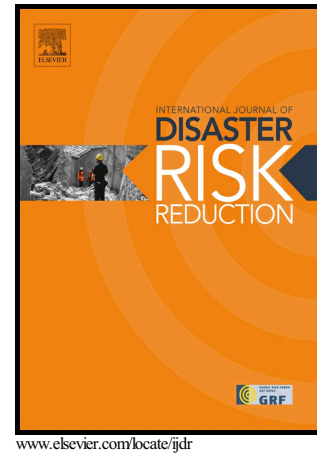


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Hurricane Risk Index (HRi)

M.L. Hernández, M.L. Carreño, L. Castillo



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Methodologies and tools of Risk Management: Hurricane Risk Index (*HRI*)

M.L. Hernández^{a1}, M.L. Carreño^b, L. Castillo^c

^aCentro de Información Geográfica. Universidad de Quintana Roo, Campus Chetumal, México. Boulevard Bahía s/n Esq. Ignacio Comonfort, Col. Del Bosque Chetumal, Quintana Roo, México C.P. 77019

^bCentre Internacional de Mètodes Numèrics en Enginyeria (CIMNE), Universitat Politècnica de Catalunya, Campus Norte UPC C/Gran Capitán S/N, 08034 Barcelona, España

^c(R.I.P) División de Ciencias e Ingeniería. Universidad de Quintana Roo, Campus Chetumal, México.

malu@uqroo.edu.mx.

liliana@cimne.upc.edu

Abstract

Mexico is recognized worldwide for the extension of its coastlines and its tourist exploitation. Quintana Roo is one of the Mexican states, which has a shoreline of approximately 800 km, known as the Mexican Caribbean. The hurricanes that form in the Atlantic Ocean are the main natural hazard to which this region is exposed. In this article, hurricane risk is evaluated for coastal cities through the definition of a system of indicators. Based on this indicators system, the Hurricane Risk Index (*HRI*) is calculated. This system allows the construction of vulnerability indices for different dimensions: physical, environmental, social, economic, cultural and institutional. The obtained results can contribute to the definition of public prevention policies and actions to reduce the levels of vulnerability and increase the resilience of these communities. This indicators model is applied to two coastal cities of the Mexican Caribbean; Mahahual, obtaining an *HRI* of 82.13%, and Chetumal obtaining an *HRI* of 69.31%, corresponding to the impact of Hurricane *Dean* in 2007. The proposed indicators system can be replicated for different hazards.

Keywords

Risk evaluation, vulnerability, hurricanes, risk management, indicators.

1. Introduction

Disaster risk is defined as the expected probability of harmful consequences or losses resulting from interactions between natural or anthropogenic hazards and vulnerable conditions (Birkman et al., 2013). It is the potential occurrence of physical, social, economic, and environmental consequences or losses, in a given area and over a period of time, resulting from the vulnerability conditions of a socio-ecological system exposed to hazards (UNDP, 2004). It is common for risk to be estimated only in physical terms since social vulnerability is difficult to assess in quantitative terms. Many of the discrepancies in the meanings of vulnerability arise from different epistemological orientations and subsequent methodological practices (Cutter, 1996). There is a potential for loss derived from the interaction of society with biophysical conditions that in turn affect the resilience of the environment to respond to the hazard or disaster as well as influencing the adaptation of society to such changing conditions (Cutter, 1996). However, it is possible to assess vulnerability in a relative way or through "relative risk" indicators, which also allow decisions and can define prevention and mitigation priorities (Cardona et al., 2003).

Coastal areas constitute geographic spaces of extraordinary importance for human beings, from the natural, social and economic point of view. In the Atlantic tropical cyclone basin, which

¹ Tel. (+52 983) 8350300x174 & 143.

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