

Evento de distribución regional: El paquete de servicios MI-SAFE

11 de julio de 2017



FAST
FORESHORE ASSESSMENT
USING SPACE TECHNOLOGY

Deltares
Enabling Delta Life

 UNIVERSITY OF
CAMBRIDGE

 GeoEcoMar

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Royal Netherlands Institute for Sea Research

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This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement n° 607131.

Programa



El paquete de servicios MI-SAFE

- 10:00 - 10:10 Bienvenida
- 10:10 - 10:40 Objetivos del proyecto Europeo FAST
- 10:40 - 11:40 El paquete MI-SAFE: servicios y valores (incluye utilización del visor MI-SAFE)
- 11:40 - 12:00 Descanso (*coffee break*)
- 12:00 - 12:45 Ejemplos de aplicaciones locales de los servicios MI-SAFE
- 12:45 - 13:30 Mesa redonda: Servicios MI-SAFE para problemáticas costeras andaluzas



Objetivos del proyecto Europeo FAST

Gloria Peralta



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El proyecto FAST



- 7º Programa Marco
- COOPERATION - SPACE
- SPA.2013.1.1-06: Stimulating development of downstream services and service evolution
- OBJETIVO: El objetivo del proyecto FAST es la utilización de datos aeroespaciales junto a datos in situ para producir nuevos servicios del proyecto GMES/Copernicus para la mejora de las estrategias de gestión de los riesgos de inundación y erosión en las zonas de humedales costeros.
- LOGROS PRINCIPALES: El paquete de servicios MI-SAFE



El proyecto FAST



- El consorcio FAST: 5 instituciones - 4 países Europeos



[Deltares](#)
(PROJECT LEADER)



Mindert de Vries
mindert.devries@deltares.nl
Tel. +31(0)6 2348 0876



[UCam](#)
University of Cambridge



Iris Möller
iris.moeller@geog.cam.ac.uk
Tel. +44 (0)1223 333353



[GeoEcoMar](#)
National Institute for
Marine Geology and
Geo-Ecology



Adrian Stanica
astanica@geoecomar.ro
Tel. +40 21 2094986



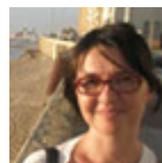
[NIOZ](#)
Royal Netherlands
Institute for Sea
Research



Daphne van der Wal
daphne.van.der.Wal@nioz.nl
Tel. +31(0)113 577300



[UCA](#)
Universidad de Cádiz



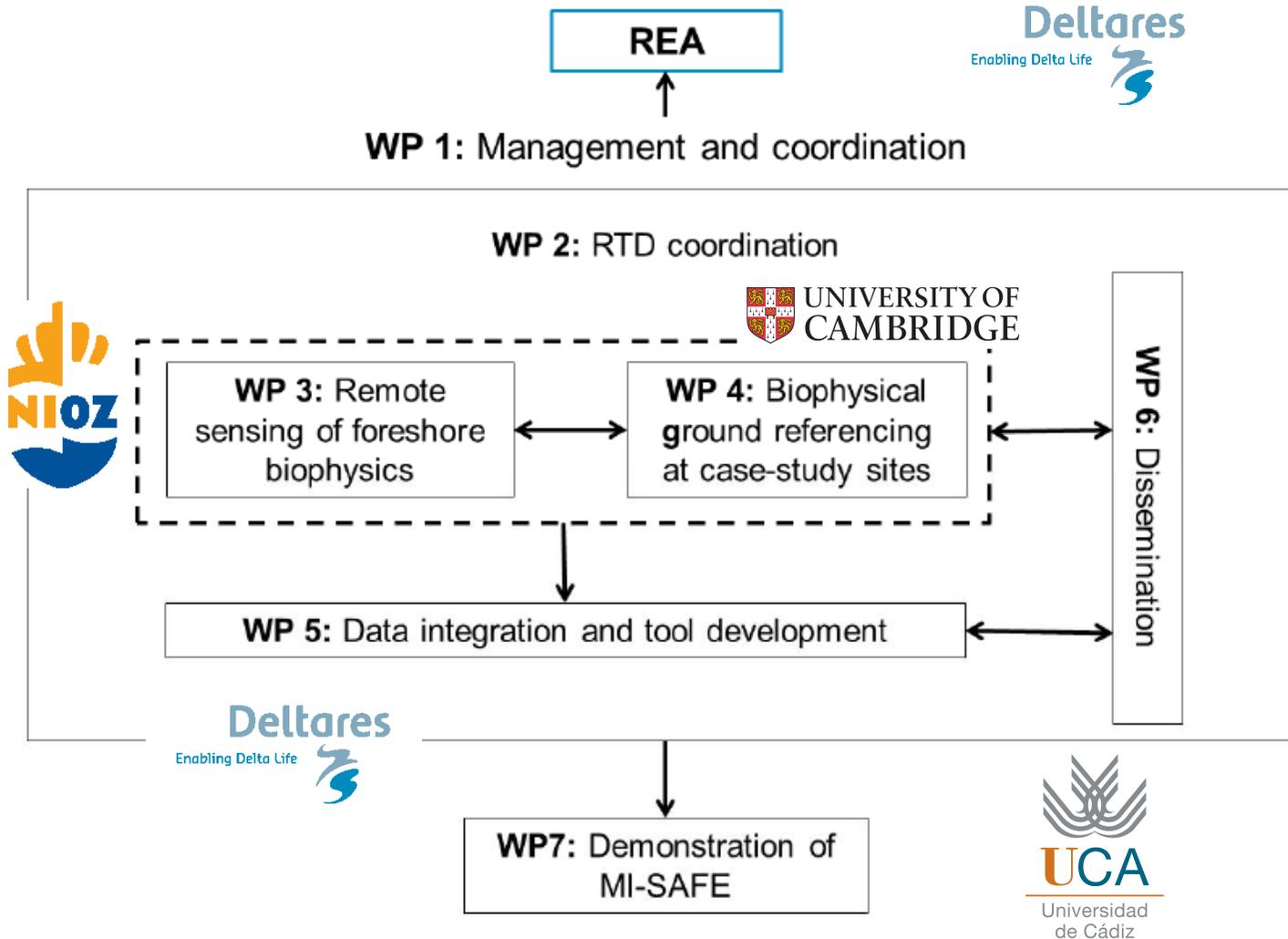
Gloria Peralta
gloria.peralta@uca.es
Tel. +34 956 016 428



El proyecto FAST



- La estructura de trabajo



El proyecto FAST



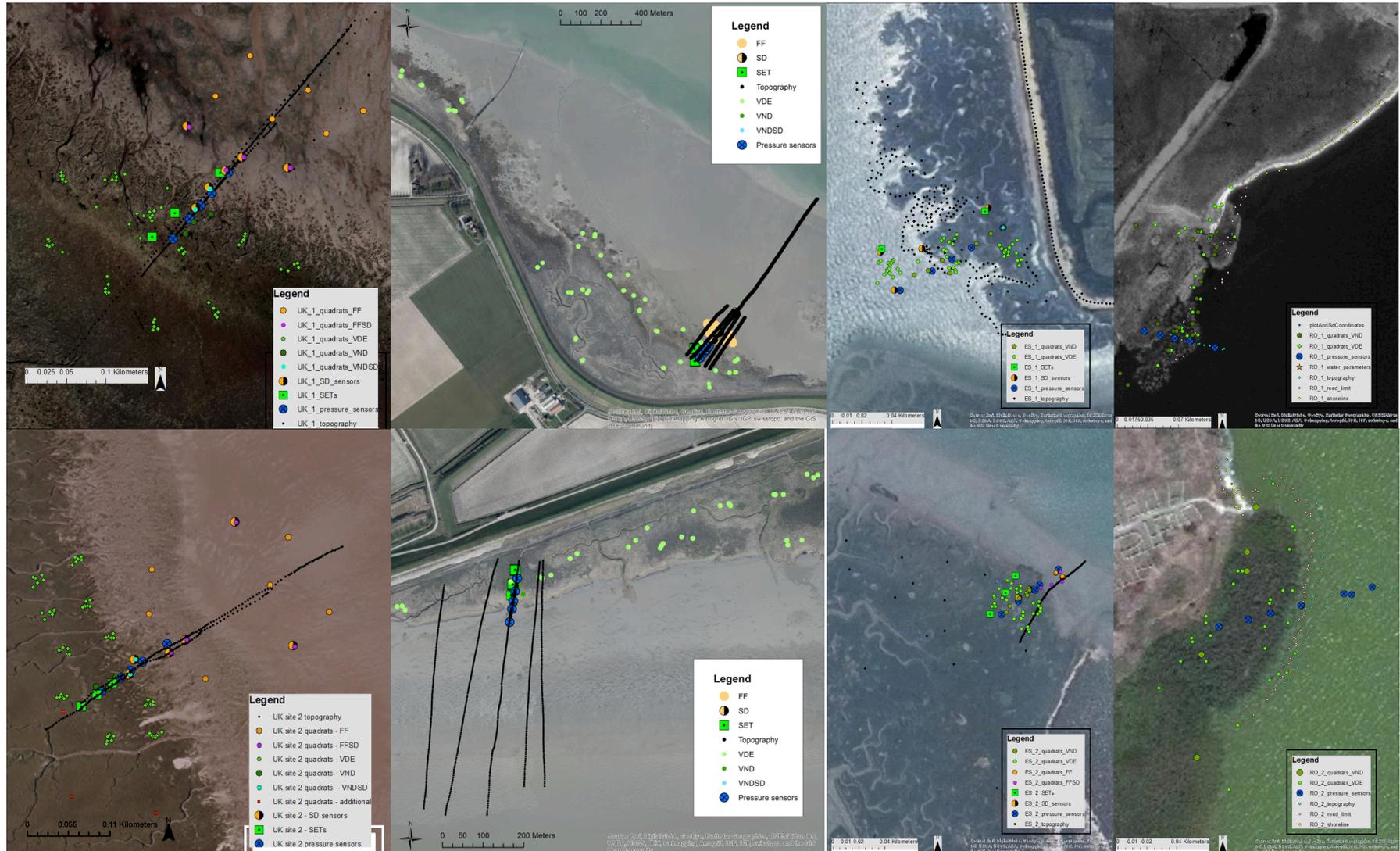
- WP4: Caracterización biofísica *in situ*.
- Objetivos: Definir características biofísicas en zonas costeras para poder establecer relaciones con imágenes de satélite y calibrar/ validar los modelos del WP5.
- Principales logros:
 - 8 casos de estudio en 4 países Europeos, caracterización estacional
 - Vegetación (Biomasa, altura, densidad, diversidad y firmas hiperespectrales)
 - Atenuación del oleaje
 - Estabilidad sedimentaria



El proyecto FAST

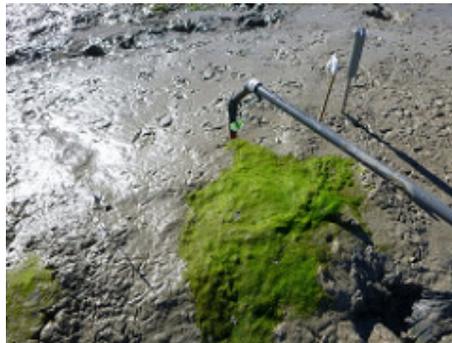
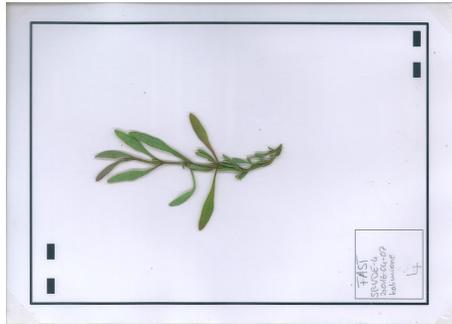
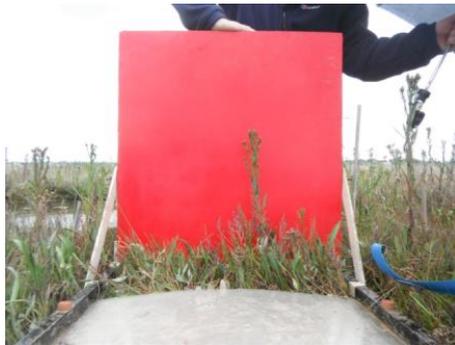


- WP4: Caracterización biofísica *in situ*.



El proyecto FAST

- WP4: Caracterización biofísica *in situ*.



