The EO_MAMMALS PROJECT: Earth observation for marine environment: application for marine mammals environmental management

O MAMMALS

PLATAFORMA OCEÁNICA DE CANARIAS

ATLANTIC FROM SPACE; 23-25, JANUARY, 2019 NATIONAL OCEANOGRAPHIC CENTRE SOUTHAMPTON, UNITED KINGDOM

Atlantic from Space Workshop; 23-25, January, 2019, Southampton, UK Ayoze Castro Plocan Innovation Manager ayoze.castro@plocan.eu

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Background: The Challenge

- More than 30 different species of cetaceans in Macaronesian waters
- Several Protected marine areas preservation of biodiversity relevant conservation management efforts
- Intense pressure from coastal Tourism Notably increase of the Whale Watching activity.
- Guarantee the development of a sustainable activity:
 - Public authorities: support tools for <u>conservation management</u>
 - Private companies: a <u>fair competition</u> Socio-economic growth of a sustainable activity

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Background: The Opportunity

- **EO data** has been extensively used by Administrations and Researchers to assist on the management of marine mammal populations (protected areas; reducing anthropogenic threats). Eg. Predictions to avoid fin whales collisions.
- **Remote sensing** of Environmental parameters can contribute to identify biological hotspots for cetaceans. Eg. bathymetry, sea surface temperature, sea surface height as well as Chlorophyll A...
- The existence of a **strong regional network of stakeholders**: **Quadruple Helix**

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European Space Agency

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PIOCA Sources



EO-MAMMALS: Project Objective

The development of a technical solution with the objective of producing a downstream service (EO_MAMMALS) for analysing associations between remote sensing oceanic environmental data and in-situ data in order to identify biological hotspots for cetaceans and provide a marine mammals' dashboard in the context of the Macaronesia area (Atlantic Ocean), therefore, help the management of marine protected areas.



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Project Objectives - Scientific

- OBJECTIVE_SCIENTIFIC_1: Use of remotely sensed environmental parameters to identify biological hotspots for cetaceans
- OBJECTIVE_SCIENTIFIC_2: Protection of the ecosystem which is a basic requirement for maritime regulation applicable for a sustainable exploitation of marine resources as specified in the marine spatial planning
- OBJECTIVE_SCIENTIFIC_3: Create a Macaronesian habitat prediction model for marine mammals by integrating EO data and Copernicus and Sentinel services with data available from a wellestablished collaborative network.
- OBJECTIVE_SCIENTIFIC_4: Use of satellite data in marine mammal surveillance and monitoring.

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Project Objectives - Technical

- OBJECTIVE_TECHNICAL_1: Define a downstream service, putting together different types of data.
- OBJECTIVE_TECHNICAL_2: The service will **enrich EO Cloud or DIAS functionality** and interfaces portfolio with minimal added cost and effort.
- OBJECTIVE_TECHNICAL_3: Leveraging existing public archives and cloud IT technologies, to bring fast data access using standard OGC interfaces to existing collections without the need to replicate data.
- OBJECTIVE_TECHNICAL_4: Setting up a service that can quickly be operationalized
- OBJECTIVE_TECHNICAL_5: The service has to easily integrate new collections and provide data, making them accessible through standardised mechanisms
- OBJECTIVE_TECHNICAL_6: Improve marine data network to be used for other users in other domains

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Project Partners

EO MAMMALS

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MINISTERIO DE CIENCIA, INNOVACIÓN Y UNIVERSIDADES Gobierno de Canarias Meteoceanographic data; Administrative and Financial Coordination



Technical development of the Solution;



Data from ESA satelites, Copernicus, Sentinel S3A and Opernicus S3B (SST, ClphA, Bathymetry, Sea Surface Height,...)



