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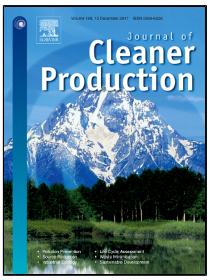

Exploring the coastal urban resilience and transformation of coupled human-environment systems

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Exploring the coastal urban resilience and transformation of coupled human-environment systems

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Abstract

Resilience thinking explores the sustainability discourse and transformation of urban complex systems. From the perspective of urban and human environment, this research simulated the resilience transformation of human-environment systems according to the modified catastrophe theory. The adaptive cycle model was performed an approach to interpret resilience transformations in the interactive human-environment systems. In this study, we quantified the resilience of human and environment sub-systems through four models of catastrophe theory (Fold, Cusp, Swallowtail and Butterfly model). The resilience transformation was addressed through the mechanism of adaptive cycle that contained four phases within four different time periods (exploitation-*r*: 2000-2002; release phase-Ω: 2002-2003; conservation-*K*: 2004-2008 and exploitation-*r*: 2008-2010). Ultimately, we explored the key drivers of the transformation in complex human-environmental systems, which included production, energy and pollution. Moreover, understanding the transformations in terms of the human and environmental components were indispensable in urban resilience management.

Keywords: Urban transformation, Resilience, Catastrophe theory, Adaptive cycle, Human-environment systems, Environment management

1. Introduction

Resilience has been widely accepted as a key concept in monitoring and navigating the