El proyecto FAST

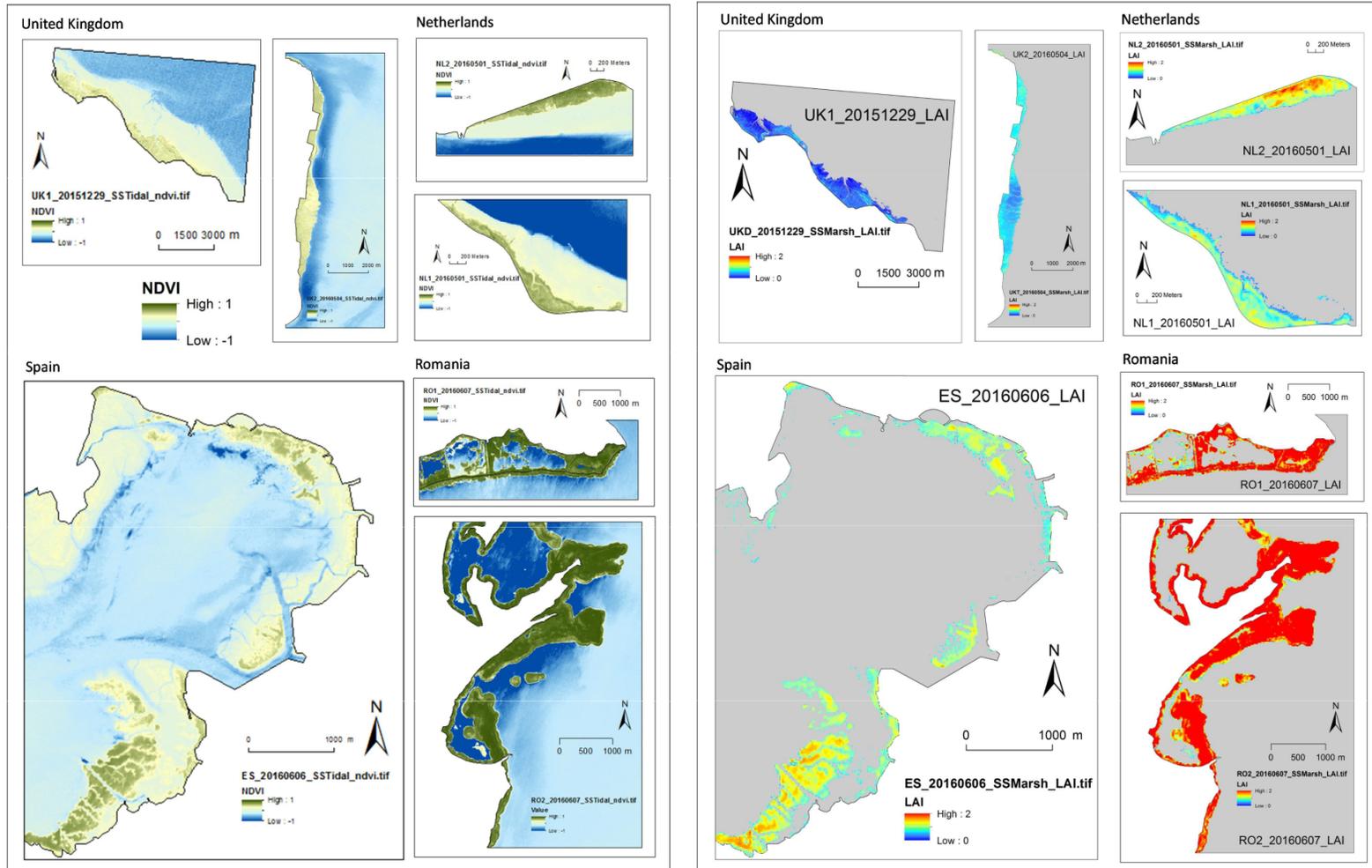


- WP3: Teledetección aplicada a zonas costeras
- Objetivos: Caracterizar condiciones ambientales costeras utilizando técnicas de teledetección.
- Retos:
 - Obtener parámetros biofísicos en **zonas intermareales** a partir de imágenes de satélite.
- Recursos utilizados:
 - Sentinel-1, Sentinel-2, RapidEye, Landsat
- Principales logros:
 - Vegetación costera
 - Batimetría intermareal



El proyecto FAST

- WP3: Teledetección aplicada a zonas costeras: **Vegetación costera.**



NDVI

Sentinel 2

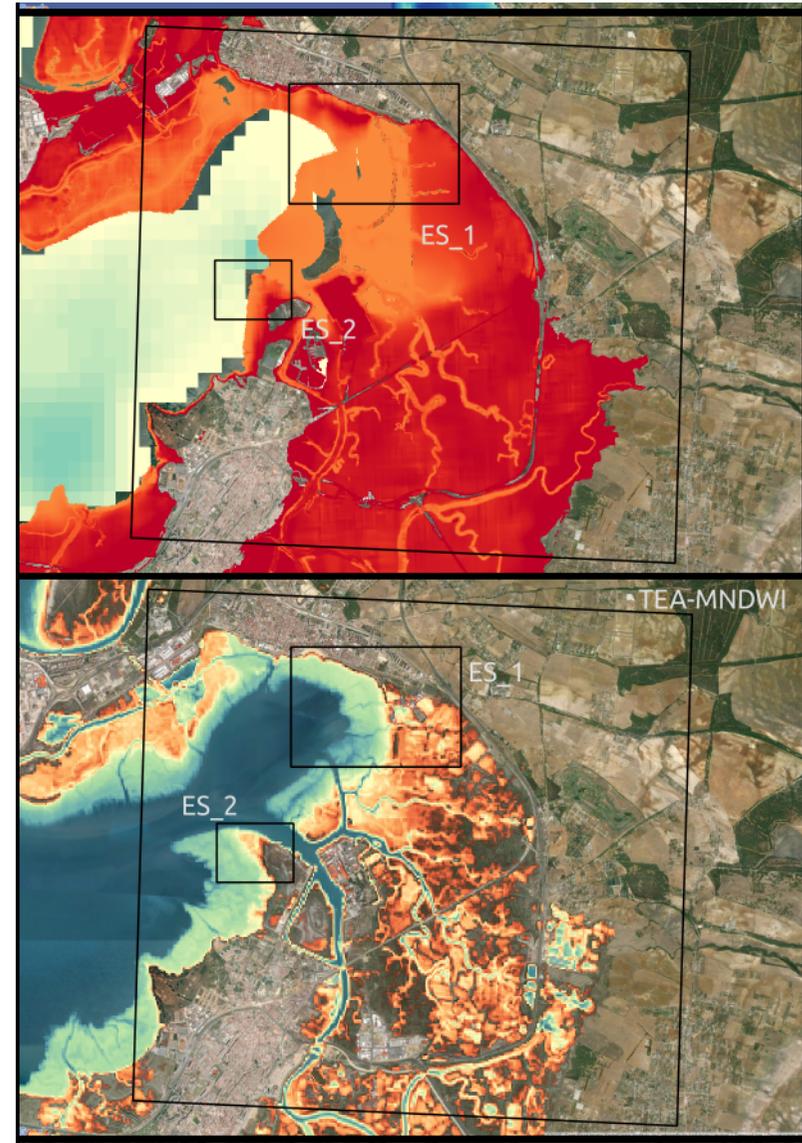
LAI

El proyecto FAST

- WP3: Teledetección aplicada a zonas costeras
 - Batimetría intermareal.

DTM datasets for Cadiz Bay

Time-ensemble average water indices



El proyecto FAST



- WP5: Integración de datos, modelado y definición de servicios (el visor MI-SAFE)
- Objetivos: Elaboración de bases de datos en formato estándar. Desarrollo/calibración de algoritmos para cuantificar el papel de la vegetación en la atenuación del oleaje, la estabilidad sedimentaria. Diseño, desarrollo y validación de servicios en colaboración con usuarios finales.
- Logros:
 - El visor MI-SAFE
 - MI-SAFE GeoNetwork CSW catalogue
 - Acceso sencillo a los servicios.



El paquete MI-SAFE: servicios y valores (utilización del visor MI-SAFE)

Gloria Peralta



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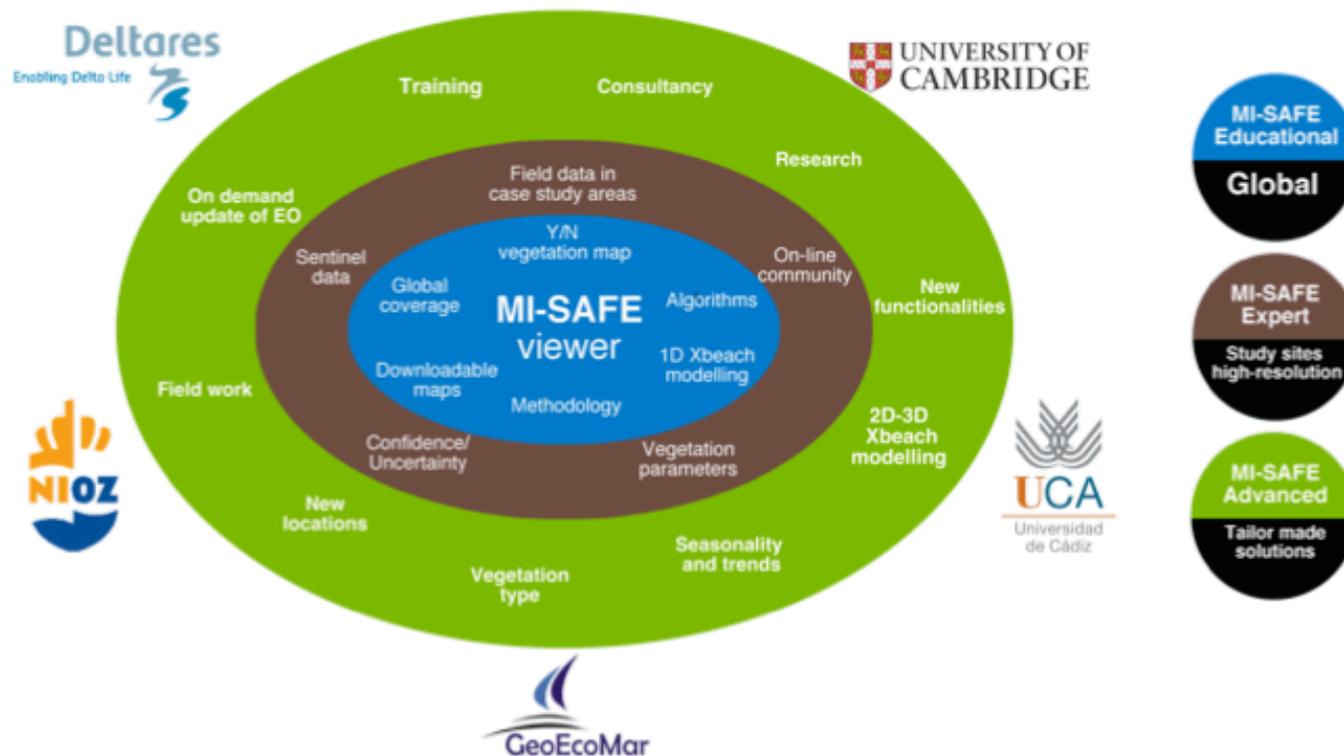


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El paquete MI-SAFE



- ¿Qué es MI-SAFE?
 - Paquete o plataforma de servicios de datos y modelado (en formato estándar y libre) para ayudar a usuarios finales que demandan información fiable de alta calidad a entender cómo las zonas costeras vegetadas reducen el riesgo de inundación en cualquier costa del planeta.



El paquete MI-SAFE



- ¿Por qué hemos desarrollado MI-SAFE?
 - Para colaborar en el reto de gestionar un creciente riesgo de inundaciones, aportando recursos y demostraciones fiables que hagan posible la implementación de soluciones verdes en las estrategias de defensa costera.



El paquete MI-SAFE



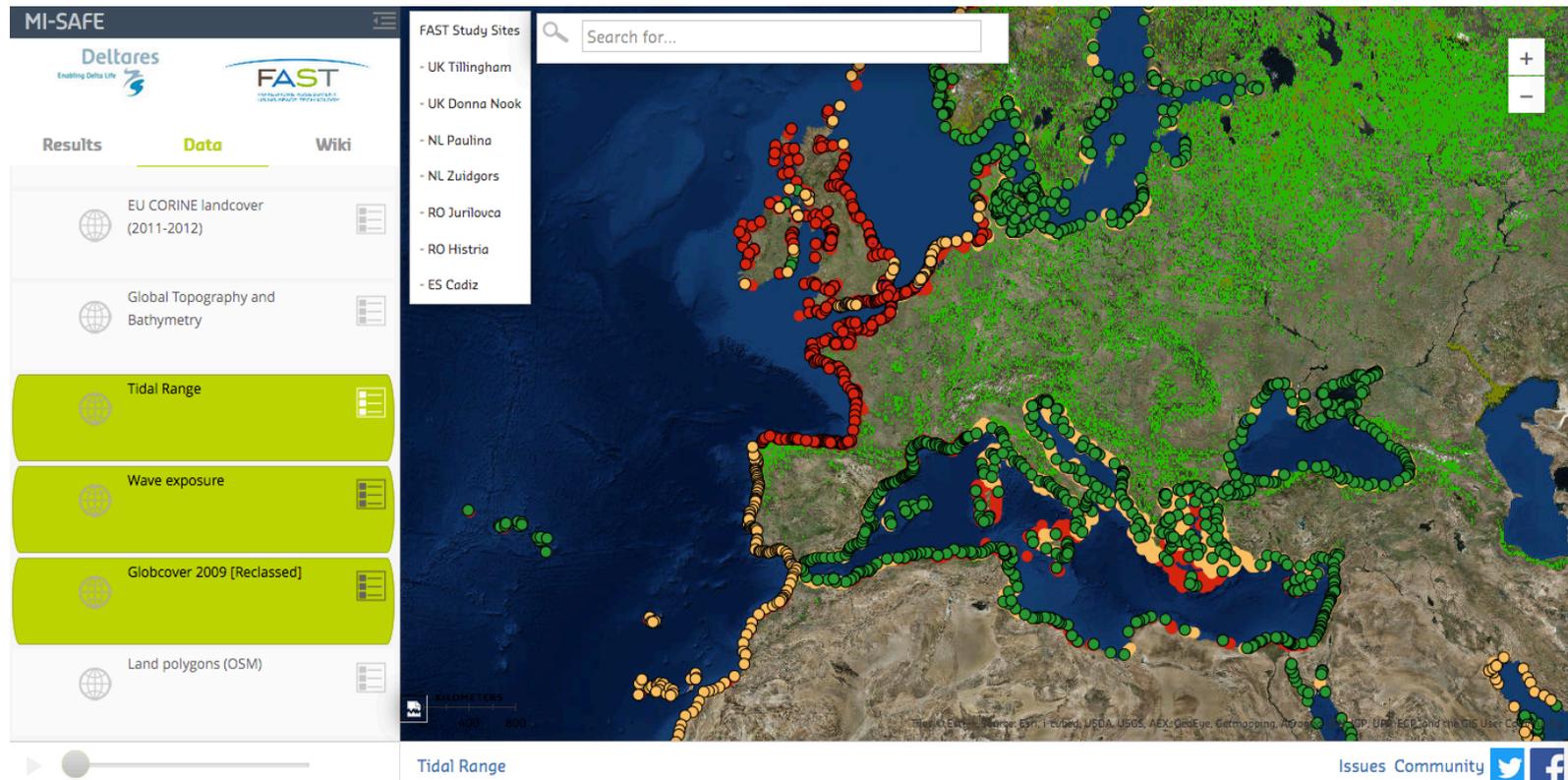
- ¿Que servicios únicos proporciona MI-SAFE?
 - Es el primer servicio que proporciona estimaciones de parámetros relacionados con el riesgo de inundación costera a nivel mundial;
 - Combina capas de datos globales y análisis local de alta resolución espacial, acoplando automáticamente datos EO, nivel del mar, oleaje y parámetros de vegetación;
 - Pilares científicos transparentes y verificables;
 - Formatos abiertos y estándar (Open Geospatial Consortium; OGC) y Desarrollo Open Source – fácilmente adaptables;
 - Acceso a un catálogo global de información ambiental costera. De acceso gratuito y compatibles con la mayoría de *workflows*.
 - Apoyo de la comunidad Open Earth;
 - Versatilidad, servicios avanzados de desarrollo (datos y modelado) para usuarios finales con necesidades más específicas.



