Project achievements overall review

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esa Coastal Erosion Project

European Space Agency

Presentation outline

- Context
- i-Sea’s vision
- Coastal Erosion cardinal requirements
- S4S team composition
- The project structure and timeline
- Activities performed & Product delivery overview
- Deliverable status
- Main lessons learnt

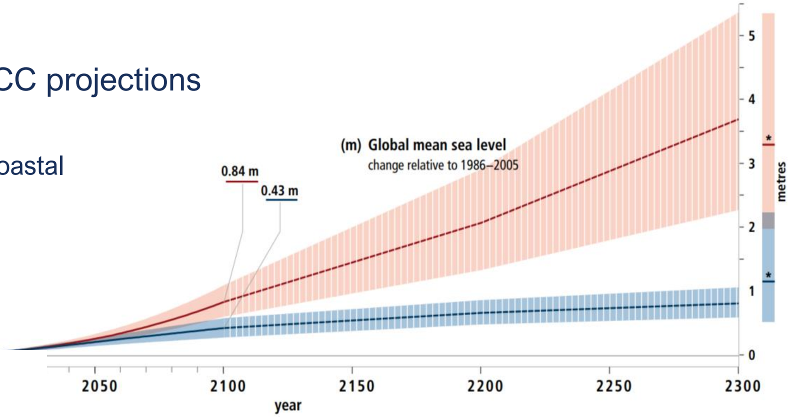
Anticipate and prevent erosion impacts : a wordwide issue

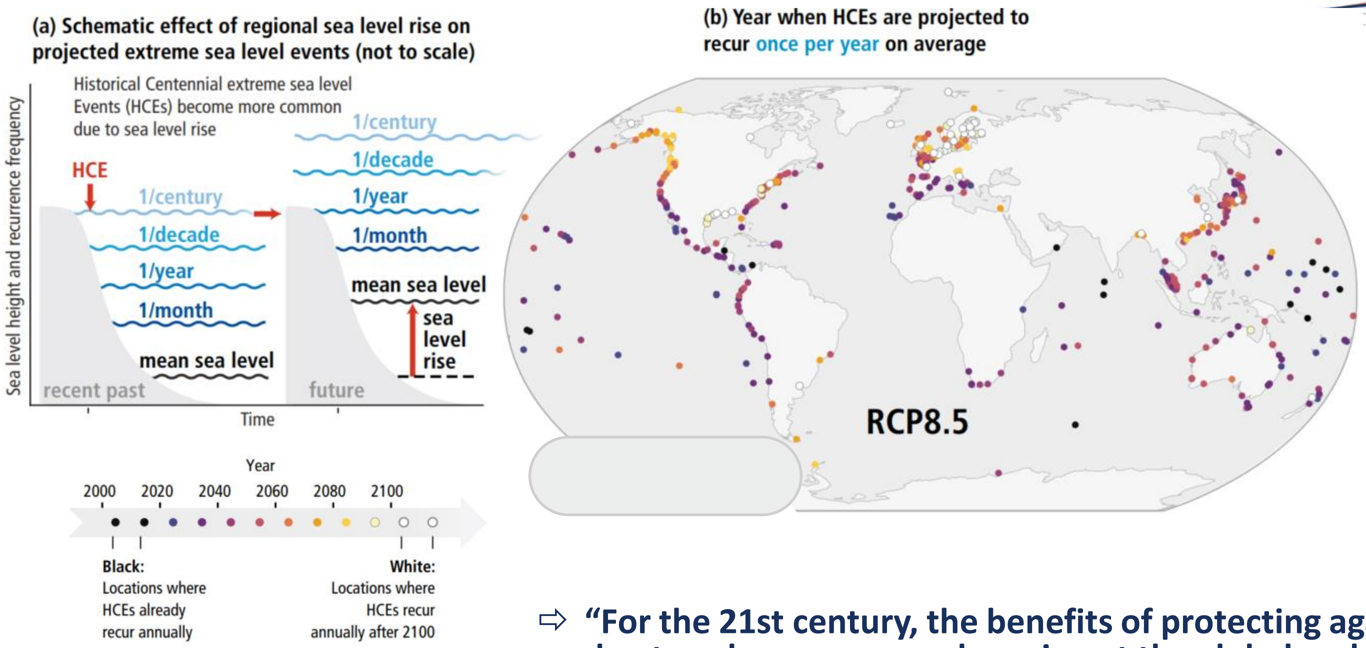
GIEC, 2014: Changements climatiques 2014: Rapport de synthèse. Contribution des Groupes de travail I, II et III au cinquième Rapport d'évaluation du Groupe d'experts intergouvernemental sur l'évolution du climat [Sous la direction de l'équipe de rédaction principale, R.K. Pachauri et L.A. Meyer]. GIEC, Genève, Suisse, 161 p

Climate change

Sea level rise ⇨ erosion & submersion

- ⇨ 70% of the coastlines will face sea level rise within the average IPCC projections
- ⇨ Geopolitical threats
  - ⇨ Impairing the territorial integrity of island states and countries mainly coastal
  - ⇨ Massive population migration by 2100
- ⇨ **Extreme hundred-year events will become annual**
- ⇨ Ecological and economical threats: loss of invaluable ecosystems





IPCC, 2019: Summary for Policymakers. In: IPCC Special Report on the Ocean and Cryosphere in a Changing Climate [H.-O. Pörtner, D.C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Alegría, M. Nicolai, A. Okem, J. Petzold, B. Rama, N.M. Weyer (eds.)].

⇨ **"For the 21st century, the benefits of protecting against increased coastal flooding and land loss due to submergence and erosion at the global scale are larger than the social and economic costs of inaction"**

The cost of inaction …

- US – coastal property loss: **500 M$ / an** (NOAA, 2013)
- West Africa – coastal degration: **3 800 M€ & 13 000 victims** (WACA Program, World Bank, 2019)
- France – worst IPCC projection, removing the protection infrastructures and measures: **47 300** endangered housing, representing a property value of **8 000 M€** (Cerema, 2020)

… compared with the action cost

- US – expenses of the federal government to control erosion: **150 M$ / an** (NOAA, 2013)
- Vietnam – coastal adaptation to climate change: **3 000 M$**
- Europe (2001) – coastline protection measures: **3 200 M€** (Eurosion, 2004)
- France – favorable IPCC projection, maintaining the protection infrastructures and measures: **5000** endangered housing, representing a property value of **800 M€** (Cerema, 2020)

i-Sea’s vision

A service platform to support decision making

For whom ?

- Public authorities – Coastal managers from local to national scale
- Users (e.g. Economic actors)
- The property sector and land and property owners
- The insurance sector
- The scientists

What for?

