L. Irish

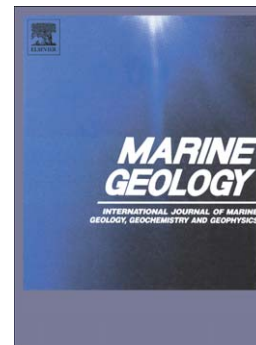
PII: S0025-3227(17)30371-7  
DOI: doi:[10.1016/j.margeo.2017.08.001](https://doi.org/10.1016/j.margeo.2017.08.001)  
Reference: MARGO 5662

To appear in: *Marine Geology*

Received date: 19 October 2016  
Revised date: 28 July 2017  
Accepted date: 3 August 2017

Please cite this article as: Zainali, Amir, Marivela, Roberto, Weiss, Robert, Yang, Yongqian, Irish, Jennifer L., Numerical simulation of nonlinear long waves in the presence of discontinuous coastal vegetation, *Marine Geology* (2017), doi:[10.1016/j.margeo.2017.08.001](https://doi.org/10.1016/j.margeo.2017.08.001)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



# Numerical simulation of nonlinear long waves in the presence of discontinuous coastal vegetation

Amir Zainali<sup>a,\*</sup>, Roberto Marivela<sup>a</sup>, Robert Weiss<sup>a</sup>, Yongqian Yang<sup>b</sup>,  
Jennifer L. Irish<sup>b</sup>

<sup>a</sup>*Department of Geosciences, Virginia Tech, Blacksburg, VA 24060, USA*

<sup>b</sup>*Department of Civil and Environmental Engineering, Virginia Tech, Blacksburg, VA 24060, USA*

---

## Abstract

We presented numerical simulations of long waves, interacting with arrays of emergent cylinders inside regularly spaced patches, representing tsunamis interacting with discontinuous patchy coastal vegetation. We employed the fully nonlinear and weakly dispersive Serre-Green-Naghdi equations (SGN) until the breaking process starts, while we changed the governing equations to nonlinear shallow water equations (NSW) at the vicinity of the breaking-wave peak and during the run-up stage. We modeled the cylinders as physical boundaries rather than approximating them as macro-roughness friction. Our results show that the cylinders provide protection for the areas behind them. However they might also cause amplification in local water depth in those areas. The presented results are extensively validated against the existing numerical and experimental data. Our results demonstrate the capability and reliability of our model in simulating wave interaction with emergent cylinders.

---

\*Corresponding author

*Email address:* [mrz@vt.edu](mailto:mrz@vt.edu) (Amir Zainali)

Download English Version:

<https://daneshyari.com/en/article/8912028>

Download Persian Version:

<https://daneshyari.com/article/8912028>

[Daneshyari.com](https://daneshyari.com)