El paquete MI-SAFE



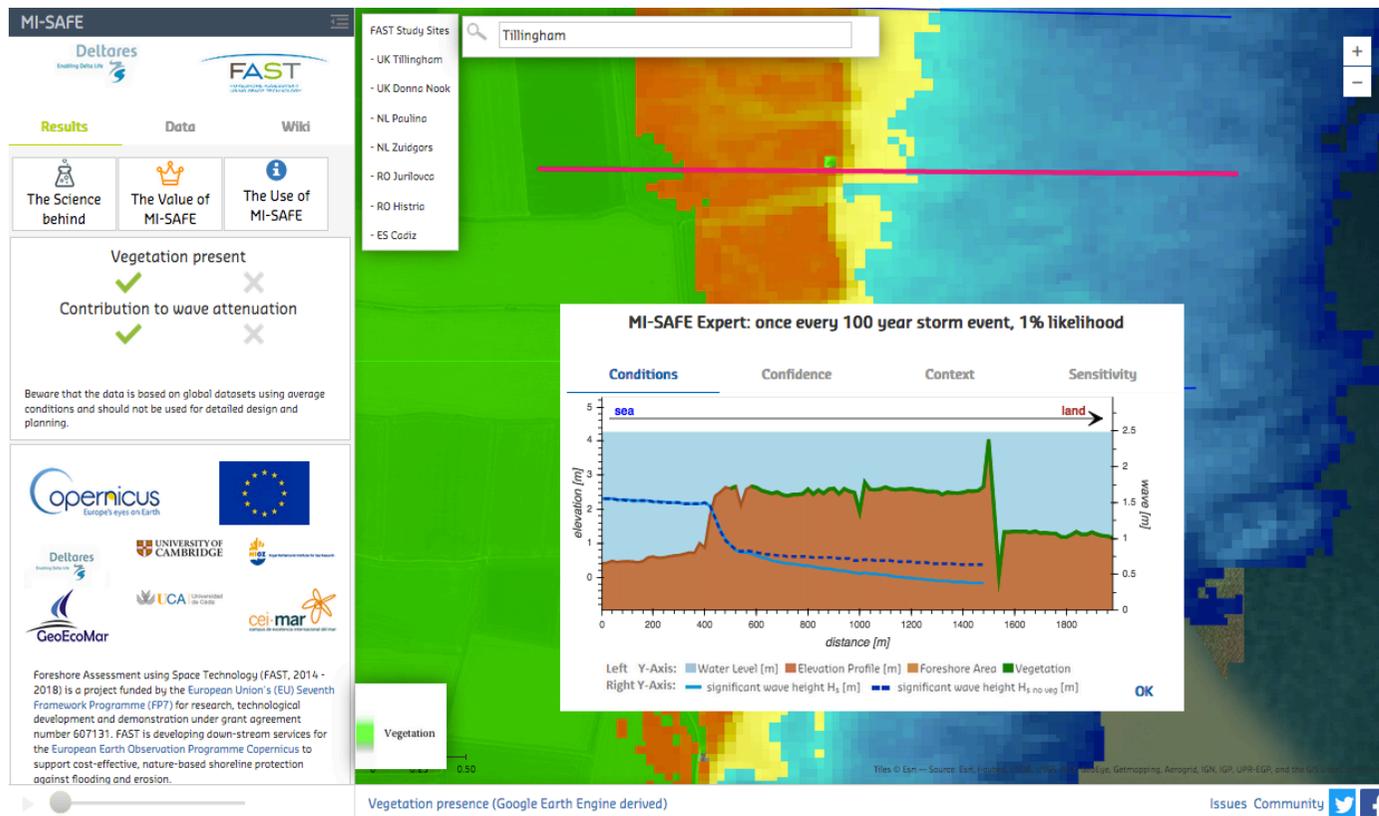
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El paquete MI-SAFE



- ¿Que servicios únicos proporciona MI-SAFE?
 - Combina capas de datos globales y análisis local de alta resolución espacial, acoplando automáticamente datos EO, nivel del mar, oleaje y parámetros de vegetación;



El paquete MI-SAFE



- ¿Que servicios únicos proporciona MI-SAFE?
 - Pilares científicos transparentes y verificables;

Results

The Science behind

The Value of MI-SAFE

The Use of MI-SAFE

Vegetation present

Contribution to wave attenuation

Beware that the data is based on global datasets using average conditions and should not be used for detailed design and planning.

The Science behind the MI-SAFE tool

Created by Gerrit Hendriksen, last modified by Jasper Dijkstra on 28-06-2017

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- Introduction
- MI-SAFE illustrative summary
 - Links to methodological videos and public documents:
- MI-SAFE data
 - Elevation
 - Field data, local coverage
 - Global SRTM coupled with GEBCO, Global coverage
 - Inter-tidal elevation (satellite-derived), Global coverage
 - Work flow protocol and algorithms
 - Application to the global coastline
 - Product specifications
 - Quality, validity and accuracy assessment
 - Waves
 - Field measurements, Local coverage
 - Era interim off-shore waves, translated to nearshore depth limited waves, Global/local coverage
 - Water levels, Global/local coverage
 - Vegetation
 - Field data, local coverage
 - Earth Observation products of vegetation, Global/local coverage
 - Vegetation presence/absence map, Global coverage
 - Vegetation type

El paquete MI-SAFE



- ¿Que servicios únicos proporciona MI-SAFE?
 - Formatos abiertos y estándar (Open Geospatial Consortium; OGC) y Desarrollo Open Source – fácilmente adaptables;



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OGC® Standards and Support

OGC(R) standards are technical documents that developers use these documents to build open internet services. These standards are the main "products" that have been developed by the membership to address specific needs. OGC standards are implemented in products or online services by engineers working independently, the resulting components work together without further debugging.

OGC maintains two tracks of standards: the Full standard track. Each is summarized below.

Full standard track: the Full standard track is a consistent standard inside the OGC Technical Committee. In the



XBeach Open Source Community

Welcome to the XBeach Open Source Community website. This website facilitates users and developers of the XBeach model and intends to keep you up-to-date on developments and events.

XBeach is a two-dimensional model for wave propagation, long waves and mean flow, sediment transport and morphological changes of the nearshore area, beaches, dunes and backbarrier during storms. It is a public-domain model that has been developed with major funding from the [US Army Corps of Engineers](#), [Rijkswaterstaat](#) and the [EU](#), supported by a consortium of [UNESCO-IHE](#), [Deltares](#) (formerly WL|Delft Hydraulics), [Delft University of Technology](#) and the [University of Miami](#). More information on the involved organisations and their roles in the development of XBeach can be found under the [About](#) section.

Happy modelling!

The XBeach Team



15.000+ joined the Deltares Open Source Community

El paquete MI-SAFE



- ¿Que servicios únicos proporciona MI-SAFE?
 - Acceso a un catálogo global de información ambiental costera. De acceso gratuito y compatibles con la mayoría de los formatos de trabajo actuales;

The screenshot displays the MI-SAFE GeoNetwork CSW catalogue interface. At the top, it features the MI-SAFE logo (three colored triangles: red, green, blue), the title 'MI-SAFE GeoNetwork CSW catalogue', and the Deltares logo. Below the title is the tagline 'The place to find and publish spatial datasets'. The main content area shows a search bar with 'Back to home' and a search icon. The primary dataset entry is titled 'Global Yes/No Vegetation Maps for the period 2013 to 2017'. The description states: 'This data set contains rasters where each pixel represents a yes/no vegetation (2013 - 2017). The product was derived from the NASA/USGS Landsat 8 and EUIESA/Copernicus Sentinel 2 earth observation collections combined. The product was produced as tiles for areas-of-interest covering the majority of the global coastline, with all available images selected between 2013 and 2017, however because of differences in the number of images available and quality filtering some tiles do not have coverage and temporal bias varies per tile. The same issue occurs in terms of nominal spatial resolution, which ranges from 20 to 30 m for the Sentinel 2 and Landsat sensors. We recommend using the product as a guide to yes/no and carrying out calibrations whenever possible. This data is not suitable for any purpose involving human safety. The research leading to these results was carried within the framework of the project 'Foreshore Assessment Using Space Technology (FAST)', which received funding from the European Union Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 607131. All views presented are those of the author's, the European Union is not liable for any use that may be made of the information contained therein.'

Download and links Help with Download

Global Yes/No vegetation map
http://al-ic004.xtr.deltares.nl:8080/geoserver/FAST_global_imagery/wms?service=WMS&version=1.1.0&request=GetMap&layers=FAST_global_imagery:GEE_vegetation&styles=&bbox=-2.003125E7,-7562510.0,2.006251E7,1.146877E7&width=768&height=364&srs=EPSG:3857&format=application/openlayers

Type dataset

Quality Unknown

Time Extent From 2012-12-31 until 2016-12-31

Keywords

Show all metadata Email feedback



El paquete MI-SAFE



- ¿Que servicios únicos proporciona MI-SAFE?
 - Apoyo de las comunidades Open Earth y Open source & Free software;

Join the
Community
Open source & Free software



Sign up | Sign In



"We believe in openness and transparency, as is evident from the free availability of our software and models. It is our firm conviction that sharing knowledge and innovative insights worldwide enables living in deltas."



- Jaap Kwadijk science director Deltares

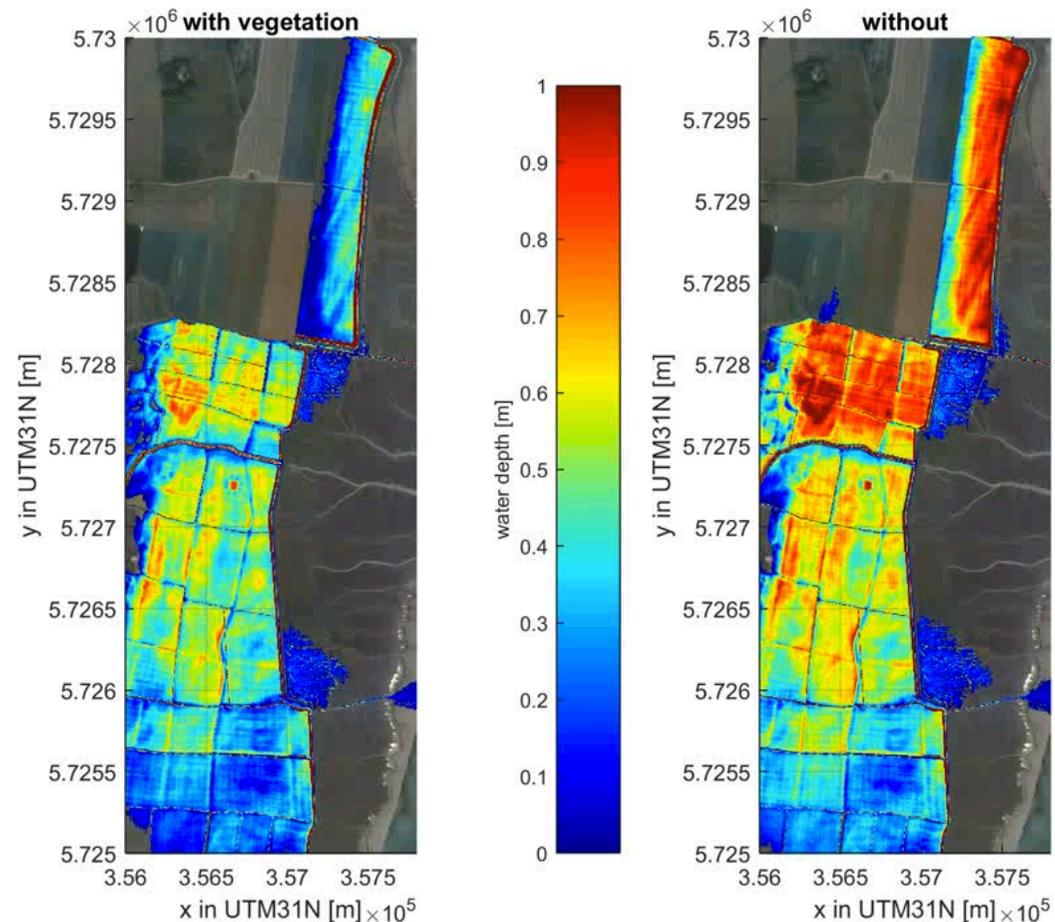
Communities

 <p>Delft3D Flexible Mesh Worldwide open source release is scheduled for 2017. For now, the access is limited to 157 Partners in Development worldwide.</p>	 <p>Delft3D Open Source Integrated suite, simulating 2D/3D flow, sediment transport and morphology, waves and water quality</p>	 <p>OpenEarth Open Source Free and open source initiative to deal with Data, Models and Tools</p>
 <p>XBeach Open Source Storm modelling incl. (long) wave propagation for morphological changes of the nearshore area</p>	 <p>iMOD Open Source Easy to use Graphical User Interface + an accelerated Deltares-version of MODFLOW</p>	 <p>Delta Shell Free Software Integrated modelling environment for models used to simulate water, soil and subsurface processes</p>



El paquete MI-SAFE

- ¿Que servicios únicos proporciona MI-SAFE?
 - Versatilidad, servicios avanzados de desarrollo (datos y modelado) para usuarios finales con necesidades más específicas.

