HOW TO IDENTIFY CRITICAL HOTSPOTS IN COASTAL ZONES? Challenges and solutions

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INTRODUCTION

- 2/3 of worldwide population lives in coastal zones;
 - 10% of worldwide population lives below 10 meters above sea-level;
- Increased exposure leads to higher risk in these areas;
- Several hazard and exposure assessment methods were developed along the years;
- Support of coastal management plans and decision making.



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PRESENTATION STRUCTURE

Structure

Introduction

Methodologies

Areas

Examples

COMASO

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HAZARD VULNERABILITY AND RISK METHODOLOGIES

- Coastal Erosion Risk
 Assessment (CERA)
- Coastal Vulnerability Index (CVI)
- THESEUS
- DIVA
- IPCC Common Methodology



ASSESSMENT AREAS



EXAMPLE 1: COASTAL HAZARD WHEEL





COASTAL CLASSIFICATIO	N (start in wheel center) INHERENT HAZARD LE	INHERENT HAZARD LEVEL			
Geological layout Wave exposure Tidal range Flora/fauna Sediment balance Storm climate Note: R= Sloping hard rock;	Ex Exposed Mx Moderately exposed P Protected B/D Balance/deficit Sur Surplus NB No Beach Y Yes to tropical cyclone activity Y Yes to tropical cyclone activity C-crails; W/M-Marsh/Mangrove; A-Any	MOT 1 1 1 1	2 7 7 8 7 7	4gh	Noor bish

EXAMPLE 1: RESULTS OF COASTAL HAZARD WHEEL



EHL – Erosion Hazard Level

EXAMPLE 2: SMARTLINE APPROACH





EXAMPLE 2: SMARTLINE IN AVEIRO AND QUINTANA ROO





RISC-KIT **RISC-KIT** profiles initial XBeach (current) Eroded Volume vs JA - P1, P2 combined 200 height [m] (m/m) 150 12 profiles 103 storms 100 -12 -1300 -1200 -1100 -1000 -900 -800 -700 -600 -500 distance [m] 'n 0.5 1.5 2.5 bed level change height [m] $|A=|2.7-H\downarrow s/w\downarrow s.T\downarrow p|$ (10.5) computed -5 -2000 erosion volume -1000 -2500 -500 0 200 101 101 $\Delta V \downarrow Accretion = 3.25 \times 10^{\circ} - 5$./A+42.61, computed with $r^2 = 0.59$ 0 10 ²⁰ retreat distance ⁴⁰ 50 60 40 $\Delta V \downarrow Erosion Updrift = 5.53 \times 10^{-5}$. JA Ξ distance [+44.43, with r² = 0.84 computed 20 30 10 40 50 60 0 $\Delta V \downarrow Erosion Downdrift = 8.01 \times 10^{-5}$. JA time [h]

EXAMPLE 3: RISC-KIT CRAF1 IN AVEIRO

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EXAMPLE 3: RISC-KIT CRAF1 IN AVEIRO



KEY REMARKS PER METHOD

- <u>Coastal Hazard Wheel</u> App is ideal for a quick overview. Detailed data can provide more accurate results, but implies GIS expertise;
- <u>Smartline</u> provides a comprehensive classification of the area, ideal for long stretches. Needs specific data that could require field work;
- <u>RISC-KIT CRAF1</u> provides numerical results on expected eroded volume. Requires numerical modelling and a comprehensive amount of data.



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COMASO – Coastal Management Solutions



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Thank you for your attention and feedback!

enjoy summer holidays :)



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