



## EVREST Project Report:

### 1<sup>st</sup> Annual Report

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

<b>Report Title</b>	1 <sup>st</sup> Annual Report
<b>Reporting Period</b>	01/06/2016 to 31/05/2017
<b>Delivery Date</b>	08/06/2016
<b>Related Tasks</b>	Tasks 1, 2, 3 and 6
<b>Objective</b>	Short description of completed work and justification of deviations from the approved proposal

## 2. Resumo dos Trabalhos Desenvolvidos e Desvios à Proposta aprovada

### Resumo dos trabalhos [6000 chars]

The kick-off meeting of the project took place in Faro (21-23/09/2016), with participation of all partners and included presentations, discussions and field visits. The main topics addressed were: a) data availability, b) data handling and features of the GIS platform, c) proposed study areas, d) determination of resilience mechanisms and indicators, e) approaches for long and short-term modelling of the evolution of the system and f) dissemination strategy and activities. The two field trips (Culatra, Barreta & Tavira islands) provided the opportunity to discuss the barrier island system, its evolution and environmental and anthropogenic pressures and specific aspects, like dune growth, vegetation and shoreline changes. The visit to Ciência Viva Tavira Science Centre was directed toward informing on its activities and discussing the dissemination of EVREST to the local community.

In the framework of Task 1, available raster datasets (ortho and aerial photographs and LIDAR data) were collected, processed and included in the GIS database, along with the related metadata. Hard-copy aerial photographs were scanned in high-resolution (1200-1800dpi). Observed gaps and missing flights were completed, when possible, with digital imagery obtained by the related authorities. This included visits to several institutions (i.e. DGT in 11/16 and IH in 02/17) to consult historical datasets. The raster data cover the period from 1947 to 2014, with 20 analysed flights. Regarding processing of aerial photography, non-orthographic imagery (flights 1947-2001) were georeferenced and mosaics of islands and of the entire Ria Formosa were produced. LIDAR terrain models are available for 2009 and 2011. Mapping of shoreline positions and dune/marsh vegetation is underway and is performed using digitization and classification techniques. Regarding hydrodynamic data collection, wave data from the coastal buoy of Faro are constantly being updated (data: 1993-present) and complemented by reanalysis wave data, obtained from the Spanish Port Authorities (data: 1953-2015).

Regarding fieldwork, four sets of campaigns were implemented during the first year of the project: a) preparatory fieldwork (July 2016), b) Tavira campaigns to measure long-term evolution and morphology (November 2016) and to identify dune and salt-marsh vegetation species (February/March 2017), c) tide observation campaign along the Algarve coast (March-May 2017) and d) mapping and sediment sampling campaign in the embayment study site of Culatra Island (May 2017). The preparatory fieldwork campaign aimed to assessing the suitability of potential sites as study areas of EVREST. The areas visited include Culatra, Barreta Tavira and Cabanas Islands Cacela Velha and Ancão Peninsula. The Tavira campaign included GPR (Ground-Penetration Radar) profiling, coring (hand corer and auger, PVC tubes), trenching (shovels, hoes) and sample collection. Two cores were collected horizontally with a PVC tube. Regarding the tide observation campaign, the main purpose was to validate the MSL (Mean Sea Level) difference between Lagos, Albufeira and Barreta Island. To that aim, three pressure transducers were deployed in the following locations: Cais da Solaria in Lagos, Porto de Abrigo in Albufeira and Faro-Olhao inlet in Barreta Island. During the campaign in the embayment of Culatra Island, the greater part of the intertidal flat was surveyed collecting: a) topographic data using a GPS RTK instrument (1527m of track mapped in total), b) sediment samples (25 in total) and c) photographs for the identification of tidal flat, intertidal and upper marsh vegetation in the area.

Task 2 has started in the 5<sup>th</sup> month of the project and is underway. Processing of LIDAR data to produce DEM maps is concluded, while the assessment of variability in barrier island

environments will start after the conclusion of Task 1. Regarding the analysis of waves, measured data (Faro buoy) were analysed using to identify individual extreme storm events. Concerning the analysis of SLH, the secular observation for Lagos (1908-2016) has already been carried out, however, local geodetic anomalies regarding the Lagos tide gauge were detected when compared to the National Datum and is still under investigation.