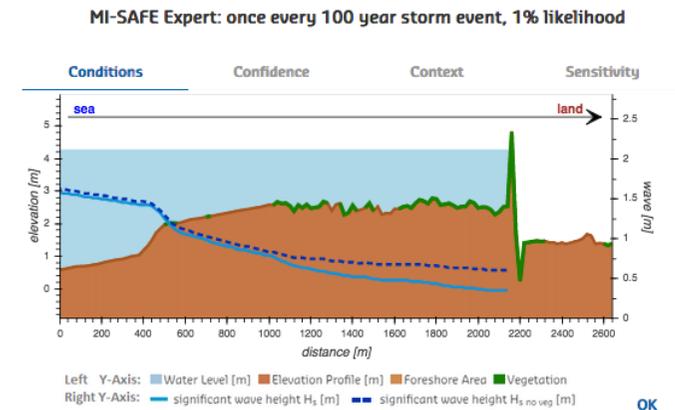
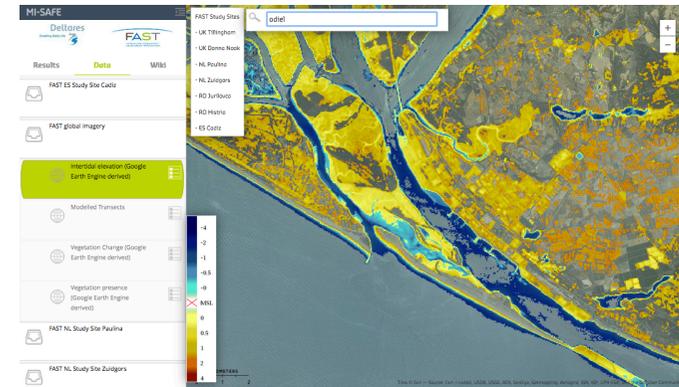


Simulación
LISFLOOD en el
caso de estudio
Tillingham (UK1)

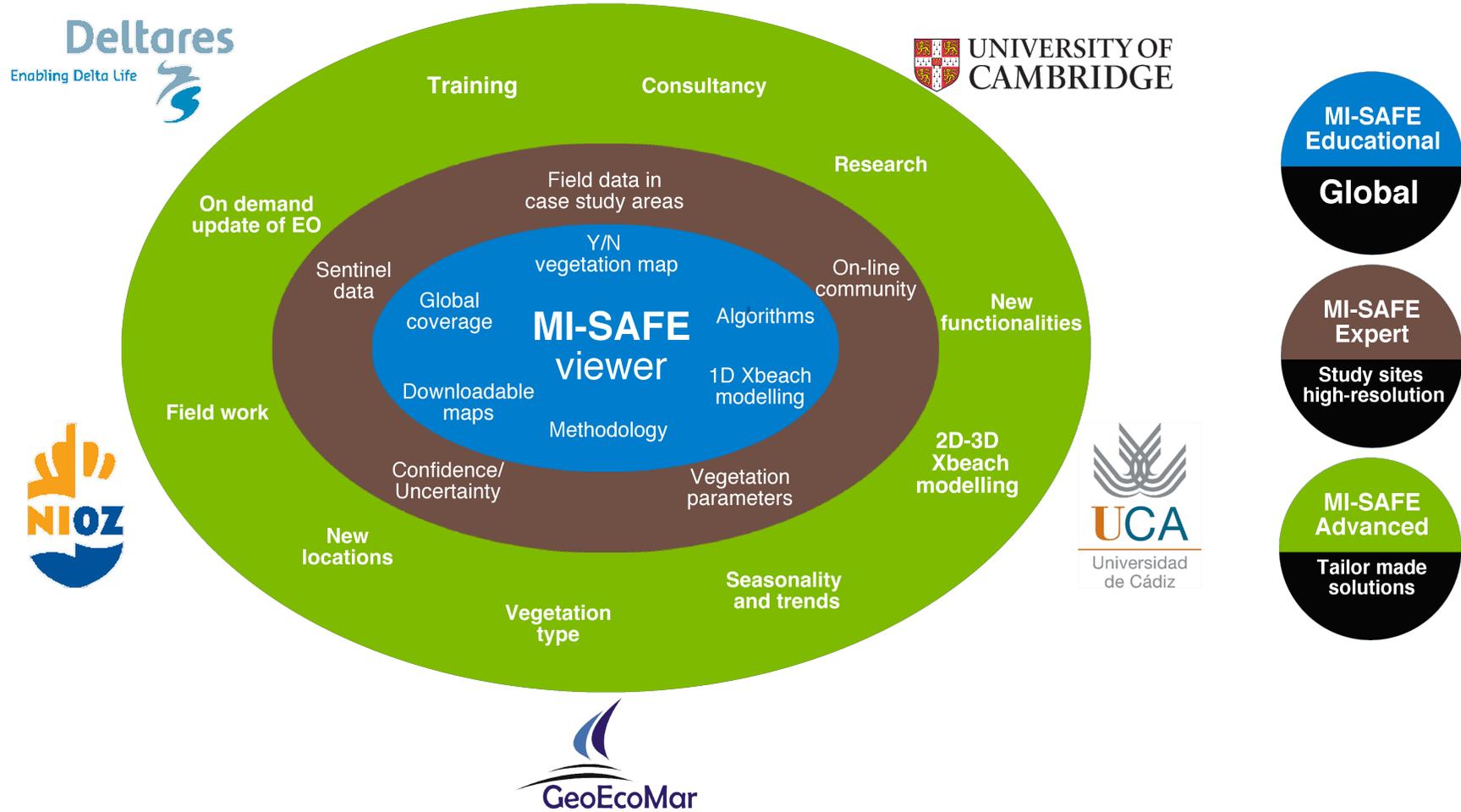
Servicios MI-SAFE



- Servicio de datos geospaciales en formato abierto (Open Geospatial Consortium, OGC): :
 - Elevación
 - Vegetación
 - Oleaje y mareas
- Modelado en código abierto (modelado OS):
 - Modulo de vegetación en XBeach
 - Combinable con proyectos de defensa costera (ej. RISC-KIT y Coastal Hazard Wheel).
- El visor MI-SAFE: visor on-line fácil de utilizar que muestra y da acceso a los productos y servicios MI-SAFE (incluye una vía de contacto directo con el consorcio FAST).



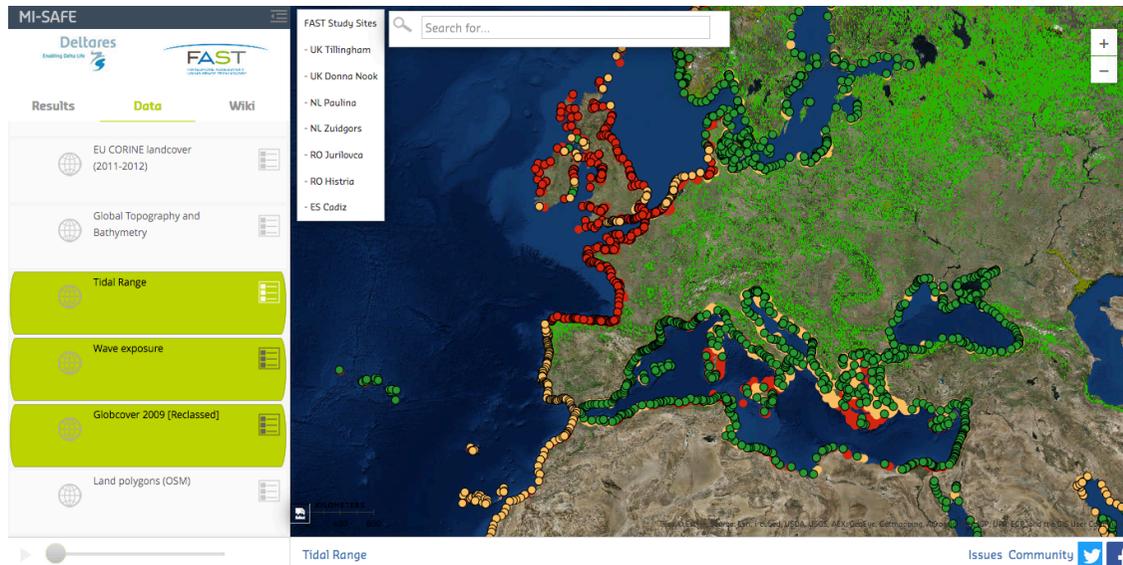
Niveles de servicio



- MI-SAFE Educational**
Global
- MI-SAFE Expert**
Study sites high-resolution
- MI-SAFE Advanced**
Tailor made solutions



Nivel Educativo

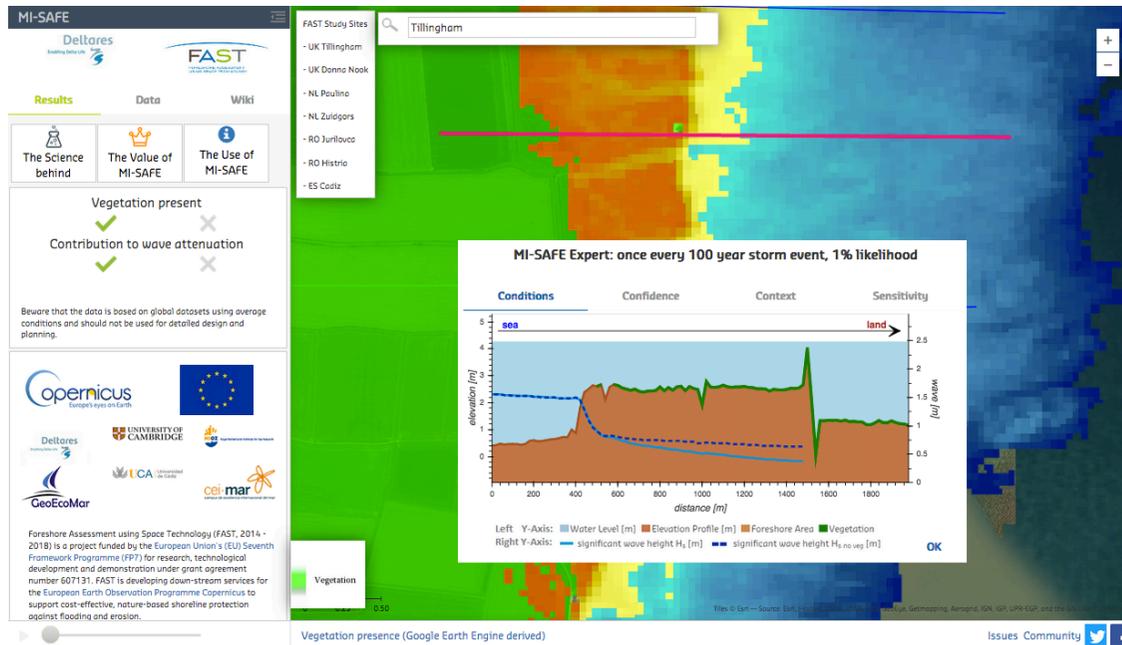


<http://fast.openearth.eu>

- Acceso y visualización de capas globales de:
 - Elevación/batimetría ((SRTM30+GEBCO; Elevación intermareal GEE)
 - Vegetación (CLC, Globcover-2009, mapas S/N, cambios en la vegetación)
 - Parámetros del agua (Olas, mareas y surge)
- Estimación del papel de la vegetación en zonas costeras.
- Bases científicas.
- Videos metodológicos.



Nivel Experto



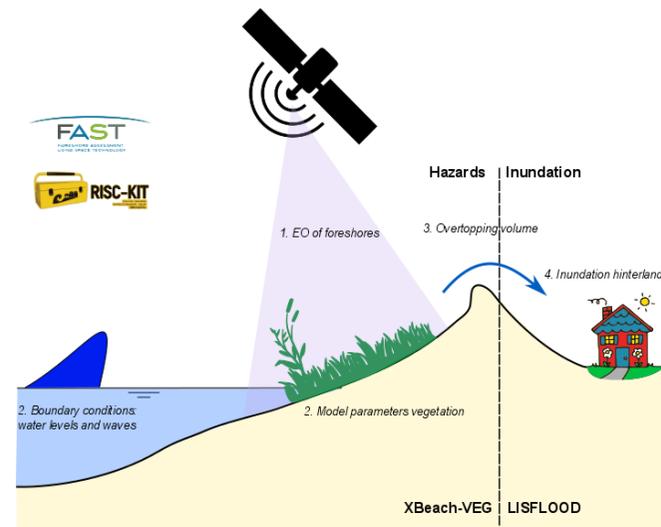
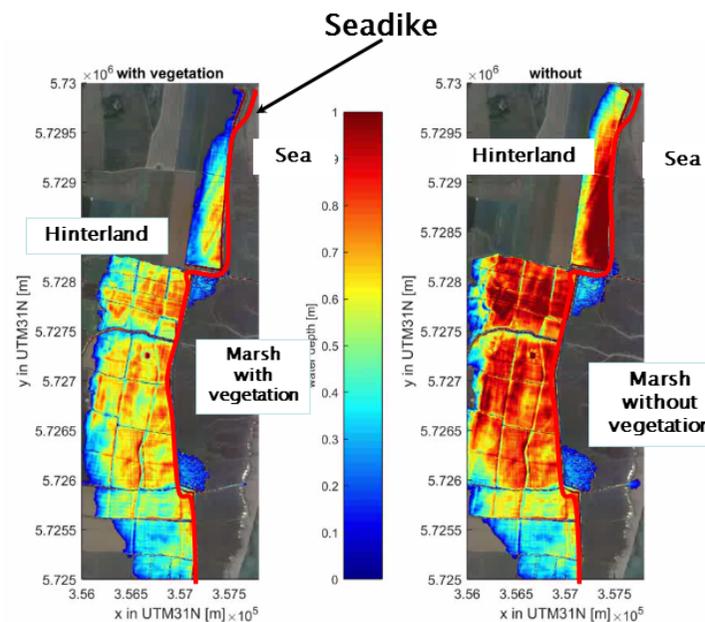
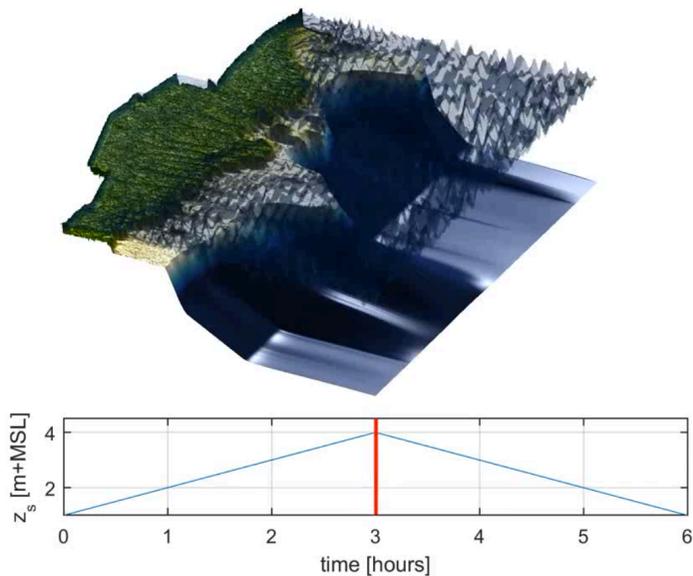
**MI-SAFE
Expert**

**Study sites
high-resolution**

- Acceso y visualización de capas específicas en zonas de estudio:
 - Elevación/batimetría (Elevación intermareal GEE)
 - Vegetación (LAI, NDVI)
 - Parámetros del agua (Olas, mareas y surge)
 - Datos locales de elevación (DTM)
- Estimación mejorada del papel de la vegetación en zonas costeras.

