

Modeling Land Use Change and Population Relocation Dynamics in Response to Sea Level Rise Scenarios: a Case Study in Bay County, Florida

Zhong-Ren Peng, Liyuan Zhao, Jie Song

Abstract

Evidences have shown that sea level will continue to rise or even accelerate into the future, which will have considerable impacts on coastal communities. This study addresses the question of how coastal residents would respond if their primary residences are permanently inundated due to sea level rise (SLR). Our survey in Panama City, Florida shows that 74% of respondents would move if their primary residences are permanently inundated, and most of them prefer to move to other part of the same county. We then developed a framework to model population dynamics and land use change based on the integrated agent-based and cellular automata models. The results show that the model can capture 80.6% of actual land use changes at the cell (50X50m) level. Under three scenarios (low, medium and high) of SLR, the future land development and population spatial distribution in Year 2030 and 2080 are produced using the calibrated model, which indicates that the model that takes into account SLR can more efficiently reflect the population dynamics than without considering SLR.

Z-R. Peng (Corresponding author) • J. Song
Department of Urban and Regional Planning, College of Design, Construction and Planning, University of Florida, Gainesville, FL 32611-5706
Email: zpeng@dcp.ufl.edu; songjiescu@ufl.edu
L. Zhao
School of Architecture and Urban Planning, Hua Zhong University of Science and Technology, Wuhan, P.R. China, 430074
Email: Liyuanzhao@hust.edu.cn