- Increase the knowlede and feed the territorial strategies to better prevent the impact of climate change
- Anticipate the crises and support protection and prevention actions

  … at a global scale
  - Characterise erosion hasards and contribute to risk analysis
  - Chose and size the erosion adaption measures
- Contribute to the analysis and compensation of losses

How?

- High-frequency monitoring of erosion indicators
- At all scales
- Based on standardized methods

ESA’s cardinal requirements

esa Coastal Erosion Project

European Space Agency

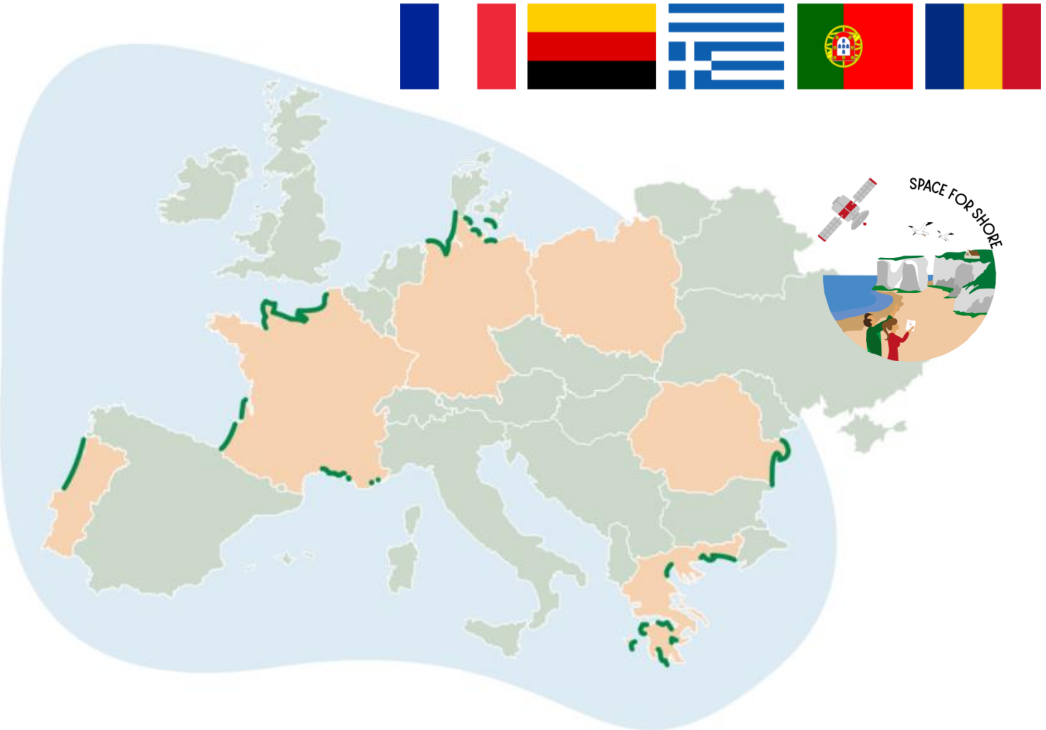
- **Involve final end-users (at least 3 entities from 3 different countries) all along the project**
    - Express their requirements
    - Participate in / coorganise demo meetings
        - Assess the products’ adequacy and utility
        - Analyse the feasibility of their integration in their working practice
    - Express their willingness to buy, in the future, the service & products

- **Make use of freely available – and historical - datasets to the largest possible extent**
    - Sentinel 1 and Sentinel 2 missions (**Develop and demonstrate innovative EO products**)
    - Combined with ERS-1, ERS-2, Envisat and SPOT archives

- **Provide erosion analysis over a minimum of 1000 linear km of coast split into 3 different member states and provide the best products suited to end user requirements over the past 25 year**

Space for Shore mantras

- **A solution embracing all European Seas**
- A monitoring solution for all **coastal geomorphologies**
- **Products prescribed by their final end-users**
- **Products tested, approved and recommended by the scientific community**
- Products for a **worldwide resilient coastline**



esa Coastal Erosion Project

European Space Agency

Space for Shore Team

Prime Contractor & Project management

i-Sea

Optical remote sensing experts

i-Sea
Regional Coordinator France

Brockmann Consult GmB
Regional Coord. Germany

TERRA SPATIUM SA
Regional Coord. Greece

TERRASIGNA™
Regional Coord. Romania

SAR remote sensing experts

HARRIS® GEOSPATIAL SOLUTIONS

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HAROKOPIO UNIVERSITY

universidade de aveiro
Regional Coord. Portugal

Service development

Kapitech

Coastal erosion experts

i-Sea

universidade de aveiro

SFÂNTU GHEORGHE MARINE AND FLUVIAL RESEARCH STATION

Aix*Marseille université

UNICAEN UNIVERSITÉ CAEN NORMANDIE

OBSERVATOIRE CÔTE AQUITAINE

Work logic & consortium main strategy

Requirement analysis

- Focus coastal managers & coastal experts
- 22 interviews (FR, RO, GR, GE, PT)
- 40 products requested
- **12 high priority erosion indicators selected**

Tech Spec

- Include all possible algorithms already at consortium's disposal (including published ones)
- Try several algorithms per product
- Find solutions to use optical and SAR imagery in the production process for each product
- **24 individual algorithms**

POC

- Fulfill end-users' need
- Favor algorithm performance comparison ⇨ start validation phase
- Cross-compare errors achieved in different regions / countries
- Cross-compare errors achieved when using HR and VHR imagery and assess the potential of S1, S2 & image archives

Algorithm dev. & consolidation

- Favor product adoption
- Improve algorithm performance
- Develop new approaches to improve SAR-derived products