Nivel Avanzado

**MI-SAFE
Advanced**
**Tailor made
solutions**



Ejemplos de aplicaciones locales de los servicios MI-SAFE

Edward P. Morris



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[Deltares](#)
(PROJECT LEADER)



Mindert de Vries
mindert.devries@deltares.nl
Tel. +31(0)6 2348 0876



[UCam](#)
University of Cambridge



Iris Möller
iris.moeller@geog.cam.ac.uk
Tel. +44 (0)1223 333353



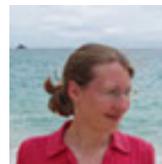
[GeoEcoMar](#)
National Institute for
Marine Geology and
Geo-Ecology



Adrian Stanica
astanica@geoecomar.ro
Tel. +40 21 2094986



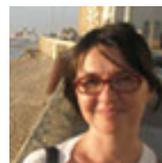
[NIOZ](#)
Royal Netherlands
Institute for Sea
Research



Daphne van der Wal
daphne.van.der.Wal@nioz.nl
Tel. +31(0)113 577300



[UCA](#)
Universidad de Cádiz



Gloria Peralta
gloria.peralta@uca.es
Tel. +34 956 016 428



Edward P. Morris (UCA)
edward.morris@uca.es
[@EdwardPMorris](#)



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- WP3: Teledetección aplicada a zonas costeras
- Objetivos: Caracterizar condiciones ambientales costeras utilizando técnicas de teledetección.
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- Principales logros:
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El proyecto FAST

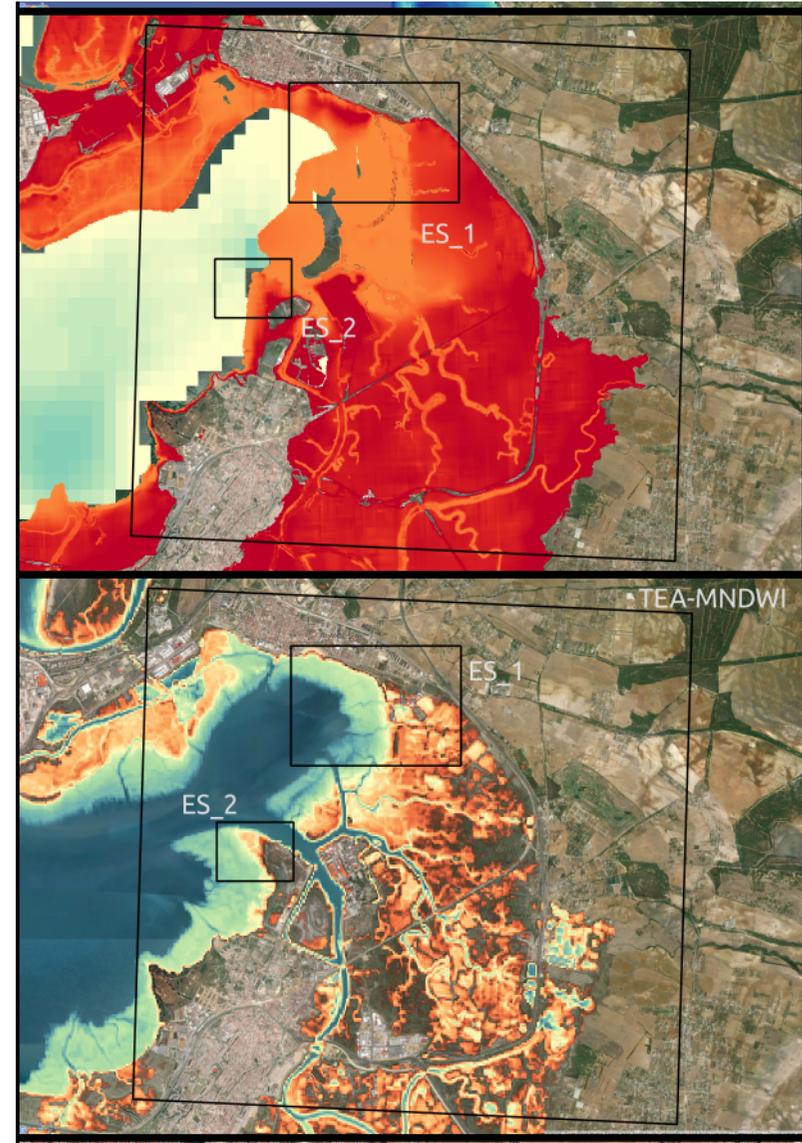
- WP3: Teledetección aplicada a zonas costeras
 - **Batimetría intermareal.**

¿Por que?

Calidad de DTMs en zonas intermareales

¿Solución?

Time-ensemble average water indices



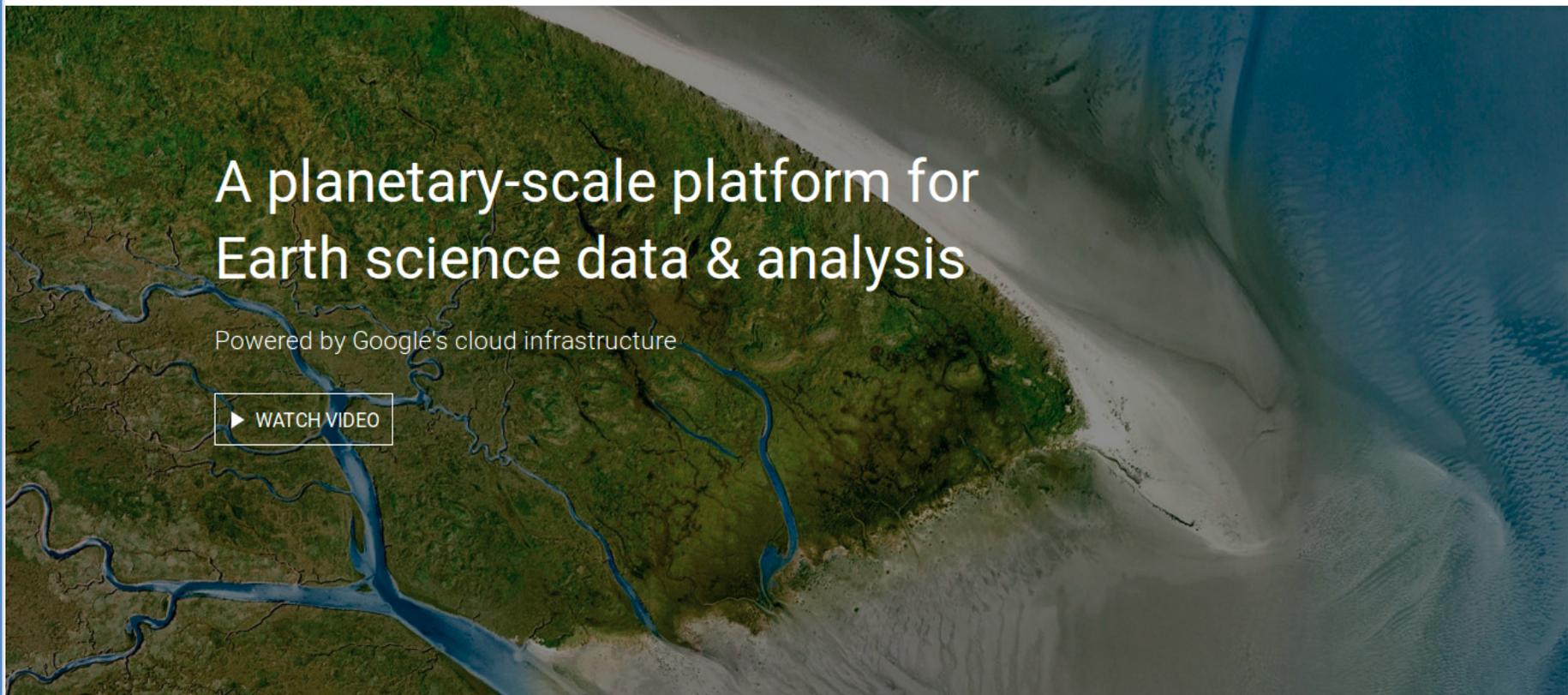
Google Earth Engine



<https://earthengine.google.com/#>

Google Earth Engine

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¿Dónde esta la zona intermareal?

<https://code.earthengine.google.com/0-link-sea-level-to-images>

Color negro es intermareal

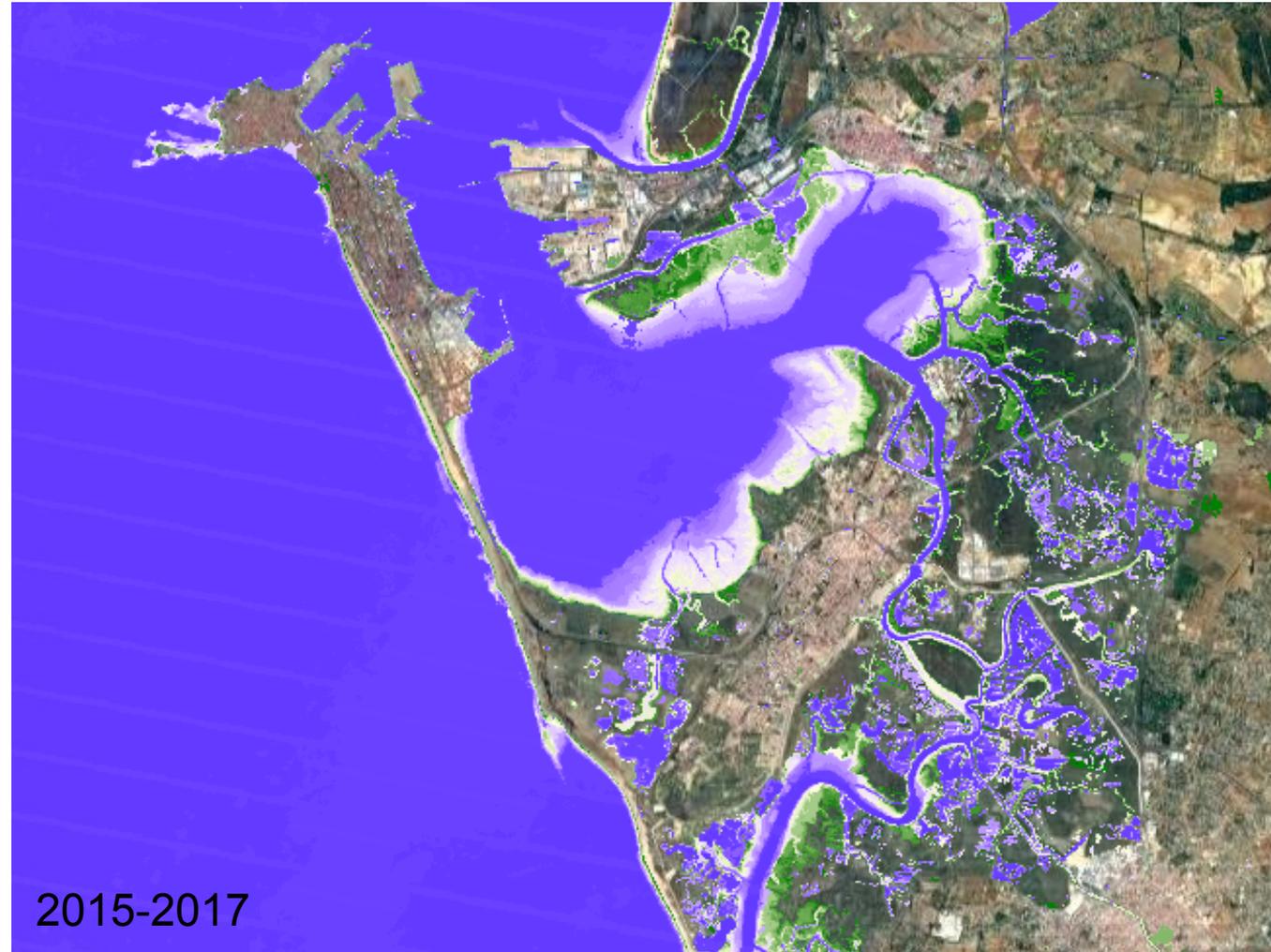


Elevación intermareal

https://code.earthengine.google.com/0_1-view-ensemble-waterlines,1-build-waterlines

Green > local mean sea-level

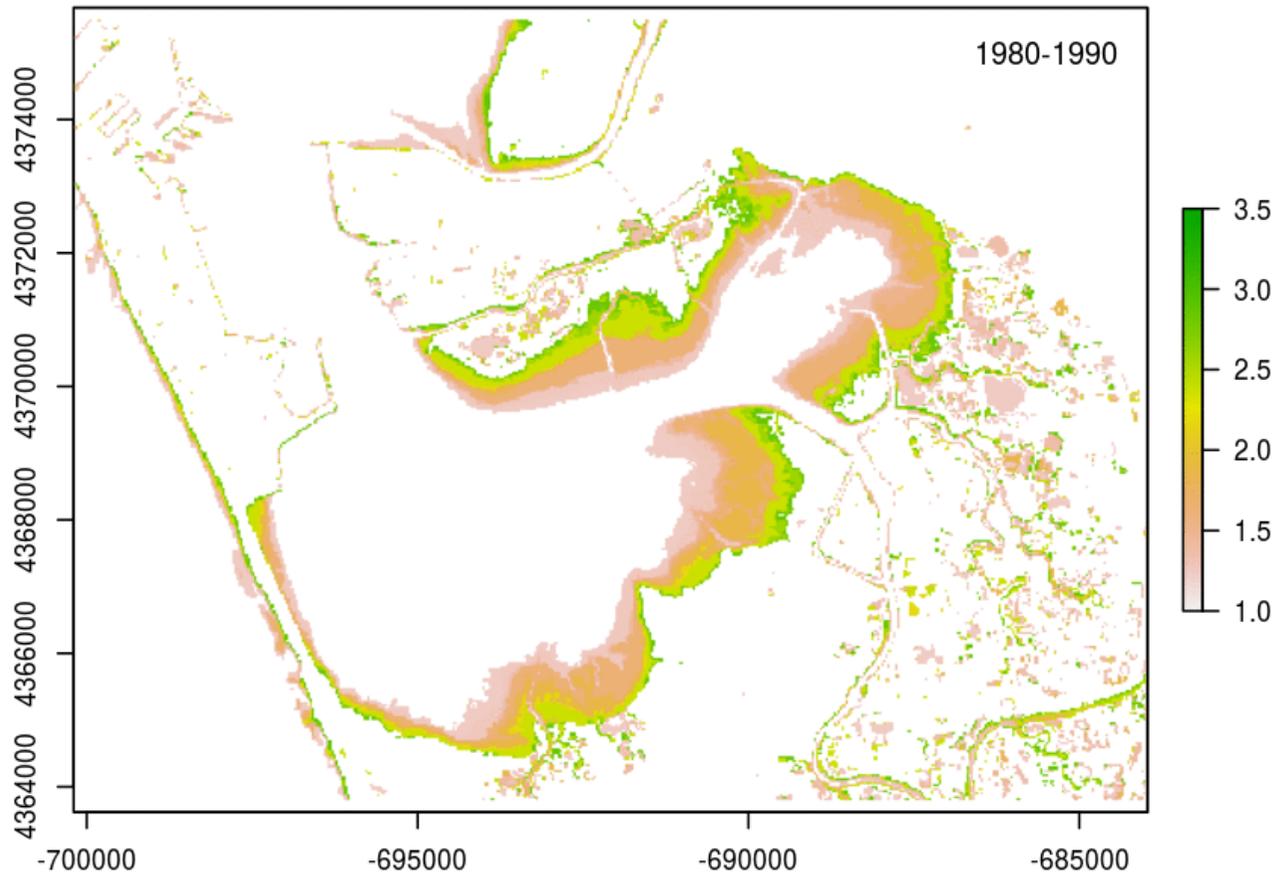
White-blue < local mean sea level



Series temporales de elevación intermareal



https://code.earthengine.google.com/0_1-view-ensemble-waterlines,1-build-waterlines

