



Jul 13th, 2:30 PM - 2:50 PM

The Framework and Application of Vulnerability Assessment of Reclaimed Land to Typhoon Storm Surge Inundation

Shuyun Dong

University of Otago, shuyun.dong@postgrad.otago.ac.nz

Wayne J. Stephenson

University of Otago, wayne.stephenson@otago.ac.nz

Sarah Wakes

University of Otago, sarah.wakes@otago.ac.nz

Zhongyuan Chen

East China Normal University, z.chen@sklec.ecnu.edu.cn

Jianzhong Ge

East China Normal University, jzge@sklec.ecnu.edu.cn

Follow this and additional works at: <https://scholarsarchive.byu.edu/iemssconference>



Part of the [Civil Engineering Commons](#), [Data Storage Systems Commons](#), [Environmental Engineering Commons](#), [Hydraulic Engineering Commons](#), and the [Other Civil and Environmental Engineering Commons](#)

Dong, Shuyun; Stephenson, Wayne J.; Wakes, Sarah; Chen, Zhongyuan; and Ge, Jianzhong, "The Framework and Application of Vulnerability Assessment of Reclaimed Land to Typhoon Storm Surge Inundation" (2016). *International Congress on Environmental Modelling and Software*. 117.
<https://scholarsarchive.byu.edu/iemssconference/2016/Stream-D/117>

This Event is brought to you for free and open access by the Civil and Environmental Engineering at BYU ScholarsArchive. It has been accepted for inclusion in International Congress on Environmental Modelling and Software by an authorized administrator of BYU ScholarsArchive. For more information, please contact scholarsarchive@byu.edu, ellen_amatangelo@byu.edu.

The Framework and Application of Vulnerability Assessment of Reclaimed Land to Typhoon Storm Surge Inundation

Shuyun Dong¹, Wayne J. Stephenson¹, Sarah Wakes², Zhongyuan Chen³ and Jianzhong Ge³

¹Department of Geography, University of Otago, PO Box 56, Dunedin, New Zealand,
shuyun.dong@postgrad.otago.ac.nz, wayne.stephenson@otago.ac.nz

²Department of Applied Sciences, University of Otago, PO Box 56, Dunedin, New Zealand,
sarah.wakes@otago.ac.nz

³State Key Laboratory for Estuarine and Coastal Research, East China Normal University, Shanghai,
200062, China, z.chen@sklec.ecnu.edu.cn, jzge@sklec.ecnu.edu.cn

Abstract: The coastal area has naturally attractive to population and industry due to its convenient geographical location and abundant resources. While the coastal area provides geographical advantages and resources for urban development, it also experiencing a dramatically growing vulnerability to natural hazards. For coastal mega-cities like Shanghai, typhoon storm surge presents a significant threat to both infrastructure and populations with relatively high vulnerability. Another fact about Shanghai coastal area is that the reclamation land has grown substantially due to the huge demand of land for further urban development. On the one hand, the reclamation land can alleviate the continuous growth of cities in the process of the rapid expansion of cities. The other side of this is that such extensive reclamation activities require a good sustainable land use plan under climate change scenario, otherwise, it may result in the increasing of vulnerability or even leads to some catastrophic damage. Therefore, this research presents a new method for reclamation planning based on vulnerability assessment to typhoon storm surge inundation. First, typhoon events in the past were simulated to generate the inundation scenarios. Then, the vulnerability of different land use types with a set of hazard-proxies to these inundations was assessed and verified by a new stage-damage curve system. Moreover, the model was run under climate change scenarios to predict the vulnerability to extreme typhoon event in the future. Based on the above vulnerability assessment, this research will provide a planning tool for reclamation.

Keywords: Typhoon Storm Surge, Vulnerability Assessment, Reclaimed Land