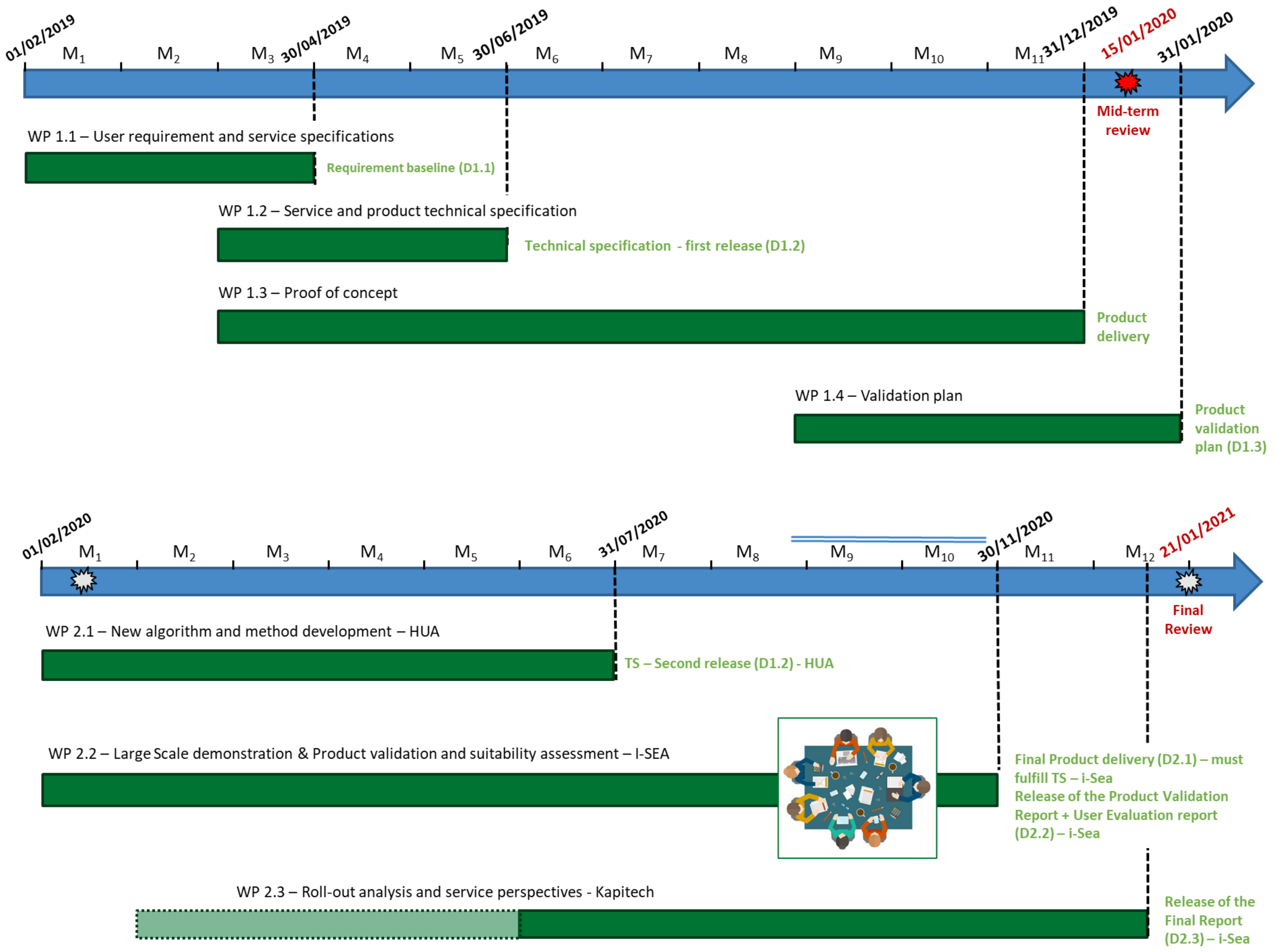
Large Scale Demo

- Extensive production
- Product validation
- Product suitability assessment for coastal dynamics analysis and erosion monitoring and/or prevention
- Consolidate product usage with the final end-users community

Roll-out analysis

- Analysis of feedbacks from end users and regional coastal experts
- Commercial perspectives and business model definition

Project timeline



Requirement Baseline

Family name	Product name	Regions of interest								
		FR AQ	FR NOR	FR PACA	GER WS	GER BS	PT NWC	GR EMT	GR PEL	RO
Shoreline	Cliff foot									
	Cliff apex									
	Dune foot									
	Waterline (sea/land interface)									
	Middle of swash zone									
	Maximum swash (or run-up) excursion during major storms									
Coastal morphological patterns	Sandbar location									
	Beach width									
	Tidal creeks: number, length, form, form and number of tidal creek endings									
	Erosion at tidal creek edges									
Coastal DEM	Bathymetry									
	Cliff topography									
	Dune topography									
Seabed cover mapping	Intertidal / foreshore type (sandy/rocky/shingle/…)									
Coastal land vertical motion	Vertical movement at top-of-the-cliff									

National governmental agencies, regional authorities, intermunicipal cooperation and municipalities, as well as natural site managers, research centers and coastal observatories

High priority erosion indicators

Intermediate products

Highly promising low-priority erosion indicator

Technical specifications

Bathymetry

Indicator Description

Purpose of the Indicator

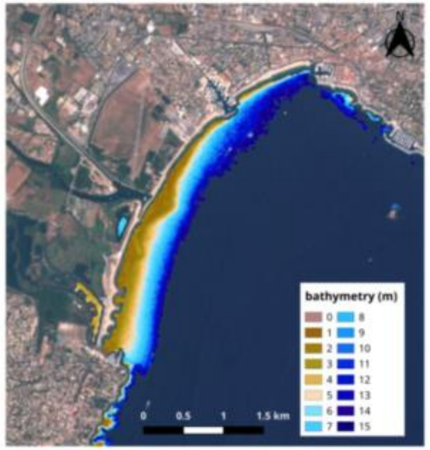
This indicator is suitable to estimate water depth in shallow near-shore waters with low turbidity and sandy or bright bottoms. Bathymetry depth range is limited to depths of 0 to 10-15 m.

Method

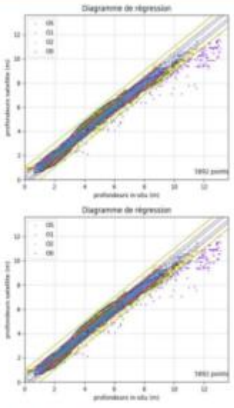
If in-situ data is available, an empirical model is fitted between in-situ depths and satellite image pixel values.

If not, a semi-analytical approach based on a physical model is used representing phenomenon occurring during light transfer through the water column. Bottom albedo and light attenuation coefficient are estimated and considered constant.

Water depth can then be retrieved by applying either the empirical or the semi-analytical model to all water pixels.



Bathymetry map derived from a Sentinel-2 data (06/07/2019) using a semi-analytical approach - Saint-Raphael (France) - UTM zone 31 North.



Regression diagrams between in-situ depths and satellite derived bathymetry using an empirical approach (top) and a semi-analytical approach (bottom)

Results

Indicator Validation and Limits

The bathymetry computed by empirical and semi-analytical approaches are compared with in-situ data. Both approaches give similar results as shown in the regression diagrams with an average error of 0.28 m and 0.32 m respectively. The empirical approach, as it is based on in-situ data, provides generally more accurate results than the semi-analytical method. But the latter doesn't require any in-situ depths to provide good results.

User Feedback

The knowledge about nearshore bathymetry is of outmost importance to management and economic activities.