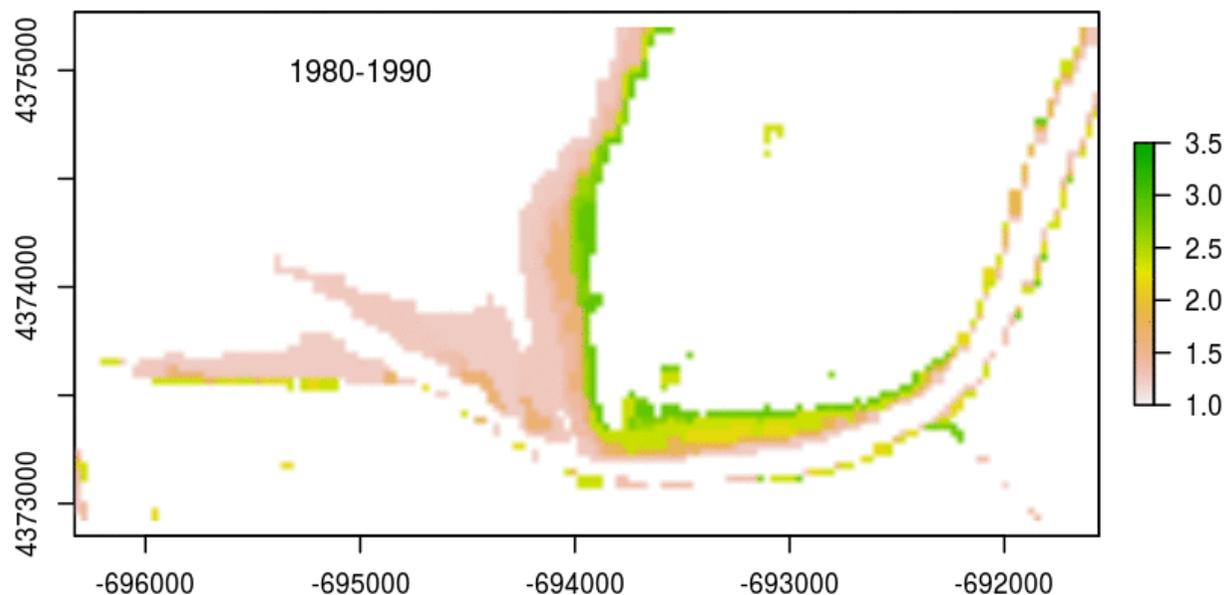


Series temporales de elevación intermareal



https://code.earthengine.google.com/0_1-view-ensemble-waterlines, 1-build-waterlines

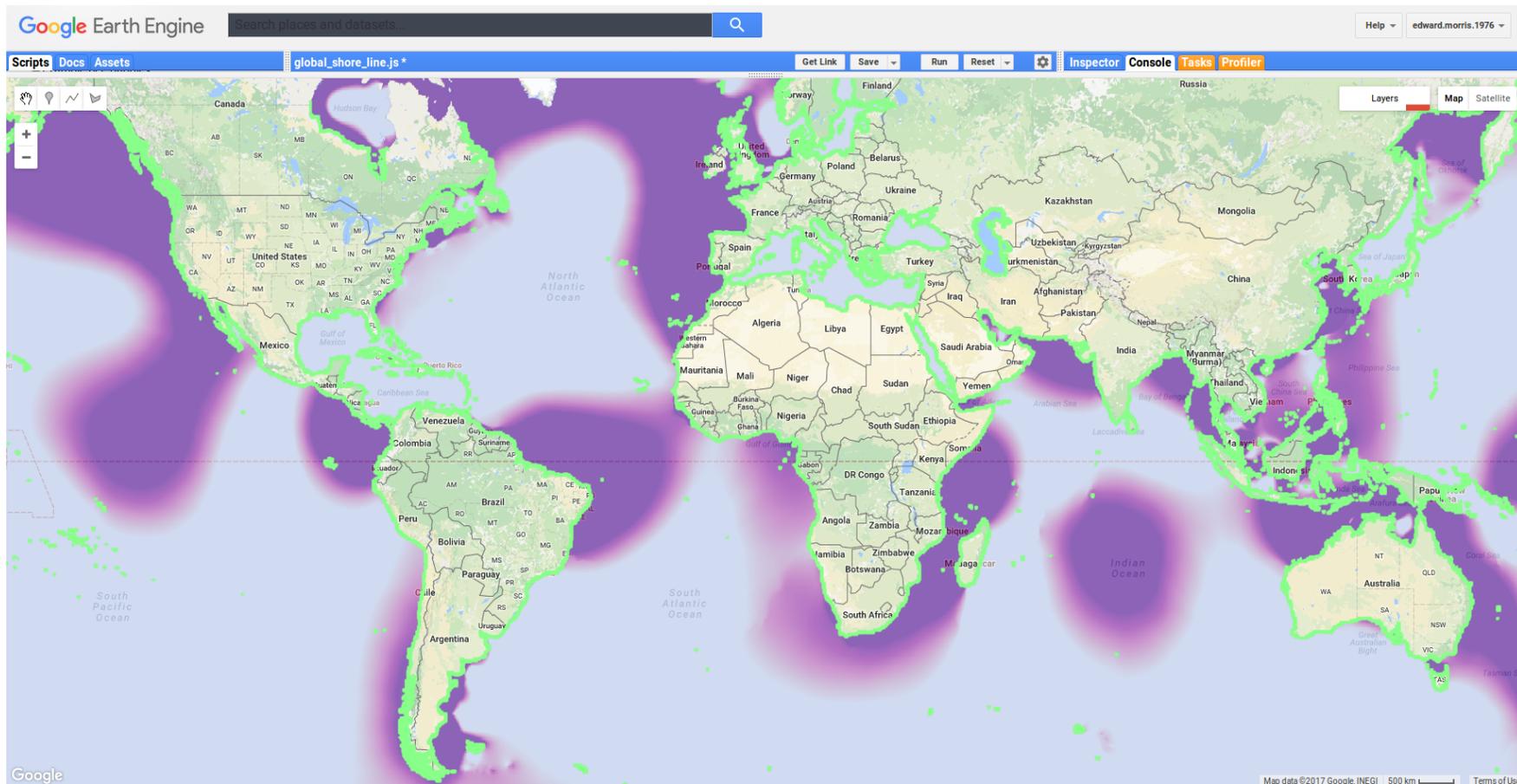
Erosión lateral de la flecha de Valdelagrana (Del Rio et al.)



Elaborando un mapa de elevaciones intermareales a nivel global

Sin series temporales del nivel del mar...

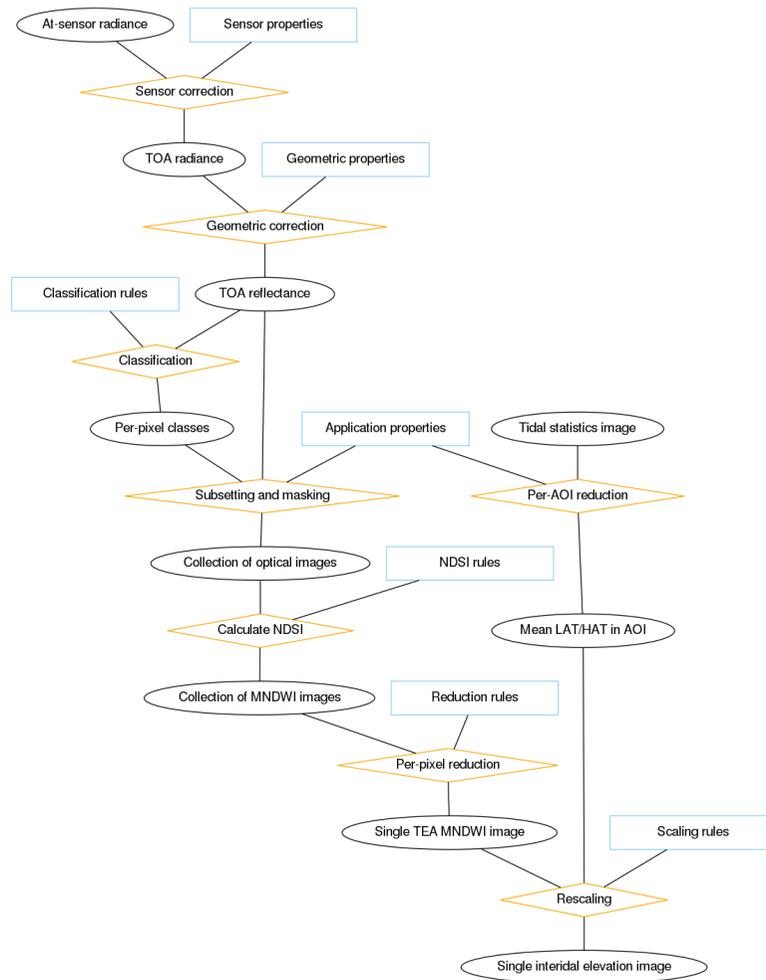
Global tide and surge model (GTSM, Muis et al. 2014)



Elaborando un mapa de elevaciones intermareales a nivel global



Sin series temporales del nivel del mar...

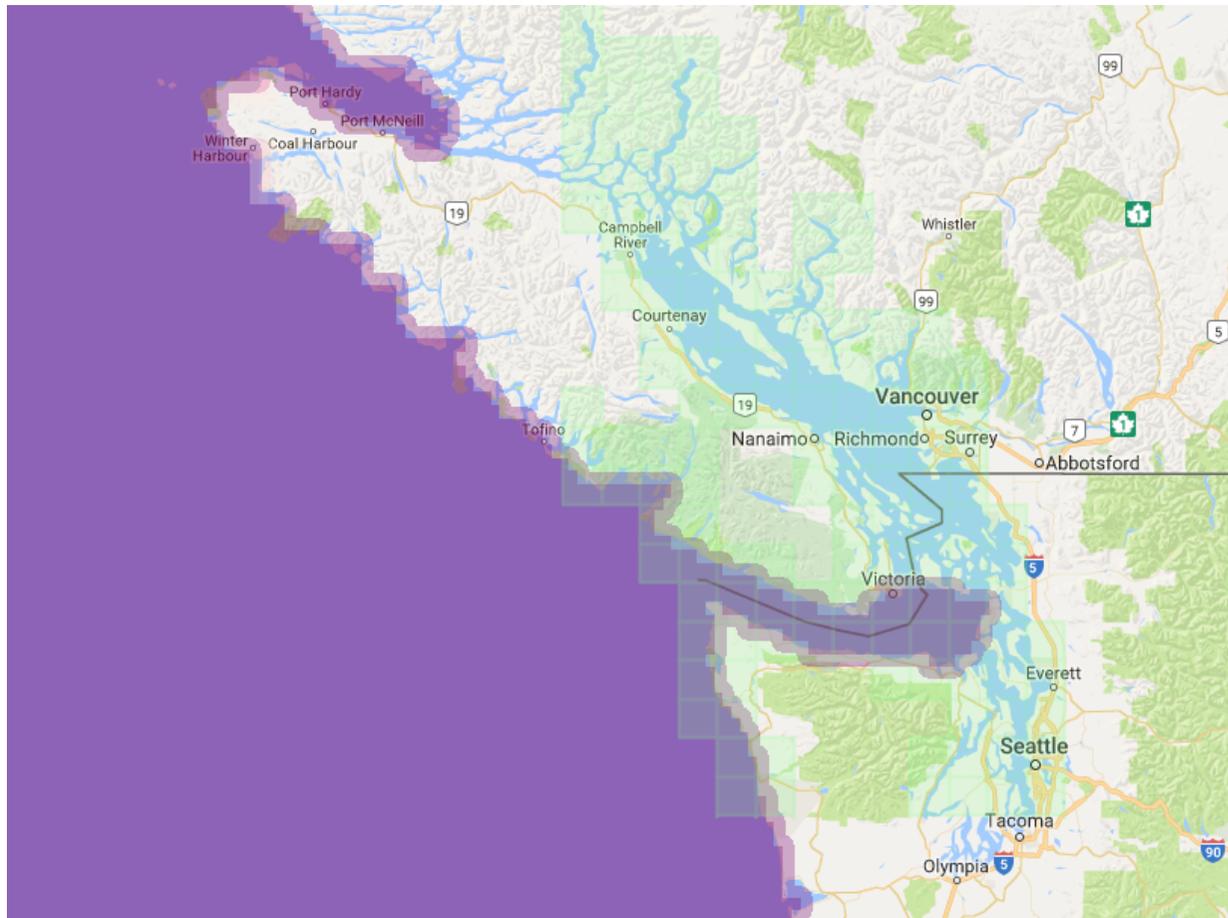



Elaborando un mapa de elevaciones intermareales a nivel global



Sin series temporales del nivel del mar...

Need local analysis in complex regions



Elaborando un mapa de elevaciones intermareales a nivel global



Sin series temporales del nivel del mar...