In the framework of Task 3 the analysis of eco-geomorphological evolution of two of the study areas (Cabanas-Cacela subsystem and Culatra embayment) has started and is underway. A meeting with the consultant Gerhard Masselink took place during the MEC 2017 conference, where results of geomorphology, vegetation and SLR obtained so far were discussed

With reference to the dissemination and outreach of the project, the following activities were concluded: a) design of the EVREST logo; b) design and implementation of the EVREST website (WordPress platform); c) production of a project leaflet; dissemination of this flyer during the Science and Technology week (Nov 2016), with ca 850 visitors and during the Algarve Nature week event (May 2017) with ca 300 visitors; d) a seminar to high school students; e) a seminar and fieldtrip to University audience. Moreover, the website (milestone M1; <http://evrest.cvtavira.pt/>) is frequently updated, with news also published at CCVTavira facebook.

During the reporting period, work derived from the project was presented (or accepted) in scientific conferences (2 national and 1 international). The PI was involved on the organization of a national conference, MEC 2017, devoted specifically to the topic of coastal morphodynamics. A session was organized to present objectives, tasks and results of scientific projects, and EVREST was one of the projects selected for presentation.

Individual reports for the aforementioned concluded activities (5 in total) and conference abstracts are accompanying the present, acting as project deliverables and as sources of further information on the work implemented during the reporting period.

#### **Desvios à Proposta Aprovada [4000 chars]**

Task 1 (Data collection and GIS integration) was scheduled to conclude at the end of the 12<sup>th</sup> month. It was considered important and advantageous for the project, however, to extend the duration of this specific task, due to the following reasons:

- a) During the first meeting of the project, the consultants advised the team to extend the efforts in the direction of mudflat and dune vegetation identification and evolution in the study area.
- b) The available raster photography presented large gaps that needed to be completed. The process of doing so was lengthy and time-consuming, since it entailed searching for the missing aerial photography in all related authorities, as well as bureaucratic delays in the ordering, delivery and shipment process, which in turn caused delays to the georeferencing process, which is the necessary first processing step.
- c) To assure the accuracy of the eco-morphologic analysis performed in the project, it was necessary to complete gaps in data and/or knowledge of the system by performing further fieldwork and testing (four sets field campaigns were already carried out during the reporting period), and laboratory work.

For the aforementioned reasons, it was essential to prolong the duration of Task 1 over the initially planned window of 1 year, so that the team has the opportunity to complement the

EVREST database with important and missing information, critical to our understanding of the system and to the quality of the deliverables and results of the project.

Finally, it is noted that Task 6 that was planned to commence on the 13<sup>th</sup> month of the project, has started earlier, with dissemination of the project objectives and preliminary results to scientific conferences.

### 3. Publicações

- **Presented:** Matias, A., Carrasco, A.R., Loureiro, C., Andriolo, U., Masselink, G., Guerreiro, M., Pacheco, A., McCall, R., Ferreira, Ó., Plomaritis, T., “Measuring and modelling overwash hydrodynamics on a barrier Island”. *Proceedings of 4ª Conferência sobre Morfodinâmica Estuarina e Costeira, 18-19 May 2017, Porto, Portugal*, pp. 46-47. URL: [http://mec2017.Inec.pt/pdf/resumos\\_final\\_v2.pdf](http://mec2017.Inec.pt/pdf/resumos_final_v2.pdf)
- **Presented:** - Matias, A., Kombiadou, K., Carrasco, R., Ferreira, Ó., Costas, S., Plomaritis, T. (2017). The EVREST Project: Evolution and resilience of barrier island systems. *Proceedings of 4ª Conferência sobre Morfodinâmica Estuarina e Costeira, 18-19 May 2017, Porto, Portugal*, pp. 59 – 60. URL: [http://mec2017.Inec.pt/pdf/resumos\\_final\\_v2.pdf](http://mec2017.Inec.pt/pdf/resumos_final_v2.pdf)
- **Accepted:** Matias, A., Carrasco, A.R., Loureiro, C., Andriolo, U., Masselink, G., Guerreiro, M., Pacheco, A., McCall, R., Ferreira, Ó., Plomaritis, T., “Measuring and modelling overwash hydrodynamics on a barrier Island”, Accepted for oral presentation. *Coastal Dynamics 2017 conference, 12-16 June 2017, Helsingør, Denmark*. URL: <http://coastaldynamics2017.dk/program.html>

#### 4. Indicadores de Realização Física

Indicadores	Quantidade realizada
A - Publicações	
Livros	0
Artigos em revistas internacionais	0
Artigos em revistas nacionais	0
B - Comunicações	
Comunicações em encontros científicos internacionais	1
Comunicações em encontros científicos nacionais	2
C - Relatórios	5
D - Organização de seminários e conferências	1
E - Formação avançada	
Teses de Doutorado	0
Teses de Mestrado	0
Outras	0
F - Modelos	0
G - Aplicações computacionais	0
H - Instalações piloto	0
I - Protótipos laboratoriais	0
J - Patentes	0
L - Outros	0