Authors: Olivier Regniers (i-SEA)

Date: 14.11.2019

Coastline Detection and Change

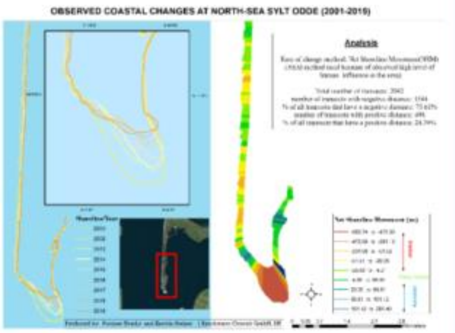
Indicator Description

Purpose of the Indicator

The shorelines from different years shows how a coast is evolving and which sections are affected by accretion and erosion. The indicator is suitable for microtidal coasts that show.

Method

The Water-Land Line from optical data is generated by using the band ratio between near Infrared and blue bands from Landsat-8 and Sentinel-2 products. Based on a threshold, the shoreline (1 >= Wet-Dry Line >= 0.9) is extracted. A polygonization of the mask is performed to generate vector data which are used for further analyses. The calculation of the change rate is based on the Net Shoreline Movement (NSM) method using the Digital Shoreline Analysis System (DSAS) tool in ArcGIS.



Coastline development and net shoreline movement for southern Sylt (Sylt Odde) between 2001 and 2019.

Extracted coastline overlayed on Google Earth Pro Historic VHR data layers. Closest date is selected.

Results

Indicator Validation

Each single shoreline derived from one satellite image is compared to VHR images available in google Earth Pro and / or airborne orthophotos. Coastlines are further compared to derived information from airborne Laserscan data. The comparisons showed that the coastline with very similar acquisition dates show very good agreement, but the coast can change within one year depending on water level and impact by anthropogenic influences.

User Feedback

The results look already very promising. Comparison with airborne data provided by the users are satisfactory. Water level should be included as metadata to the products when assessing the results.

References

Orthophotos and Laserscan data are provided by user LKN (Landesbetrieb für Küstenschutz, Nationalpark und Meeresschutz Schleswig-Holstein).

Authors: Prosper Evadzi, Kerstin Stelzer (Brockmann Consult)

Date: 02.12.2019

Top of the Cliff Vertical Movement

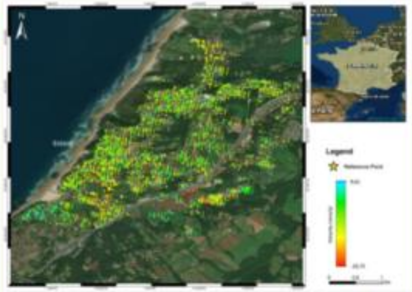
Indicator Description

Purpose of the Indicator

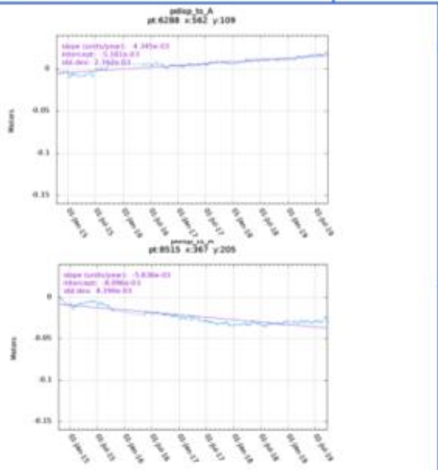
This indicator represents the cliff movement in the LOS (line of sight) of satellite for six years (2014-2019).

Method(s)

A series of Sentinel 1 SLC images from 18.10.2014 to 22.09.2019 were processed and then coregistered to extract points with high temporal coherence which estimate the satellite's line-of-sight (LOS) movement using the interferometric point target analysis (IPTA) method. A series of interferograms were generated using a single reference image (in the middle of time-series). Then a reference point was chosen that is roughly equidistant from the AOI's limits, located on a geological basement having a height near the area's average values. The interferograms were unwrapped and the atmospheric contribution was filtered out. Then a mask was applied extracting the final product, a list of points that correspond to the thresholds of standard deviation, spatial coherence, and residual height.



Top of cliff LOS movement in the area of Erretegia derived from 121 S1 SLC Scenes using GAMMA- IPTA software.



Example of two scatterers the annual deformation through the years 2015 until 2019.

Results

Indicator Validation and Limits

the validation will be performed using the data sources as laser scanning or ground base interferometry for each area of interest- if available.

User Feedback

Regional to local authorities defining and enforcing specific mitigation measures, such as reducing the vulnerability by means of structural interventions and planning.

Authors: Konstantina Bantouvaki, Minos Fylaktos, Issaak Parcharidis (HUA)

Date: 05.01.2020

Technical specifications & POC strategy

Family name	Product name	Sensor	
		Optical	SAR
Shoreline	**Cliff foot**	3 (2 VHR)	1
	Cliff apex		
	Dune foot	5 (3 VHR)	1
	Waterline (sea/land interface)	4	1
	Middle of swash zone	5 (1 VHR)	1
	Maximum swash (or run-up) excursion during major storms		
Coastal morphological patterns	**Sandbar location & change**	2	Unachievable
	Beach width	4	1
	Tidal creeks: number, length, form, form and number of tidal creek endings	1	1
	Erosion at tidal creek edges	1	1
Coastal DEMs	**Bathymetry**	3	1
	Cliff topography	2 (VHR)	1
	Dune topography	2 (VHR)	1
Seabed cover mapping	Intertidal / foreshore type (sandy/rocky/shingle/…)	2	1
Coastal land vertical motion	**Vertical movement at top-of-the-cliff**	Unachievable	1

- ✓ 24 individual algorithms
- ✓ Several algorithms per product
- ✓ All products can be obtained either from optical or SAR data

POC in brief

- 245 anticipated products in order to showcase ALL high-priority erosion indicators
  - Where the request was formulated by the end-user
  - Focusing simultaneously several countries or region
  - In priority where validation data are available or where experts can qualitatively evaluate the products

Family name	Product name	Country code / Regions of interest								
		FR			GER		PT	GR	GR	RO
		AQ	NOR	PACA	NS	BS	NWC	EMT	PEL	RO
Shoreline	Cliff foot	10	10			0	0	2	0	
	Cliff apex	8	7			0		2	0	
	Dune foot	8	0				5	1		
	Waterline (sea/land interface)					27		35		22
	Middle of swash zone			30						0
	Maximum swash excursion during major storms			0						3
Coastal morphological patterns	Sandbar location	0			14		0			8
	Beach width	3	2							
	Tidal creeks morphology				21					
Coastal DEM	Bathymetry	8	0	11			3	1	0	0
3D Evolution	Top-of-the-cliff vertical movement	2	2							