<http://fast.openearth.eu/> , Search Bangladesh

MI-SAFE

Deltares

FAST

Results Data Wiki

The Science behind The Value of MI-SAFE The Use of MI-SAFE

Vegetation present

Contribution to wave attenuation

Beware that the data is based on global datasets using average conditions and should not be used for detailed design and planning.

Copernicus Europe's eyes on Earth

UNIVERSITY OF CAMBRIDGE

Deltares

GeoEcoMar

LCA Universidad de Galdak

cei-mar

Foreshore Assessment using Space Technology (FAST, 2014 - 2018) is a project funded by the European Union's (EU) Seventh Framework Programme (FP7) for research, technological development and demonstration under grant agreement number 607131. FAST is developing down-stream services for the European Earth Observation Programme Copernicus to support cost-effective, nature-based shoreline protection against flooding and erosion.

Fast Space Project

FAST Study Sites

- UK Tillingham
- UK Donna Nook
- NL Paulina
- NL Zuidgors
- RO Jurilovca
- RO Histria
- ES Cadiz

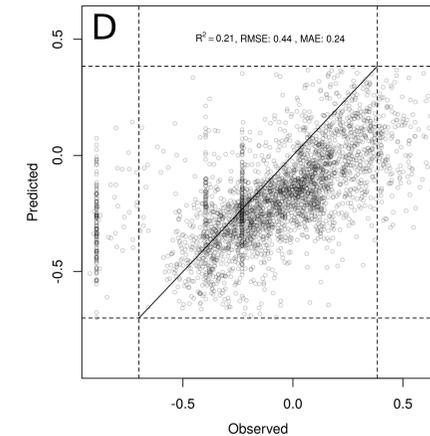
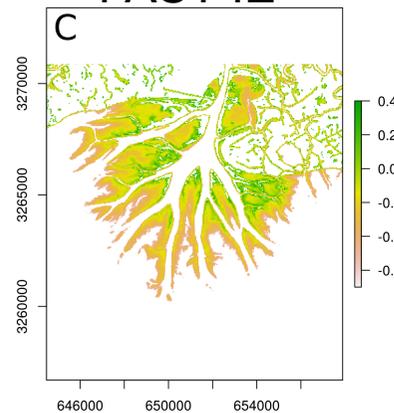
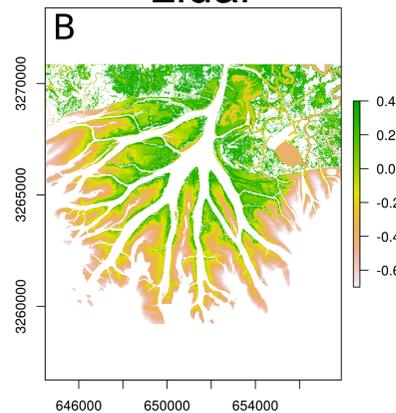
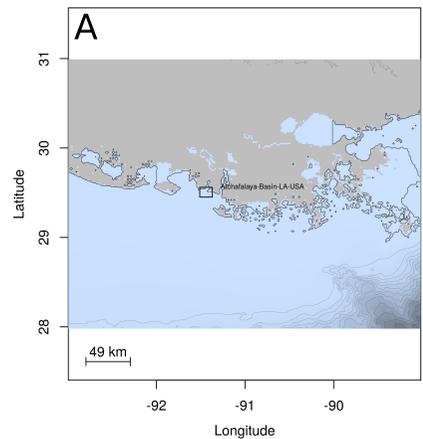
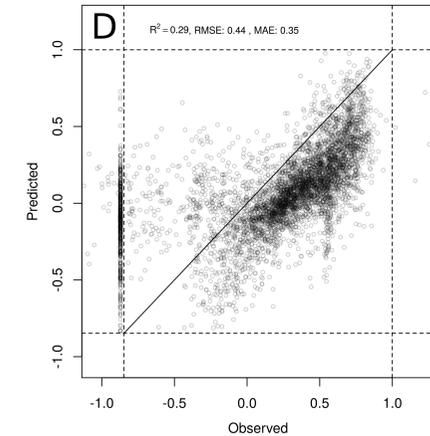
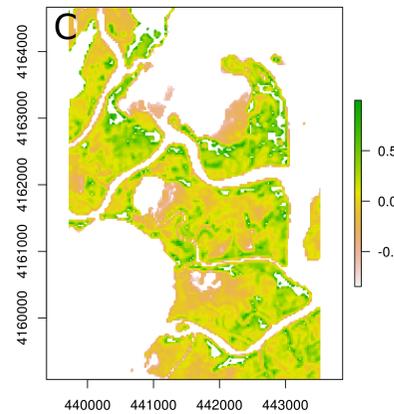
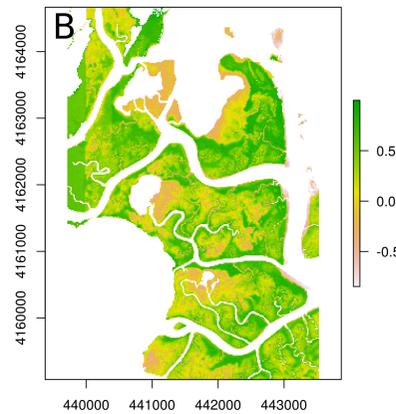
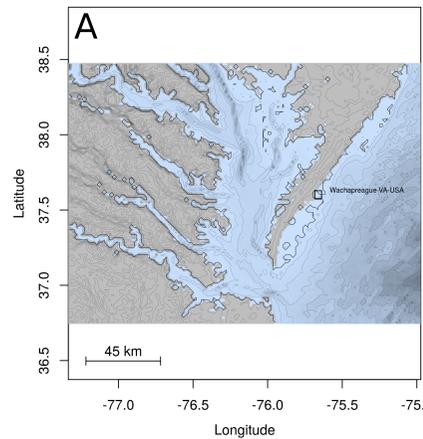
0 10 20 KILOMETERS

Issues Community



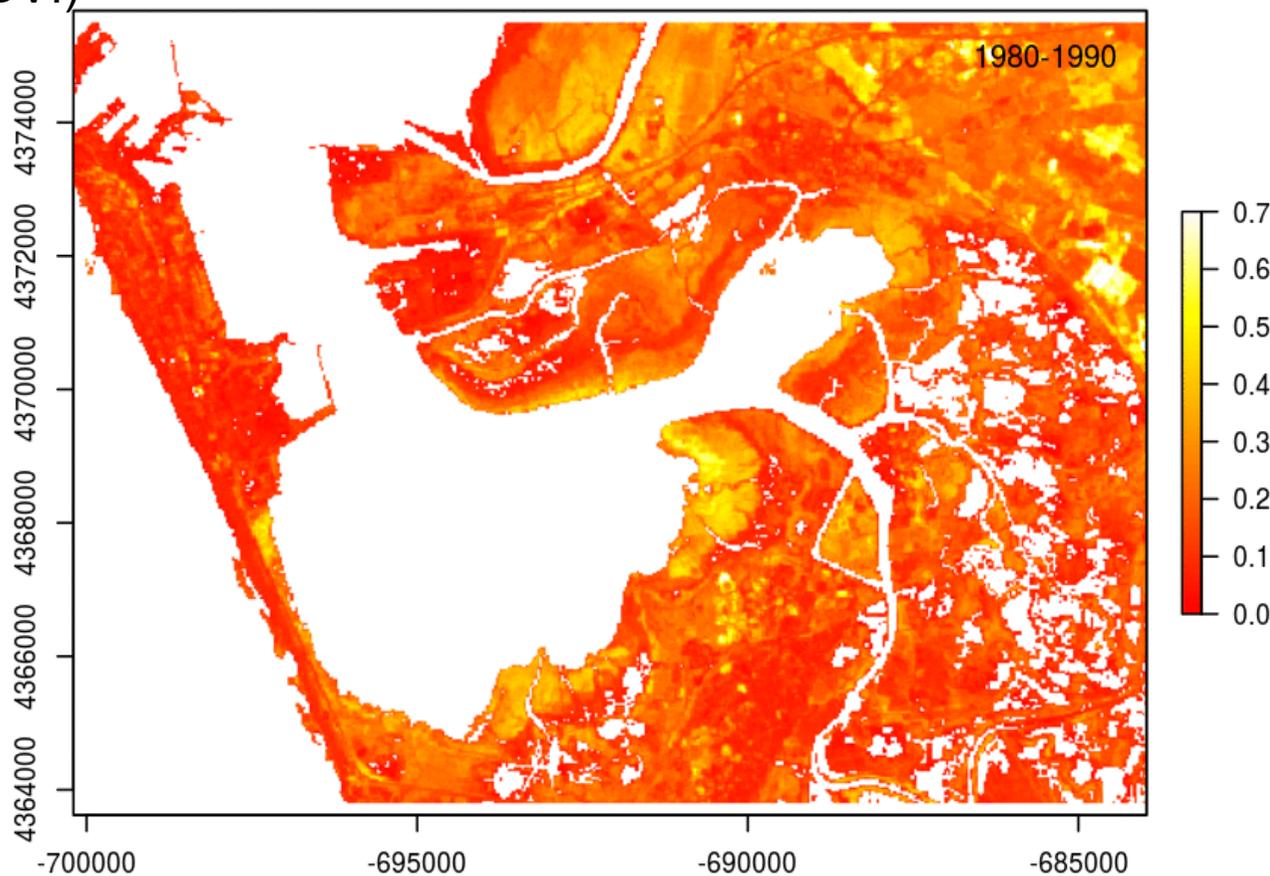
Elaborando un mapa de elevaciones intermareales a nivel global

Mean absolute error 0.2 to 0.9 m at number of sites (FAST + 2 sites in USA)



WP3: Teledetección aplicada a zonas costeras Vegetación costera

Normalised difference vegetation index
(NDVI)