Scientifc Validation; creation of a statistical predictive model and map to be integrated in the Canary Government app: Red PROMAR

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EO MAMMALS is 100% funded by ESA under the science for society programme element of the EOEP-5 of ESA.

http://www.redpromar.com/



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Collaboration - Whale watching sector

Spirit of the Sea



Marine Mammal data Supplier:

17 years worth of opportunistic whale-watching data in the South of Gran Canaria in the Zone of Special Conservation, ZEC ES7010017, Mogán: GPS coordinates, Date and time, Species, Behaviour, Number of animals, Reaction to the whale watching boat, etc.

MARCE

Network

http://www.dolphinwhale.co.uk/

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Work Packages and Timeline

WP-ID	WP Name	Responsible	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
WP1000	Project Office	PLOCAN												
WP1100	Project Management	PLOCAN												
WP1200	Quality Management	PLOCAN												
WP2000	System Requirements	PLOCAN/GMV												
WP2100	Use Cases Requirements	PLOCAN												
WP2200	Input data Requirements	GMV												
	MTR1				٠									
WP3000	Model Definition and Scientific validation	Univ. St Andrews												
WP4000	Implementation and Validation	GMV/PLOCAN												
WP4100	Prototype Design	GMV												
WP4200	Implementation of the prototype	GMV												
WP4300	Validation and Verification	GMV												
WP4310	Contribution to System Requirements Validation	GMV												
WP4400	Collection of input data	PLOCAN												
	MTR2										٠			
WP5000	Demonstration and Conclusions	ALL												
WP5100	Definition of use case Demonstration	PLOCAN												
WP5200	Execution of Use Case Demonstration	GMV												
WP5300	Conclusions and Roadmap and Final Presentation	ALL												
WP5400	Website elaboration	GMV												
	FP,EoC													•

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Expected Impacts

- Improved correlation: environmental variables and the distribution/abundance of Marine Mammals
- Decrease data infrastructures costs maximizing data use and dissemination
- To leverage technolgies based on Smart and user-friendly data retrieval and associated standardised interfaces.
- A new data service based on Copernicus EO data opening new future opportunities and users.
- Positive impact on MACARONESIA region by determining high-density marine mammals areas, promoting conservation priorities and contributing to MSP.
- Quadruple Helix benefits: Admin; Industry; Research and Citizens/Tourists

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Project Website: www.eomammals.com

EUROPEAN SPACE AGENCY



Copernicus for Marine Environment: Application for marine mammals surveillance and monitoring environmental public management

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EO MAMMALS

esa







Overview

Earth Observation (EO) data has been extensively used over the years to assist on the management of marine mammal populations either by establishing protected areas where stakeholders' activity are reduced, or by minimizing the impact of anthropogenic threats. It is considered a basic and essential tool for the conservation of species, both by researchers and governments.

Some examples include weekly predictions of fin whale (Balaenop-tera physalus) distribution that represent a valuable conservation tool in marine protected areas to prevent collisions with ships.

Remotely sensed environmental parameters have the potential to identify biological hotspots for cetaceans and to therefore establish areas of marine conservation priority. Satellite measurements of ocean have proved an effective tool to map the environmental variables and processes occurring. It is the main tool for measuring ocean productivity (ocean colour) and its response to climate change/variability. Other variables also related with the presence and movements of cetaceans can be measured from space, e.g. sea surface temperature, sea surface height, etc.

This project aims to identify biological hotspots for cetaceans and help the management of marine protected areas, using Earth Observation and other collaborative network's data.

EO MAMMALS is 100% funded by ESA under the science for society programme element of the EOEP-5 of ESA.

Proposal

This project's technical solution was designed with the purpose of producing a downstream service (EO MAMMALS) to analyze associations between oceanic environment data remotely sensed and biological data, in order to provide a marine mammals dashboard in the context of the Atlantic Ocean (Macaronesia area).

EO MAMMALS will produce maps showing the areas with the best life conditions for the concentration of mammals, based on the knowledge of the different species in the Macaronesian ecosystem. Such maps will be based on physical and marine biogeochemical products obtained from Satellite Data and Copernicus Marine Environment Monitoring Service (CMEMS).

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