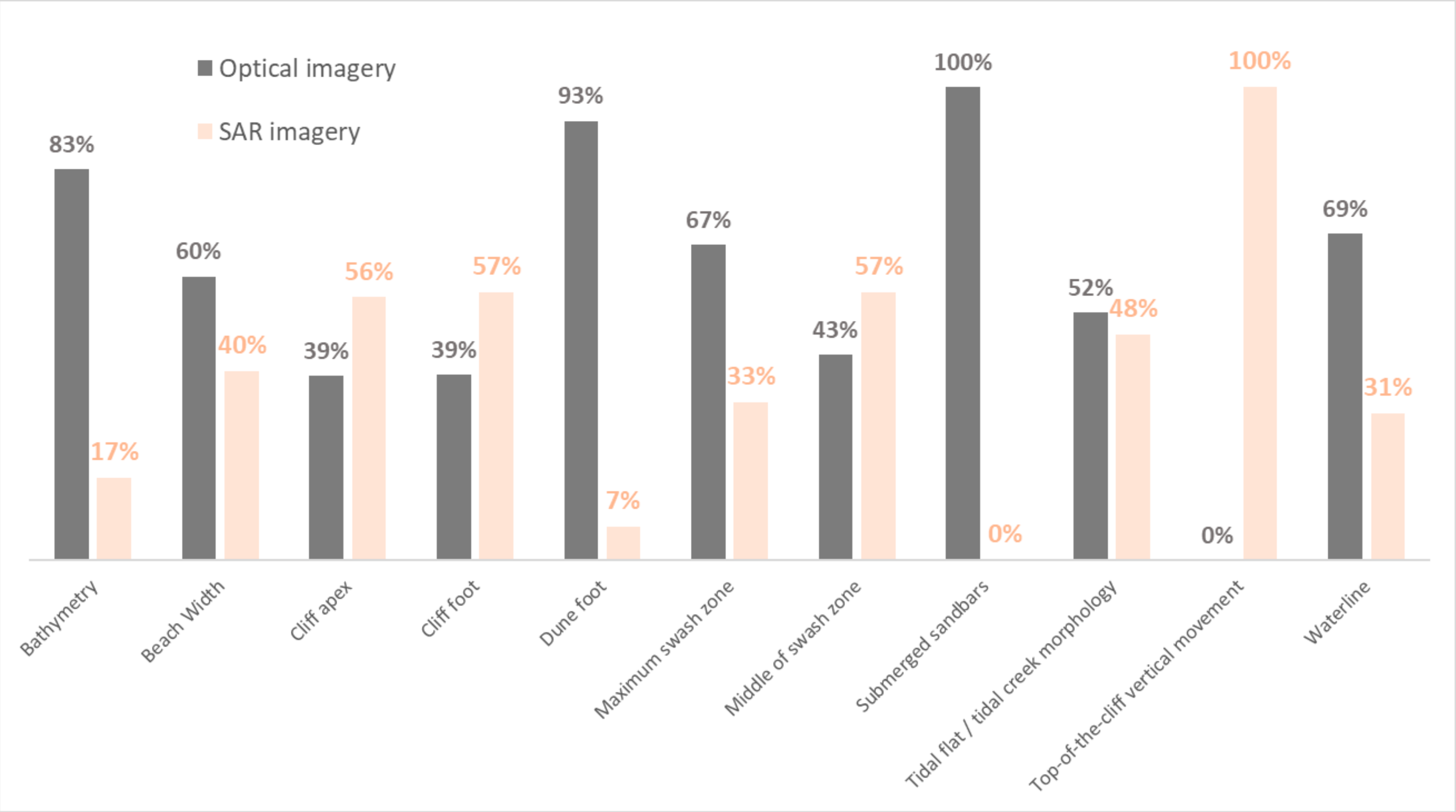
POC in brief

- 245 anticipated products in order to showcase
  - Massively products based on S1 & S2
  - Products based on lower resolution imagery

	Landsat 5	Landsat 7	Landsat 8	SP 1 – 4	SPOT 5	Sentinel 2	SP 6 / 7	Pleiades	Worldview	ERS ENVISAT	Sentinel-1	CosmoSkyM
Bathymetry												
Beach Width												
Cliff apex / cliff foot												
Dune foot												
Maximum swash zone												
Middle of swash zone/ waterline												
Submerged sandbars												
Tidal flat / tidal creek morphology												
Top-of-the-cliff vertical movement												
Total nb of exploited products	1	5	34	16	14	133	11	14	9	32	636	2

POC in brief

- 245 anticipated products in order to showcase
  - Indicators retrieved from SAR and optical data



POC in brief

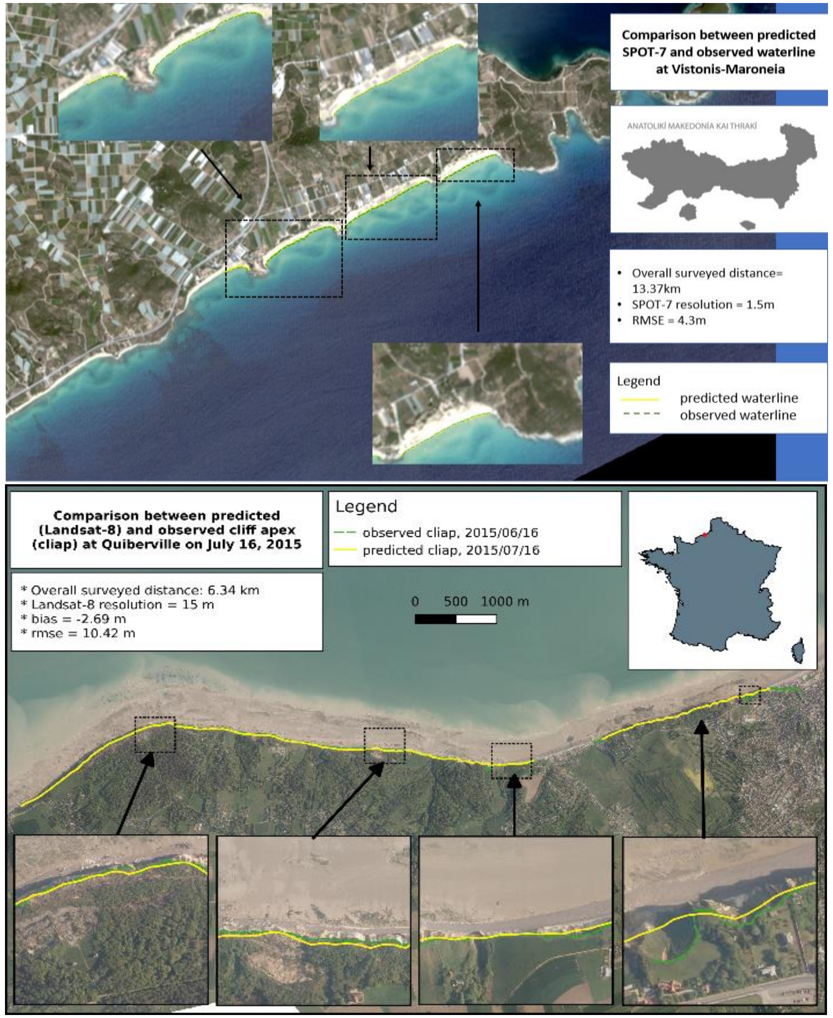
- 245 anticipated products in order to showcase
  - Short product times series useful to prepare erosion analysis according to end-users requests