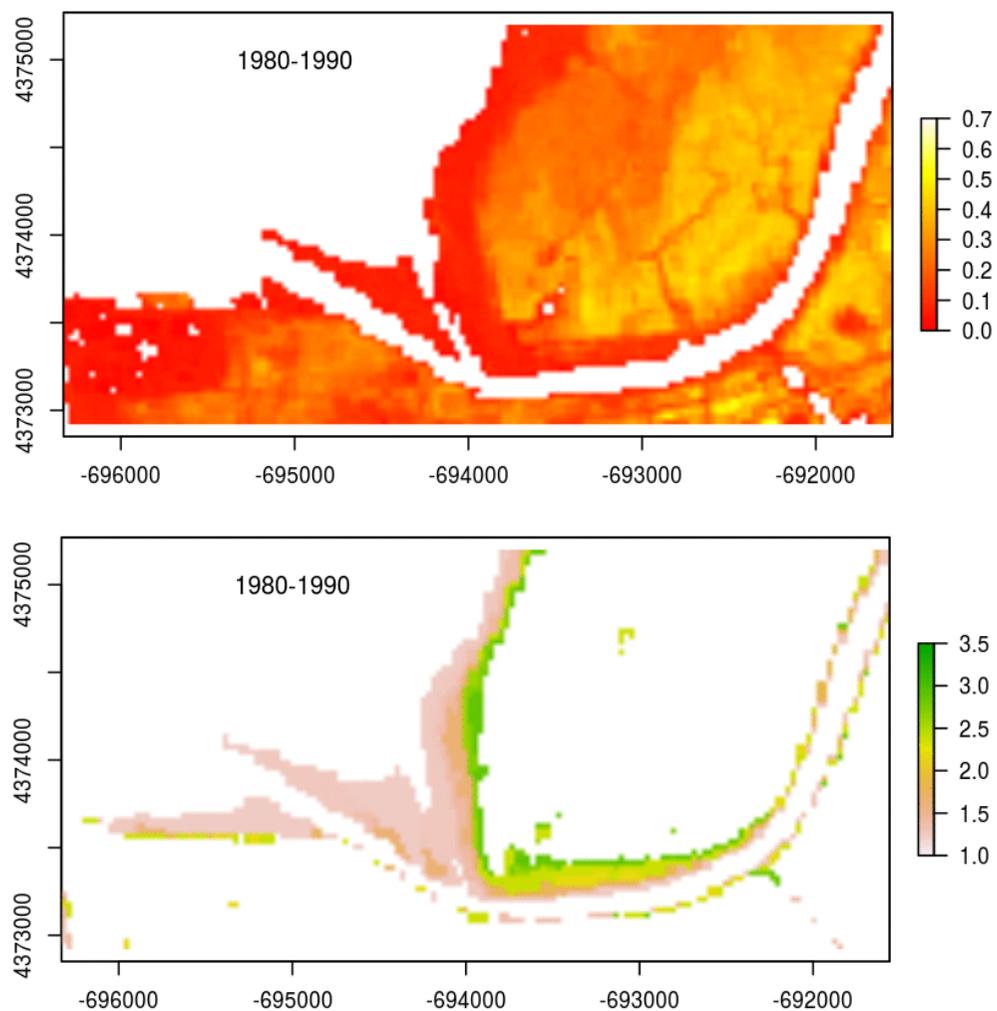


WP3: Teledetección aplicada a zonas costeras

Vegetación costera



Normalised difference vegetation index (NDVI) and Intertidal elevation

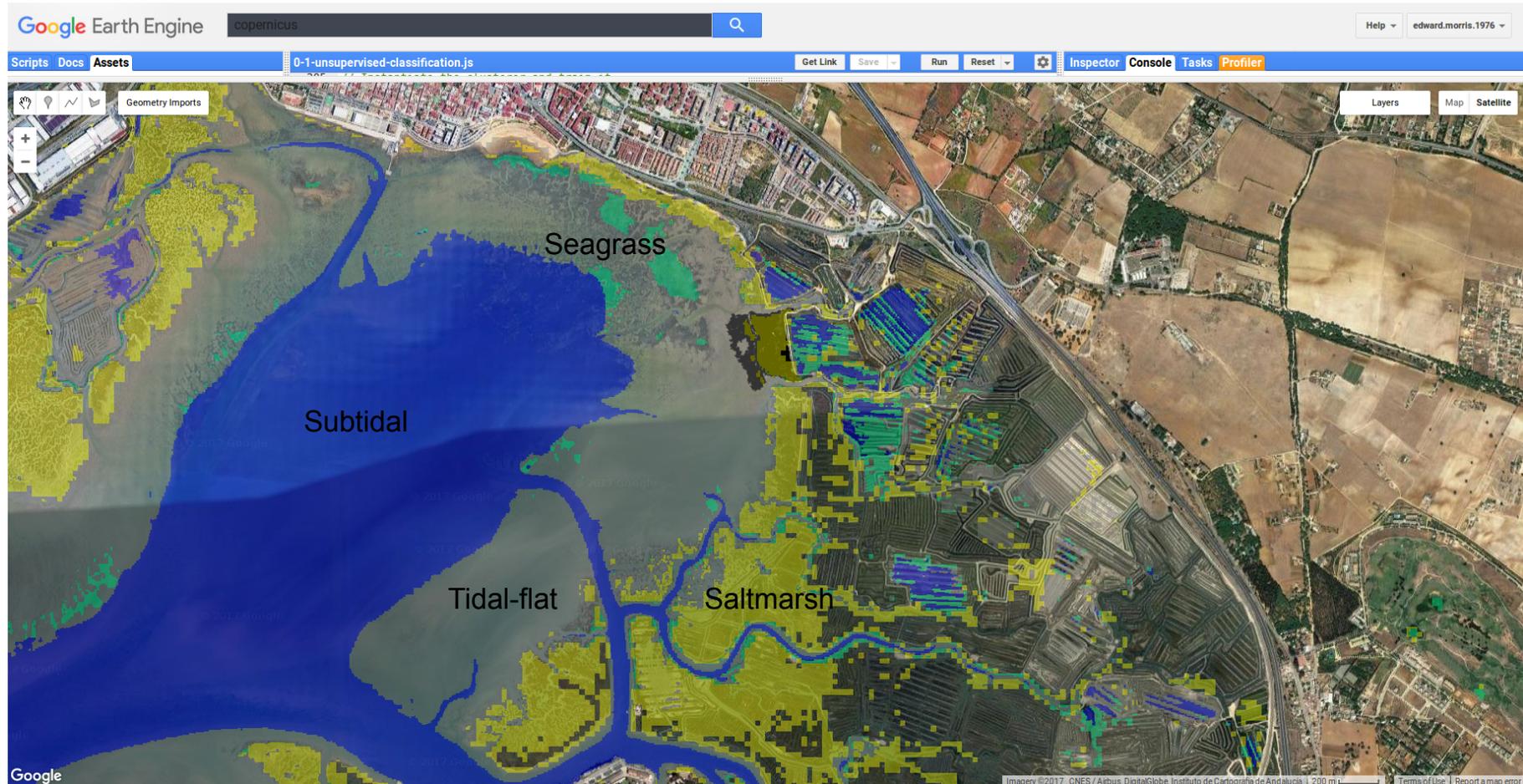


WP3: Teledetección aplicada a zonas costeras

Classificación intermareal



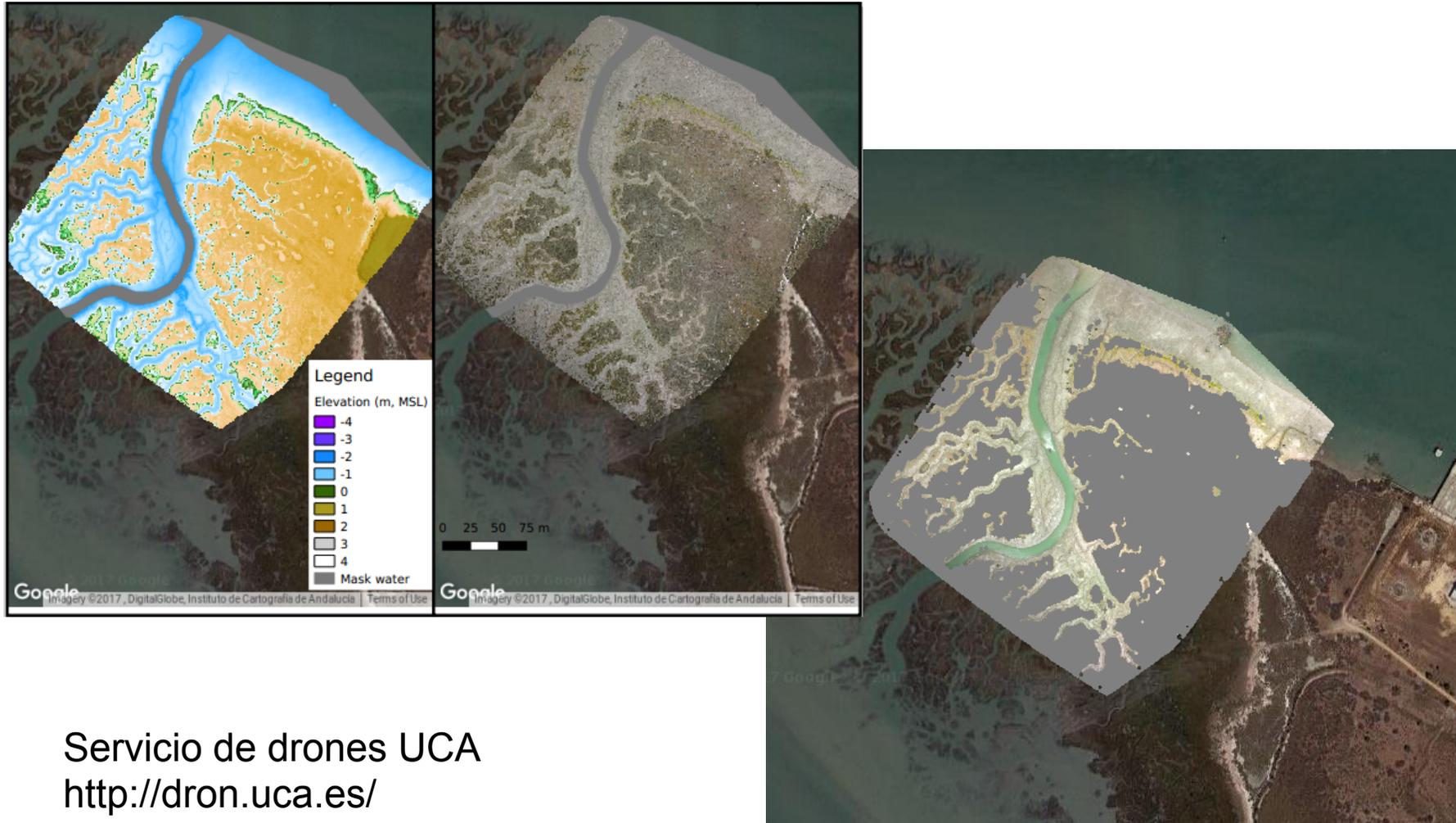
https://code.earthengine.google.com/0-1-unsupervised_classification.js



WP3: Teledetección aplicada a zonas costeras Classificación intermareal



<https://code.earthengine.google.com/uav-weka--classification.js>

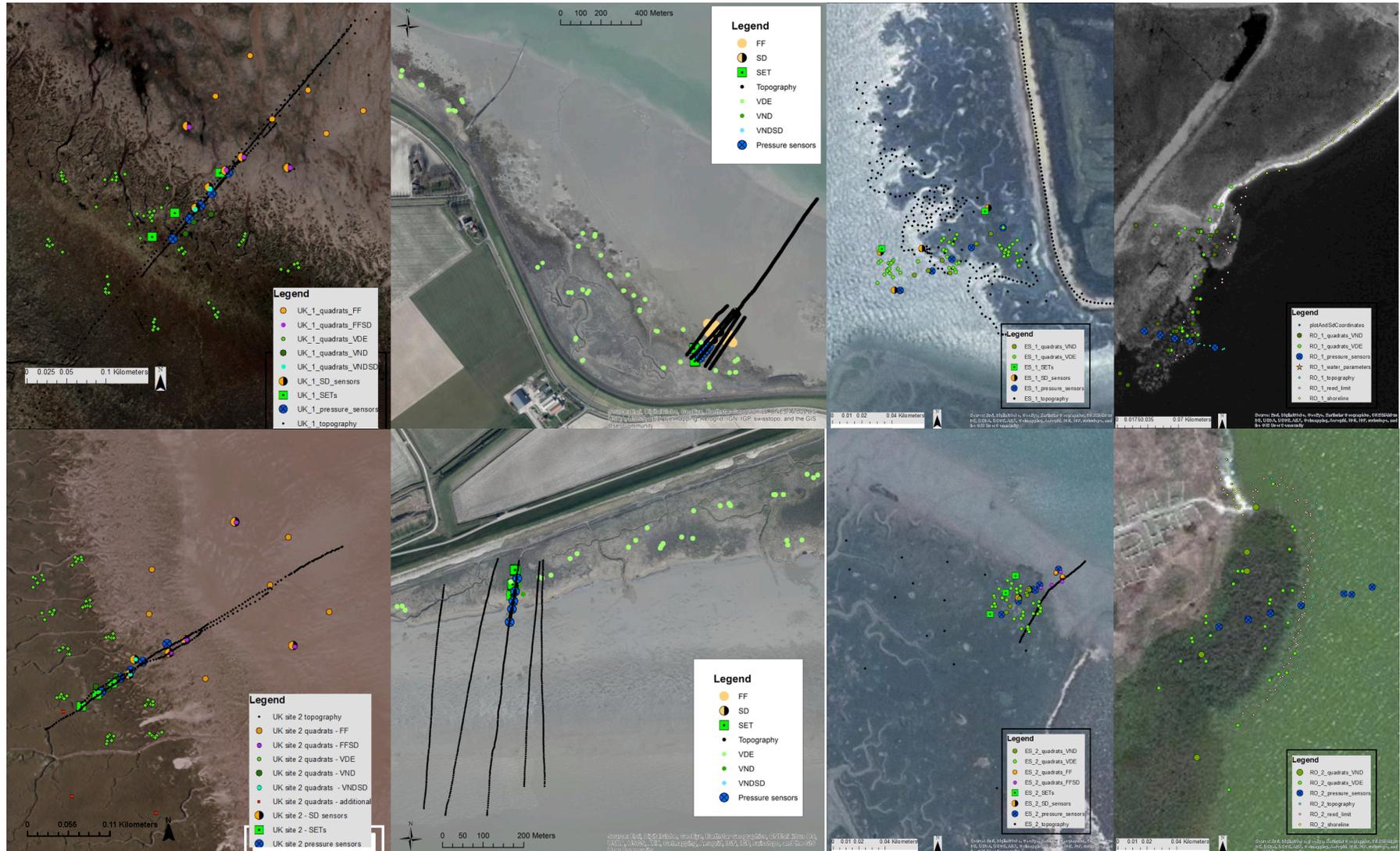


Servicio de drones UCA
<http://dron.uca.es/>



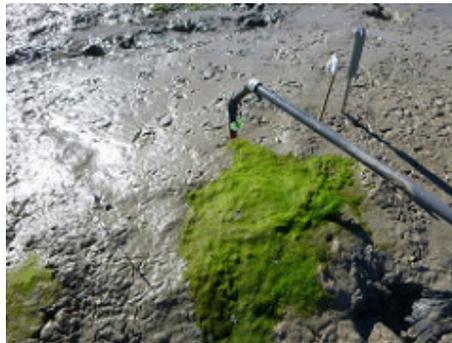
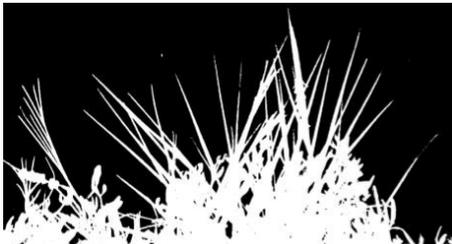
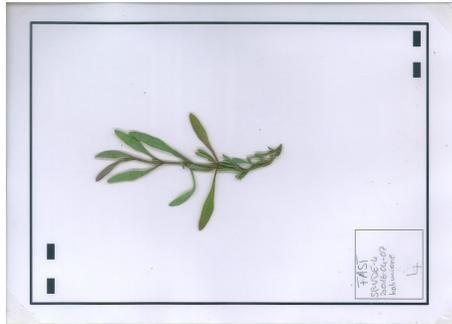
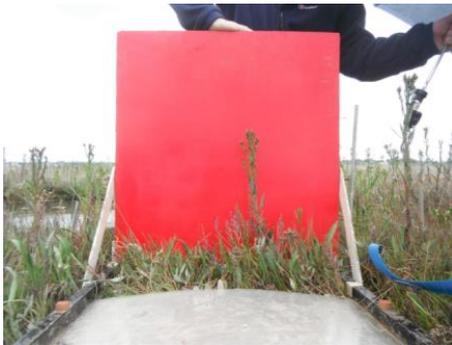
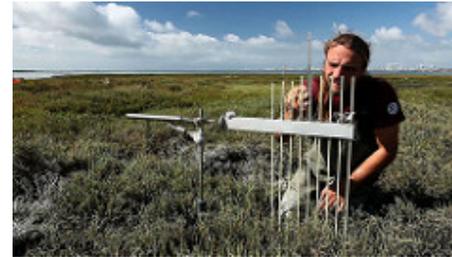
Retos WP3

- Linking Caracterización biofísica *in situ* a EO.



Retos WP3

- Linking biofísica *in situ* a EO.



WP3 más información



Type	Product type	Scale	RS Input	Res. (m)	Calibrated	Validated	Level of service
Elevation	Bathymetry/ topography	Global	EO (SRTM15plus)	>=20	No	Optional	Educational
		Regional	EO/other (EMODNET, LIDAR)	>=20	No	Optional	Expert
	Intertidal elevation	Local/ Global	EO (L8, S1, S2)	20-30	No	Yes (dGPS)	Expert
Vegetation	Basic land cover / vegetation type	European	Recode CLC (Corine Land Cover)	100	Thematic subset	No	Educational
	Vegetation Y/N	Global	EO (S2)	10	No	Optional	Educational
	Leaf Area Index marsh	Local	EO (S2)	10	No	Optional - field data	Expert
	NDVI (vegetated, unveg.)	Local	EO (S2)	10	No	Optional - field spectra	Expert
	Other biophysical parameters	Local	EO (S2, RE) + field data	5-10	Yes (field), modelling	Yes (field)	Advanced (in progress)
Stability	Stability (surface)	Local	EO (S1, S2, RE), + field data	20-30	Yes (field), modelling	Yes (field)	Advanced (in progress)



Summary



- Inter-tidal regions create specific EO challenges.
- Time-series (Big Data) analysis is promising and now feasible.
- Large potential to apply innovative analysis to local, regional and global challenges.
- Open access synthetic aperture radar (SAR) and synergies to be developed.
- Atmospheric correction and clouds still an issue, but improving.
- Specific algorithms for coastal vegetation biophysical properties in development.

Contact: edward.morris@uca.es @EdwardPMorris

