



EVREST Project Report:

Progress Report on the third Meeting/Workshop

Project Funding: Fundação para a Ciência e a Tecnologia (FCT)

Scientific Domain: Marine Sciences and Earth Sciences - Estuarine Coastal and Littoral Systems

Project reference: PTDC/MAREST/1031/2014

Report Title	Progress Report on the third Meeting/Workshop
Reporting Period	27-28 September 2018
Delivery Date	04/10/2018
Related Task	Tasks 1, 2, 3, 4, 5 & 6
Objective	Evaluate project progress and scientific results – formulate strategy on resilience assessment
Participants	Ana Matias, Ana Ramos, Ana Rita Carrasco, Fábio Madeira, Gerd Masselink, Haris Plomaritis, João Afonso, Katerina Kombiadou, Óscar Ferreira, Rui Taborda, Susana Costas, Xabier Otero

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1. MEETING OUTLINE

27th September 2018

09h20 – 10h30 – Presentations

10h30 – 11h00 – Coffee break

11h00 – 12h30 - Presentations

12h30 – 14h00 – Lunch break, restaurant

14h00 – 15h00 – Open lecture

15h00 – 15h30 – Coffee break

15h30 – 18h00 – Discussion of results

28th September 2018

09h00 – 12h30: Discussion of results and dissemination plan

Locations of the meeting:

Presentations: Building 2, room 2.11

Open lecture: Building 3, Amphitheatre A

Discussions: Building 2, room 2.11 (27/09/2018) and Building 7, room 1.74 (28/09/2018).

UNIVERSIDADE DO ALGARVE CAMPUS DE GAMBELAS

- 1 Edifício 1 – Faculdade de Ciências Humanas e Sociais (FCHS)
- 2 Edifício 2 – Faculdade de Ciências e Tecnologia (FCT)
- 3 Edifício 3 – Complexo Pedagógico
- 4 Edifício 4 – Grande Auditório
- 5 Edifício 5 – Reitoria, Biblioteca Central
- 6 Edifício 6 – Restaurante, Cantina
- 7 Edifício 7 – Faculdade de Ciências e Tecnologia (FCT)
- 8 Edifício 8 – Faculdade de Ciências e Tecnologia (FCT)
- 9 Edifício 9 – Faculdade de Economia (FEUAlg)
- P Portaria
- A UAIC – Unidade de Apoio à Investigação
- B CRIA – Divisão de Empreendedorismo e Transferência de Tecnologia



Figure 1. Location of meeting rooms.

2. ATTENDANTS

Ana Matias (CIMA, University of Algarve)

Ana Ramos (Centro Ciência Viva de Tavira)

Ana Rita Carrasco (CIMA, University of Algarve)

Fábio Madeira (Faculdade de Ciências, Universidade de Lisboa)

Gerd Masselink (University of Plymouth, UK)

Haris Plomaritis (CIMA, University of Algarve)

João Afonso (Centro Ciência Viva de Tavira)

Katerina Kombiadou (CIMA, University of Algarve)

Óscar Ferreira (CIMA, University of Algarve)

Rui Taborda (Faculdade de Ciências, Universidade de Lisboa)

Susana Costas (CIMA, University of Algarve)

Xabier Otero (CIMA, University of Algarve)

3. SCIENTIFIC DISCUSSION

During the meeting, several topics were presented by EVREST team members, guest researchers and the consultant. Each presentation boosted a discussion on various topics covered by the project. A brief summary of each is given below, in the order that they were presented.

3.1 Introduction/Welcome

The meeting started with a brief introduction and reminder of the EVREST project's objectives, tasks and expected indicators by **Ana Matias**.

3.2 Recent barrier evolution in Ria Formosa

The methods to assess and results of recent barrier evolution in Ria Formosa were presented by **Katerina Kombiadou**. The data sources and methods and mapping criteria used to analyse the barrier evolution in Ria Formosa were presented, along with the coverage of the raster data and associated errors. Clarification and discussion was made about the long-term evolution of each barrier island, focusing not only on the evidences of evolution but also on the drivers. The long-term cross-shore changes in the mapped coastlines at the ocean and the lagoon side were presented, along with the evolution of barrier coverage in the west and east flank of Ria Formosa with respect to natural (i.e. storms) and artificial (i.e. jetty construction) stressors. Finally, the main barrier evolution regimes and the related limiting and promoting factors for the long-term evolution of the entire barrier system, as derived from the analysis, were presented and discussed.

3.3 Marsh evolution in the Ria Formosa lagoon

The preliminary results of salt-marsh evolution were presented by **Ana Rita Carrasco**. Marsh evolution and accretion mechanisms and the related temporal scales were, initially, discussed. The results presented compile a wide range of data, from remote sensing (i.e. aerial photographs), sedimentological (core and surface samples) and bibliographic (i.e. sedimentation rates in marshes), to modelling approaches (i.e. simulating perched marsh growth). The concluded mapping, based on aerial photographic data, and analysis of the evolution of marsh in the entire lagoon system of Ria Formosa were presented. Available data from literature that can be utilised, in combination to the analysis already performed within EVREST, to assess past evolution of the lagoon marshes, as well as potential response to future Sea Level Rise (SLR) scenarios were discussed, along with alternative data sources – methods to assess sedimentation rates in the system. The case-study of a perched marsh in Culatra, created within the time-frame of analysis and used as a paradigm, though combination of various data sources (in-situ and remotely-sensed) and modelling approaches, to simulate and understand the early stages of marsh evolution and the maturation within the system, was also presented and discussed.