	BATHYMETRY	BEACH WIDTH	CLIFF APEX	CLIFF FOOT	DUNE FOOT	MAXIMUM SWASH ZONE	MIDDLE OF SWASH ZONE	SUBMERGED SANDBARS	TIDAL FLAT / TIDAL CREEK MORPHOLOGY	TOP-OF-THE-CLIFF VERT MVT	WATERLINE
FR - ST RAPHAEL	2017, 2019	2017-2019					**2008-2019**				
FR - HYERES							**2008-2019**				
FR - CAMARGUE	2013-2018						**2008-2019**				
FR - CORNICHE BASQUE			**2014 -2018**	**2014 -2018**						2014-2019	
FR - ERRETEGIA	2018		**2014 -2018**	**2014 -2018**						2014-2019	
FR - BISCARROSSE	**2007-2019**	2017-2019			**2009-2019**						
FR - VACHES NOIRES			2019	**2009-2019**							
FR - QUIBERVILLE			**2008 -2019**							2014-2019	
GE - KIEL PROBSTEI								**2001-2019**			**2001-2019**
GE - NS BLAUORT								2013-2019	**2009-2019**		
GE - NS SYLT ODDE											**2001-2019**
GR- EVROS DELTA			2019	2019							**2009-2019**
GR - VISTONIS-MARONEIA	2019		2015-2019	2015-2019	2019						**2009-2019**
PT -AVEIRO SOUTH	**2011-2019**				2011-2014						
RO - SULINA-SF. GHEORGHE						2014-2015		2011-2018			2013-2016

Validation experiments

Objectives

- Present objectively the accuracy of the produced indicators either based on optical/SAR and on Landsat, SPOT, VHR, Sentinels, ERS/ENVISAT
- Convince the end-users that the products delivered fit their expectations in terms of horizontal and vertical accuracies & move on towards large scale demo
- Drive the development of innovative algorithms
- Improve Technical Specification during phase 2
- Plan the validation experiment for phase 2



What

- 13 algorithms evaluated
- 35 products evaluated

Major outcomes

In terms of horizontal and vertical accuracies, final end-users requests often difficult to reach although the results seem promising and were approved during the MTR by the end-users

- Large scale deployment on a historical basis is secured based on optical data
    - Bathymetry
    - Submerged sandbars
    - Waterline
    - Beach width
- Large scale deployment for the following indicators is promising
    - Dune foot based on optical data
    - Cliff lines
    - Tidal flat and tidal creek morphology
    - Top-of-the-cliff vertical movement
- Innovations are expected
    - Maximum swash zone excursion
    - Middle of swash zone ⇨ Upper swash limit
    - Dune foot detection based on Landsat/SPOT
    - Top-of-the-cliff vertical movement ⇨ PSI and DSAS
    - SAR-derived bathymetry ⇨ wavelet approach
    - SAR-derived cliff lines ⇨ multiple views
    - SAR-derived creek morphology indicators ⇨ ERS
    - Algorithms to serve erosion analysis and anticipation

Family name	Product name	Sensor	
		Optical	SAR
Shoreline	**Cliff foot**		
	Cliff apex		
	Dune foot		
	Waterline (sea/land interface)		
	Middle of swash zone ⇨ **Upper swash limit**		
	Maximum swash (or run-up) excursion during major storms		
Coastal morphological patterns	**Sandbar location & change**		
	Beach width		
	Tidal creeks: number, length, form, form and number of tidal creek endings		
	Erosion at tidal creek edges		
Coastal DEMs	**Bathymetry**		
	Cliff topography		
	Dune topography		
Seabed cover mapping	Intertidal / foreshore type (sandy/rocky/shingle/…)		
Coastal land vertical motion	**Vertical movement at top-of-the-cliff**		

Major outcomes

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  - SAR-derived bathymetry ⇨ wavelet approach
  - SAR-derived cliff lines ⇨ multiple views
  - SAR-derived creek morphology indicators ⇨ ERS
  - Algorithms to serve erosion analysis and anticipation

245 anticipated products
⇨ 170 products disseminated

The initial database that will fill the large scale demo

Tech Spec 2020 : final delivery

HAROKOPIO UNIVERSITY

Family name	Product name	Sensor	
		Optical	SAR
Shoreline	Cliff foot		
	Cliff apex		
	Dune foot		
	Waterline (sea/land interface) & creek edge detection		
	Upper swash limit		
	Maximum swash (or run-up) excursion during major storms		
	Vegetation limit		
Coastal morphological patterns	Sandbar location & change		
	Beach width		
	Erosion at tidal creek edges		
Coastal DEMs	Bathymetry		
	Cliff topography		
	Dune topography		
Seabed cover mapping	Intertidal / foreshore type (sandy/rocky/shingle/…)		
Coastal land vertical motion	Vertical movement at top-of-the-cliff		

