LITTORAL 2016

THE CHANGING LITTORAL. ANTICIPATION AND ADAPTATION TO CLIMATE CHANGE

BIARRITZ 25-29 October 2016

Program and abstracts

Littoral 2016
Biarritz, 25-29 October

http://littoral2016.univ-pau.fr/

EUC France
Réseau Européen des Littoraux

Centre de la mer
Biarritz

UNIVERSITÉ DE PAU ET DES PAYS DE L'ADOUR

EUC Coastal & Marine

UNION EUROPÉENNE

RÉGION NOUVELLE-AQUITAINE
AQUITAINE LIMOUSIN POITOU-CHARENTES

Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE
Ministère de l'Environnement, de l'Énergie et de la Mer

PYRENEES ATLANTIQUES
LE DEPARTEMENT

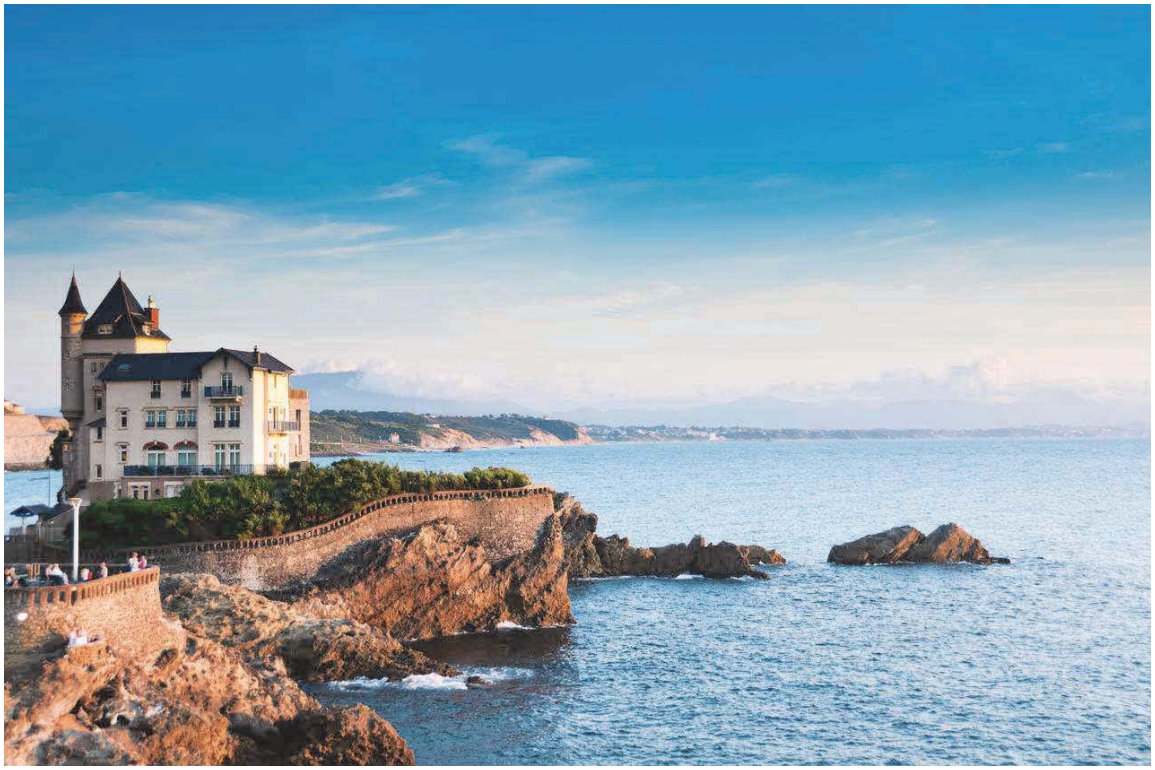
AGGLOMÉRATION CÔTE BASQUE-ADOUR

Agglo Sud Pays Basque
Hegoa Lapurdiko Hirigunea
www.agglospb.fr

BIARRITZ

LLOYD'S

« Grande Plage » of Biarritz



« La Villa Belza »

Building for nature: adjusting the surface structure of concrete revetments to enhance biodiversity in the intertidal zone

VAN OIJEN T.*[1], SALVADOR DE PAIVA J.[1], VAN HEUVEL T.[1], BOERSEMA M.[1], BOUMA T.[2]

[1] HZ University of Applied Sciences, the Netherlands.
[2] Royal Netherlands Institute for Sea Research (NIOZ), the Netherlands.

* tim.van.oijen@hz.nl

Keywords: intertidal zone, revetments, seaweed zonation

Many dikes and other hard coastal defence structures around the world need reinforcement to meet the changing safety standards in times of sea-level rise. In the design and construction of dikes, more and more attention is addressed to sustaining the biodiversity on these artificial yet sometimes historically rich intertidal habitats. In our research we studied the effects of cm-scale pits in the top surface of concrete block revetments. The aim of this research is to study the influence of pit size on the colonisation by macroalgae and sessile macrofauna. We designed four different blocks with one, two, four or nine diamond-shaped pits. For each design, the total surface area in the pits was kept constant *i.e.* the pit size decreased with increasing number. Ten replicates of each block type, together with smooth reference blocks, were placed on a frame in the Eastern Scheldt (the Netherlands) at three vertical levels. Species abundance and coverage were monitored at regular intervals. After 14 months, biodiversity was significantly higher on the blocks with pits. The presence of larger pits especially stimulated the colonisation by red seaweed species at the lowest level (60% inundation time). Also Pacific Oysters (*Crassostrea gigas*) were only present in and around pits. For a large-scale experiment that commenced in 2015, the block types were produced on mass-scale by a concrete factory and were implemented on three replicate 10m-width dike sections. These sections alternated with replicate sections with smooth blocks and sections with blocks with the traditional lavastone eco-toplayer. Next to standard monitoring of species abundance and coverage, the dike section was surveyed using a drone equipped with a HD camera. Images were analysed using GIS to map differences in seaweed zonation between the different sections. During the first year, after an initial pioneering stage with mainly *Ulva sp.*, the blocks with pits showed a quick colonisation by *Fucus sp.* in most of the intertidal zone. By contrast, sections with blocks with the lavastone ecotop were still mainly covered with *Ulva sp.* after six months. In the first year, colonization by macrofauna was still limited. The results show that modifications of concrete block revetments can lead to significant changes in seaweed species abundance and recolonisation in the short-term. Alternative block designs could increase the pace at which a climax-state is reached which could be of pivotal importance to bird species which are dependent on this habitat for foraging.