3.4 Evaluation of coastal barrier constructive processes on Barreta Island

The work focused on dune evolution in Barreta Island, presented by Xabier Otero, was performed in the framework of his master thesis with the Vrije University of Amsterdam with the collaboration of the University of Algarve. The methodology and criteria used in the analysis of raster datasets and mapping processes (i.e. segregating beach ridges from dunes) and the available hypsometric data

(LiDar) exploited and combined with the mapped features were analysed and discussed. The analysis focussed on dune evolution within the analysed timeframe (1952-2014), identifying dune ridges creation and relating the dune accretion with shoreline progradation in the island and the dune field formation and characteristics. Accretionary units were identified, as well as accumulation rates in each barrier section and/or temporal window. The potential of combining estimates of annual longshore sediment transport to assess inter-annual variability in the marine sediment deposition and their impacts on dune variability were also discussed.

3.5 Assessment of relative sea level rise for Algarve region

The work implemented for the evaluation of regional SLR rates in the area of the Algarve and the related conclusions, were presented by **Fabio Madeira**. The available dataset of Sea Level Heights (SLH) recordings from the tidal gauge of Lagos (2004 to present) and the various methodologies implemented to correct their inherent errors were presented and discussed. The identified and corrected errors included errors of vertical acceleration, barometric pressure, as well as unsystematic cut-off errors. The possibility of exploiting other available datasets, including nearby tidal gauges (e.g. Cádiz) and satellite altimetry data, and their comparison with the corrected timeseries of Lagos were presented and discussed.

3.6 CCVT dissemination activities – EVREST Science Club

The dissemination activities, performed by the Centro Ciência Viva de Tavira (CCVT), within Task 6, were presented by **Ana Ramos and João Afonso**. Aim of the activities, planned and implemented, was to increase awareness and to provide wide dissemination of the results obtained within the project to the general public. To this aim, EVREST members participated in various dissemination events, such as Researchers Night 2017 and Science & Technology Week 2017. The members of CCVT also created and implemented the 'EVREST Science Club', an activity implemented with students between March and June 2017. A total of 215 students (92% of the class targets) participated in EVREST Science Club that included three (3) Sessions, two (2) of which were hands-on activities and one (1) field trip in Barril beach. The hands-on activities refer to the dune (dune formation module) and the marsh system (wave tank), whereas during the field visit the students had the opportunity to observe and identify the different habitats, sediment, fauna and flora and consolidate the acquired knowledge during the classroom and hands-on activities. Finally, the students created mind maps for the dune and the marsh environments, both before and after their participation, with results that clearly demonstrated the effectiveness of the methodology used and the knowledge and understanding gained.

3.7 'Variability in the north-east Atlantic wave climate and its influence on annual-to-decadal beach dynamics': Open lecture in the framework of the MSc program 'Marine and Coastal Systems' by Gerd Masselink

The presentation, given by the project consultant, Gerd Masselink, referred to the investigation of long-term coastal dynamics in the SW coast of the United Kingdom. The presentation included an introduction to the Atlantic wave climate and the presentation of the impacts of the highly energetic winter of 2013-14. The wide range of storm responses initiated under these extreme wave conditions were presented with relation to wave directionality and coast orientation. Post storm recovery, related trajectories and their dependence on seasonality and different forcing and controlling factors, though examples and extensive field data were shown. Different approaches to resolve sediment budget in sandy and gravel beaches were presented, using multiple measurement methods/datasets

and the related challenges, inherent errors and applicability were discussed. The need for the closure of the sediment budget within the surveyed area and the error propagation involved when integrating different datasets were stressed. The dependence of beach recovery to the inter-annual variability and the potential implications of climate change were included in the closing arguments.

3.8 Passing from evolution to resilience - presentation and open discussion

The aim of the presentation and discussion that followed was to exploit the database and results of the project in terms of long- and short-term evolution of the distinct environmental units of Ria Formosa analysed (barrier-dune-marsh) and translating them to resilience indicators. These indicators will be used to draw conceptual resilience schemes and indexes that apply over a wide spatial range (from barrier parts to the entire barrier system). The presentation, given by **Katerina Kombiadou**, included an initial introduction of different resilience theories, focussing on the differences between engineering and ecological principles, resilience definitions and the basic dimensions used to 'measure' them. The concept of ecological resilience and the different temporal and spatial scales involved were discussed, as well as the main aspects of resilience and cross-scale interactions between adaptive cycles. The work, already performed, to transfer these resilience concepts to the barrier system of Ria Formosa was presented, with a variety of different approximations-visualisations of morphologic characteristics and their potential interpretations within the ecological resilience framework.

The presentation was followed by a general discussion where the validity, applicability and transferability of the methodologies proposed were under debate. Different views were presented and potential alternative pathways proposed. Overall, the discussion was very fruitful, strengthening the resilience concepts and principles already employed by the team and proposed resilient states and related criteria and thresholds between states. New and alternative ways to express the general resilience of the system were proposed and will be tested regarding applicability, related spatio-temporal scales and potential for assessing current conditions and future scenarios.