15 algorithms left

Tech Spec 2020 : final delivery & demo strategy

HAROKOPIO UNIVERSITY

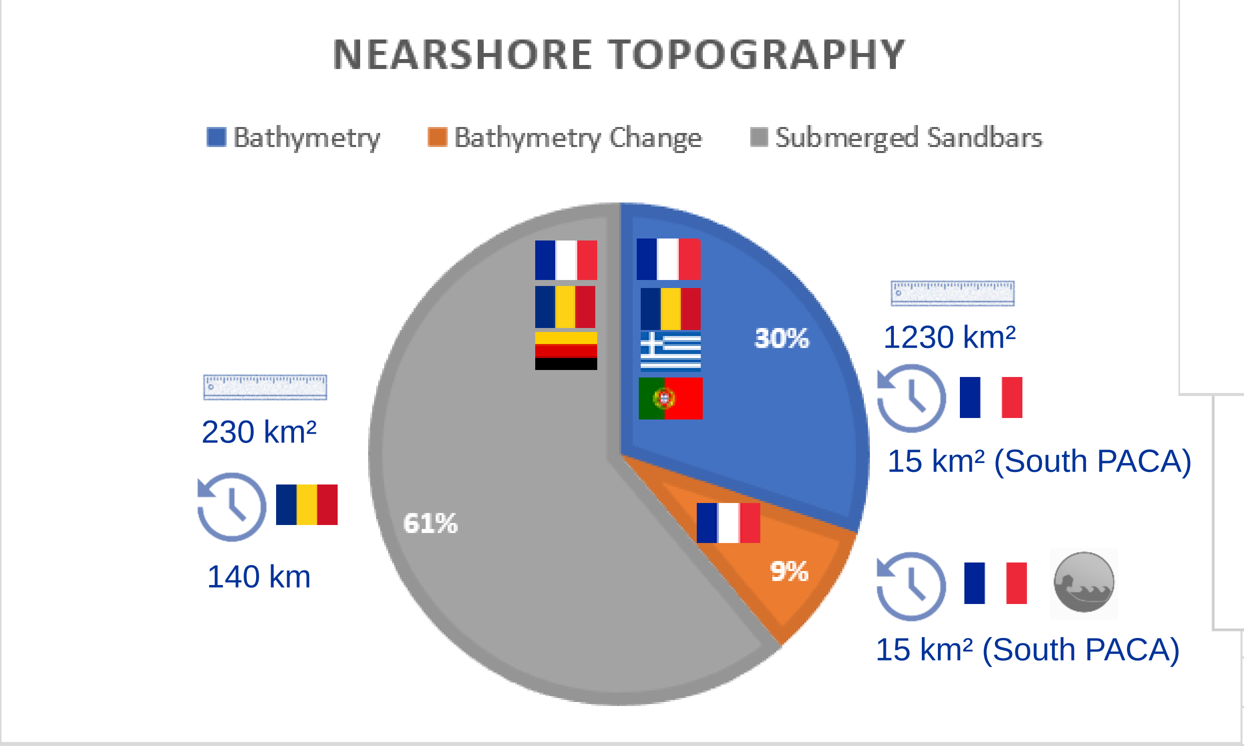
Family name	Product name	Sensor: Optical	Sensor: SAR
Shoreline	Cliff foot		
	Cliff apex		
	Dune foot		
	Waterline (sea/land interface) & creek edge detection		
	Upper swash limit		
	Maximum swash (or run-up) excursion during major storms		
	Vegetation limit		
Coastal morphological patterns	Sandbar location & change		
	Beach width		
	Erosion at tidal creek edges		
Coastal DEMs	Bathymetry		
	Cliff topography		
	Dune topography		
Seabed cover mapping	Intertidal / foreshore type (sandy/rocky/shingle/…)		
Coastal land vertical motion	Vertical movement at top-of-the-cliff		

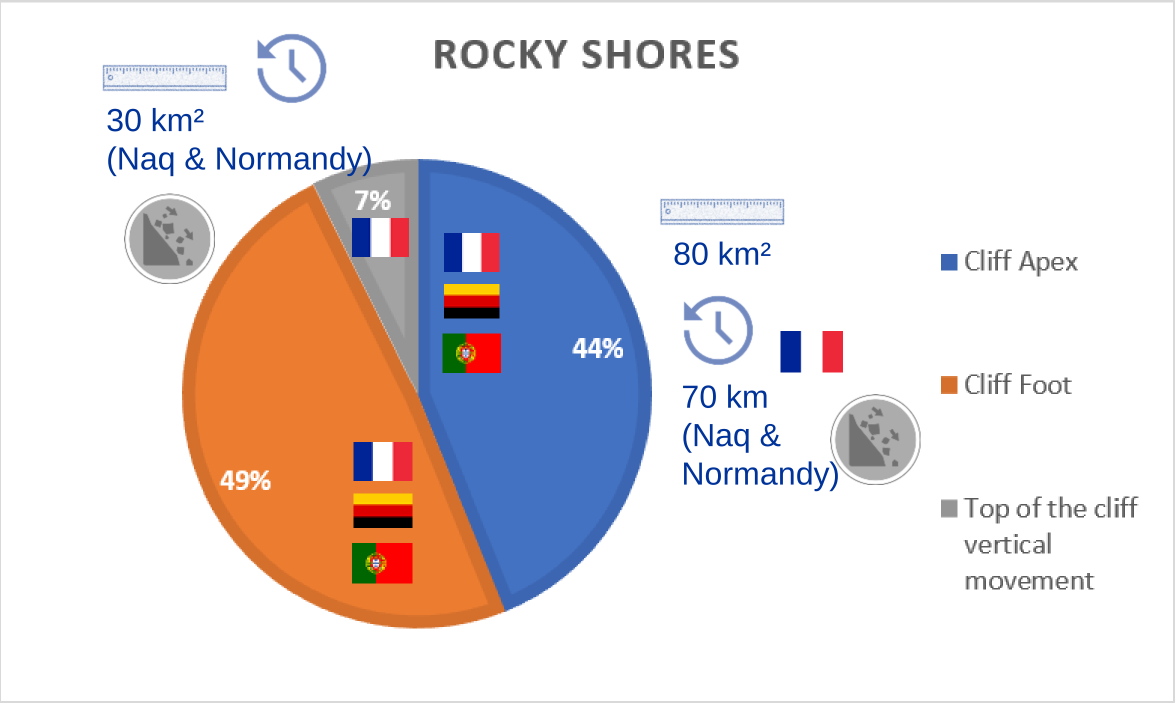
Additional tools applied to derive erosion trends and anticipate shoreline change

- Tools to analyse dune foot change, dune foot area change and project future dune foot location
- Tools to analyse upper swash limit change & upper swash limit area change
- Tools to analyse bathymetric changes ans sediment budgets
- Tools to highlight landslides

Product delivery overview

- 1 445 products delivered in total (including 170 POC products)
  - In order to fulfil end-users' requests and ESA's cardinal requirements





INTERTIDAL CREEKS AND INTERTIDAL FLATS: DETECTION AND CHANGE

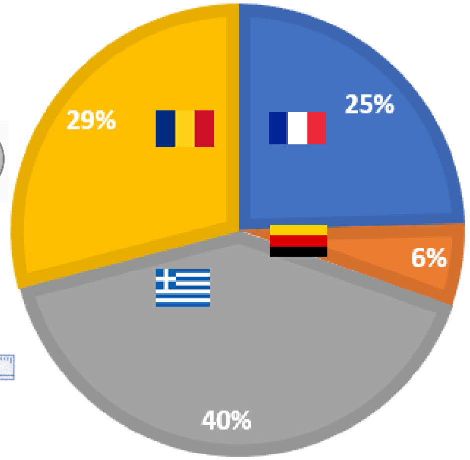
240 km²

Product delivery overview

- 1 445 products delivered in total (including 170 POC products)
    - In order to fulfil end-users' requests and ESA's cardinal requirements

WATERLINES

140 km



60 km

60 km

900 km

MACROTIDAL SANDY BEACHES: DUNE FOOT DUNE FOOT CHANGE

~ 110 km

~60 km

UPPER SWASH LIMIT AND CHANGE

~ 100 km

~90 km

BEACH WIDTH

~ 120 km

~ 80 km

Large scale demo in numbers

- The total production effort encompasses **2400 linear km of coast split into 5 different member states**

