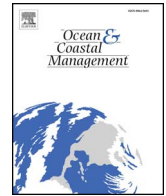


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Preface to the special issue: Management strategies for coastal erosion processes

The forces and processes observable at earth's surface are the same that have shaped earth's landscape throughout natural history.

James Hutton

We grew up in a family of fishermen, and it was there that We saw the way that, for example, our beaches suffered as a result of erosion; We saw the effect of that on life - on human life ... in our life!

Anonymous Colombian Fisherman

Coastal erosion is a normal process that has been active since landmasses first emerged from the oceans. It can occur as a slow pervasive process, or rapidly during extreme events and can be a result of human or natural related causes. Irrespective of the rates or causes, coastal erosion processes raise a significant hazard to ecosystems and human activities, generating a significant economic loss, ecological damage, and different political and societal problems.

Currently, the world is facing serious issues related to coastal erosion. Constant loss of property, infrastructures and beach width exert an economic cost to counteract the damage caused, which amongst others, produces a high loss of valuable coastal habitats, resulting in difficult management issues.

Coastal erosion is of critical relevance considering that, at least, 75% of the world shorelines are impacted (Bird, 1985; Pilkey and Cooper, 2014). Under the prevailing conditions of a warming climate and rising sea levels, linked to measured and further predicted climatic change processes (Anfuso et al., 2015; Jones and Phillips, 2011), it is expected that coastal erosion will have an even greater impact especially in urbanized regions that may partly or entirely disappear (Rangel-Buitrago and Anfuso, 2013). Additionally, environmental impacts on the world's coastal zones will be significant in future years due to the intense and increasingly ongoing coastal development (Pilkey and Cooper, 2014).

The World Cities Report (UN-HABITAT, 2009) indicated that during the last sixty-six years, world coastal areas have experienced an excessive human development with an annual average urban growth close to 3%. For this same period, the number of coastal cities has multiplied by 4.5 times, increasing from 472 in 1950 to 2135 in 2016. It is estimated that almost 40% of residences within first 200 m along coastlines may be severely affected by erosion over the next half century.

Under the above conditions, sustainable coastal development might be reached by using adequate zoning of human activities and implementation of optimal coastal erosion management strategies. Unfortunately, current coastal erosion management decisions are strongly influenced by economic considerations based on two opposing aspects:

- Action-reaction basis (Rangel-Buitrago et al., 2015)
- Cost-benefit analysis approach (Cooper and McKenna, 2007).

The typology of coastal management strategies approaches was first classified by IPCC CZMS (1990) and includes four general options:

- Protect: preserve vulnerable areas, especially human population centers, economic activities and natural resources using hard structures and soft protection measures.
- Accommodate: persist in occupying sensitive areas, but accept a greater degree of flooding by changing land use, construction methods and improving preparedness.
- Planned retreat: remove structures in currently developed areas, resettle inhabitants and require that new development be set back from the coast as appropriate, and do not redevelop high hazard zones after natural disasters
- Do nothing: unplanned retreat in loss by attrition.

This SI promotes an essential addition to these conventional coastal management practices, namely the obvious, but usually not used, management strategy of Intervention **Concerning the Causes**.

Any of the above options necessarily require strong management action that must include techniques, knowledge, equipment, institutional instruments and stakeholders participation to minimize or eliminate coastal erosion related impacts. These must have an optimal benefit to reduce vulnerability due to related coastal erosion hazards. Considering current and future climate change scenarios, management strategies must also consider ecosystems and coastal communities to minimize deterioration while benefitting from any potential positive consequences.

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Coastal erosion management consists of more than just implementing one of the previously presented options. Coastal erosion management is a policy and implementation process involving general stakeholder decision-making and technology applications. Successful management should be integrated within the activities of all planning departments, rather than acted upon in an isolationist way (Tompkins, 2005).

This Special Issue (SI) of **Management Strategies for Coastal Erosion Processes (MSforCEP)** presents an international collection of papers related to the implementation of various management strategies for coastal erosion under specific objectives:

- Identification of significant coastal erosion issues.
- Understanding of the underlying coastal processes contributing to erosion problems.
- Development and evaluation of strategies for the adequate coastal erosion management.
- Facilitation of community input on coastal erosion issues.
- Assistance in coastal planning for the delivery of optimal erosion management options.

The SI objective is to make a clear and explicit link between fundamental concepts and the improvement of coastal erosion management practice. To reach this goal, papers presented in this special issue are grouped into four main topics:

- Policies.
- Management Practices.
- Methodological Approaches.
- New Alternatives in the Coastal Erosion Management.

The first paper “The Management of Coastal Erosion” (Williams et al.) presents an in depth analysis of coastal erosion management theory, as well as, giving many examples of the various options available to manage erosion. To the standard trio of defend, sacrifice, and realignment strategies is added a fourth strategy: ‘intervention as to the causes.’

Under the topic ‘Policies for coastal erosion management’ two papers are presented from the USA. ‘Why coastal regulations fail’ (Neal et al.) and ‘Coastal erosion and the United States Flood Insurance Program’ (Leatherman). These papers show both the general weaknesses of regulations as well as how some specific programs have failed in part due to legal flaws, and also in part for not including projected rates of sea-level rise and erosion.

The ‘Coastal erosion management practices’ section includes papers from Italy (Pranzini), Colombia (Rangel et al.), Kuwait (Neelamani), West Africa (Ndour et al.), Argentina (Isla et al.) and the USA (Nordstrom et al.). These papers confirm that coastal erosion is a rising worldwide problem, and reflect how many management practices have not been used very successfully or have failed in their purpose. The conclusion is that under current coastal development practices and climate change conditions, smart, innovative and strong coastal erosion management plans are needed.

The ‘Methodological approaches section’ includes detailed case studies from Bulgaria (Stanchev et al.), Chile (Martinez et al.), Mexico (Escudero-Castillo et al.), Saint Kitts (Stancioff et al.), USA (Psuty et al.), Brazil (Bonetti et al.) and Malta (Micallef et al.). These papers include methodologies such as i) analysis of shoreline changes by satellite images, ii) beach profiling, iii) geo-indicators and iv) the Coastal Hazard Wheel: all used as tools that provide reliable data and useful information for coastal erosion management.

Lastly, the section called ‘New alternatives in the coastal erosion management’ encompasses a review article (Gracia et al.) and four case studies from Croatia (Pikelj et al.), Portugal – the Netherlands (Stronkhorst et al.), India (Ramakrishnan et al.) and West Africa (Giardino et al.). These five papers conclude that coastal erosion management using new approaches can be cost-effective and sustainable, but the success of these kinds of strategies will depend on the determination of realistic operational objectives and indicators.

The world urgently requires effective management strategies to help solve the present coastal erosion problem. The use of one strategy by itself cannot guarantee a 100% success rate; the combination of different strategies seems a promising way forward. Management strategies for coastal erosion must be included and not overlooked in any coastal planning scheme. Within the last few years, new approaches have received much attention, but there are still many areas in research, education, and practice that must be covered. As climate change raises the risk and incidence of coastal hazards, it is imperative that all involved stakeholders continue to examine their role and participation in the coastal erosion management process.

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