More than 3 000 sat images - ½ SAR ½ Optical
1/3 of the final products (about 1500) based on the Sentinels

- Based on the high priority-products requested, coastal dynamics was analysed for **1264 linear km of coast split into 5 different member states**
- Based on the products requested, coastal dynamics was **quantitatively** analysed for **975 linear km of coast split into 3 different member states (FR, GE, RO) & for 7 products:**
    - Submerged sandbars (FR, GE, RO)
    - Bathymetry (based on optical data) (FR)
    - Waterline (GE, RO)
    - Upper swash limit (FR)
    - Dune foot (FR Nouvelle Aquitaine & Normandy)
    - Cliff lines (FR Nouvelle Aquitaine & Normandy)
    - Cliff vertical movement (FR Nouvelle Aquitaine & Normandy)

Large scale demo in numbers

- Upon end-users' request, historical databases have been successfully produced encompassing **1 493 linear km of coast split into 4 different countries, 485 linear km if we consider erosion analysis based on long time-series :**

  - **Submarine sandbars**, including a **monthly sandbar dynamics analysis over the last 30 years in Romania** (140 km)
  - **Bathymetry**, including **seasonal sediment budget analysis over the last 27 years in France** (South PACA, 19 km, 15 km²)
  - **Tidal channels & tidal creeks**, including **interannual to annual qualitative assessment of erosion at tidal creek over the last 28 years in Germany** (41 km, 240 km²)
  - **Waterlines** in **Greece** (900 km), also including **monthly shoreline changes analyzed over the last 30 years in Romania** (140 km) and **interannual to annual dynamics over the last 19 years in Germany** (60 km)
  - **Beach widths** in **Greece** (63 km)
  - **Dune foots**, including **seasonal to annual dune foot change analysis over the last 33 years in France** (Nouvelle Aquitaine, 63 km)
  - **Cliff vertical movements**, including **monthly ground deformation analysis for the last 25 years in France** (Nouvelle Aquitaine and Normandy, 30 km)
  - **Cliff apex and cliff bottoms**, including **interannual to annual** cliff line dynamics **over the last 25 years in France** (Normandy and Nouvelle Aquitaine, total demo length: 100 km)

Validation in brief

- **56 products validated**
- **13 algorithms evaluated**

	Bathymetry	DEM	Cliff lines	Dune foot	Submerged sandbars	Tidal flat / tidal creek morph.	Top of the cliff movement	Waterline and Upper swash limit (replace Middle of swash Zone)
FR - Fréjus- St Raphaël	Landsat-8, Sentinel-2, Pléiades							Sentinel-2, Landsat, Pléiades
FR - Camargue	Sentinel-2							Sentinel-2
FR - Corniche Basque		Pléiades	Sentinel-1, Sentinel-2, Pléiades, SPOT					
FR - Erretegia	Sentinel-1	Pléiades	Sentinel-1, Sentinel-2, Pléiades, SPOT					
FR- Nord Médoc				Sentinel-2, SPOT				
FR - Vaches Noires			Sentinel-1, Sentinel-2, SPOT					
FR - Biscarrosse				Sentinel-2				
GE - Kiel Probstei					Sentinel-2			Sentinel-2, Landsat
GE - NS Blauort						Sentinel-2, Landsat		
GE - NS Sylt Odde					Sentinel-2			Sentinel-2, SPOT, Landsat
GE - Fehmarn					Sentinel-2			Sentinel-2, Landsat
RO - Sulina-Sf. Gheorghe					Sentinel-2, Landsat, SPOT, Pléiades			Sentinel-2, SPOT, Pléiades, Landsat Sentinel-1, ERS
GR - Vistonis-Maroneia								Landsat, Sentinel-2, SPOT7
PT - Leiria			Sentinel-2					
PT - Aveiro	Sentinel-1			Pléiades, WorldView, Sentinel-2				
PT - Mondego	Sentinel-1							
PT - Figueira Foz	Sentinel-1							

Regional demo meetings at a glance

9 meetings achieved – October – November 2020

Total: 206 attendees

50 attendees

RÉGION SUD PROVENCE ALPES CÔTE D'AZUR

CRIGE PACA

i-Sea

cerege

21 attendees

BROCKMANN CONSULT GMB

SH Schleswig-Holstein Landesamt für Landwirtschaft, Umwelt und ländliche Räume

UHH Universität Hamburg DER FORSCHUNG | DER LEHRE | DER BILDUNG

National workshop in Bx in January 2020

12 attendees

RÉGION NORMANDIE

ROL

i-Sea

30 attendees

HAROKOPIO UNIVERSITY

TERRA SPATIUM SA

16 attendees

SFÂNTU GHEORGHE MARINE AND FLUVIAL RESEARCH STATION

TERRASIGNA™

65 attendees

RÉGION Nouvelle-Aquitaine

OBSERVATOIRE CÔTE AQUITAINE

i-Sea

10 attendees

universidade de aveiro

Roll-out analysis

Product and service roll-out analysis

Today at 2 pm

With the testimonies of coastal experts and final end-users

- François Sabatier and Stéphanie Oudin, South Region
- Vincent Bawedin , CdC Grands Lacs
- Christian Reimers, LLUR
- Celso Pinto, APA
- Thanasis Nalmpantis, Region of Eastern Macedonia & Thrace

Deliverable status

- Deliverable 1.1 – Requirement Baseline
  - 19/04/2019
  - 23/04/2019
- Deliverable 1.2 – Technical Specification
  - 12/07/2019
  - 13/08/2019
  - 30/09/2019
  - 15/10/2020
- Deliverable 1.3 – Product Validation Plan
  - 7/01/2020
  - 10/01/2020
  - 22/01/2020
- Deliverable 2.1 – Product Delivery
  - Half completed: 23/09/2020
  - 75% achieved: 02/10/2020
  - Final delivery: 11/12/2020
- Demo meeting summary
  - 2/12/2020
- Deliverable 2.2 – Product Validation Report
  - 4/12/2020
- Deliverable 2.3 – Final Report
  - 11/01/2021: Service roll-out analysis completed
  - 13/01/2021: first version of the final report
  - 20/01/2021 : Final report completed

Main lessons leart

- Working for ESA: a great opportunity for a small startup

- Project management … is time consuming
  - But a great experience with S4S partners!

- Communication is a full-time job supported by a strategy
  - 2 peer-review publications submitted
  - 9 conference papers
  - 2 Newsletters … and almost nothing else in terms of large scale communication!

Let’s go to session 2

All details about satellite-based Coastal Erosion Products !

esa Coastal Erosion Project

European Space Agency