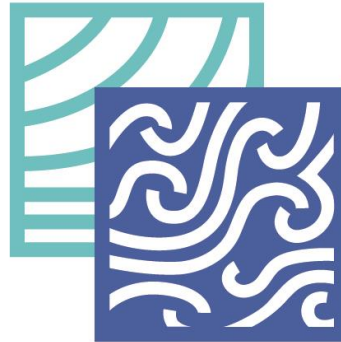


Coast Bordeaux 2017



MODÉLISATION ET AIDE
À LA DÉCISION FACE AUX RISQUES
CÔTIERS EN EUSKAL ATLANTIQUE
MaReA

A cross-border research project to
improve coastal risk management in
the Basque Country

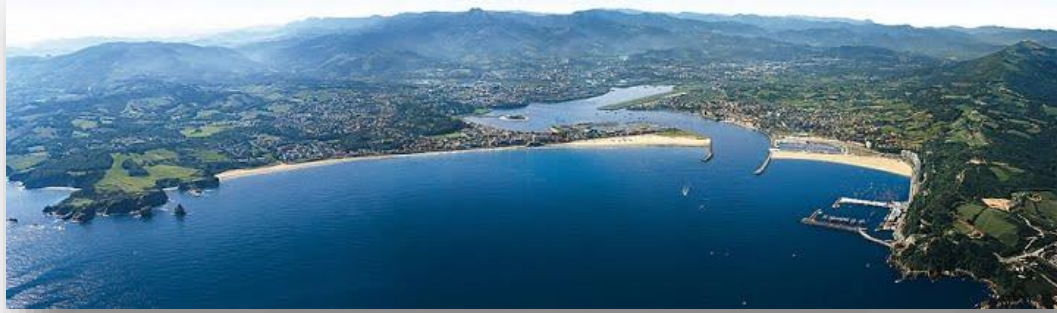


Interreg
POCTEFA
MAREA



Scientist Interest Group “Littoral Basque” (GIS Littoral Basque) : why and what for ?

- **Cross border geography** : local authorities of the Basque Country have to manage the same environmental problematics



- need to know, measure, understand, model and predict coastal processes to improve coastal management : observation and characterization of coastal dynamics – flood/erosion hazard, evaluate coastal water quality (bathing area)
- 8 members - local authorities and scientific structures - from the Basque country working together since 2003 (bilaterally) and all together since 2013 (partnership convention)
- GIS Littoral Basque : **match needs of local politics and scientific competences** implanted in Basque country
- In order to develop locals and operative research projects, capable of giving new scientific **responses to local authorities**
→ **optimize risk and coastal management.**



Research themes of GIS Littoral Basque

- Characterization of coastal hazards in Basque country (flood and erosion) and risk management
- Develop new analytic methods to evaluate coastal water quality, considering the influences of drainage basins (microbiology, organic chemistry)
- Preservation of marine and coastal biodiversity
- Support marine renewable energy development
- improve marine waste management
- Diffuse knowledge, deliverables and open data in order to improve public management of Basque country and contribute to new research programs (open data platform of GIS Littoral Basque <http://gislittoralbasque.eu>)

GIS Littoral Basque is a flexible organization, and many collaborations are in progress with other scientific organizations and authorities in France and Spain :





Budgets € 2016 - 2019		FEDER
Agglomération Pays Basque	347 774	226 052
SUEZ Rivages Pro Tech	344 522	223 939
Azti Tecnalia	399 265	259 522
UPPA	213 473	138 757
Euskalmet DAEM	240 000	156 000
TOTAL	1 545 035	1 004 273

European Project 2016-2019, global budget 1 545 035 €, 65% financed by FEDER

Communauté
D'AGGLOMERATION
PAYS BASQUE
EUSKAL
HIRIGUNE
Elkargoa

 **euskalmet**
agencia vasca de meteorología



 Géosciences pour une Terre durable
brgm

 **suez**
rivages
PRO TECH

 **UNIVERSITÉ**
DE PAU ET DES
PAYS DE L'ADOUR

azti
tecnalia

 **CASAGEC**
INGENIERIE

GIS
LITTORAL
BASQUE



Associates partners and search areas



Gipuzkoako Foru Aldundia



OBSERVATOIRE
CÔTE AQUITAINE



Xynthia storm in 2010 : 53 deaths in Vendée + 2013 - 2014 series of serious storms : huge impacts in Basque country

- Citizens in danger
- Destruction of seawalls and protections
- Beach and cliff erosion : threat for the houses, economics activities, biodiversity
- Massive public investments to repair infrastructures (more than 10 millions euros in Spain)
- After the disasters caused by the storms of 2013 and 2014, **Basque authorities need to improve local knowledge about coastal risks (erosion and submersion)** in order to optimize citizen's and infrastructures protection when a storm is coming.
- **Starting point, workshops between the members of the GIS Littoral Basque to create MAREA project**

→ **develop locals and operative alert tools capable of predicting erosion and submersion processes on local beaches in seven littoral cities, from Bermeo (Spain) to Anglet (France).** MAREA : 6 lines of research

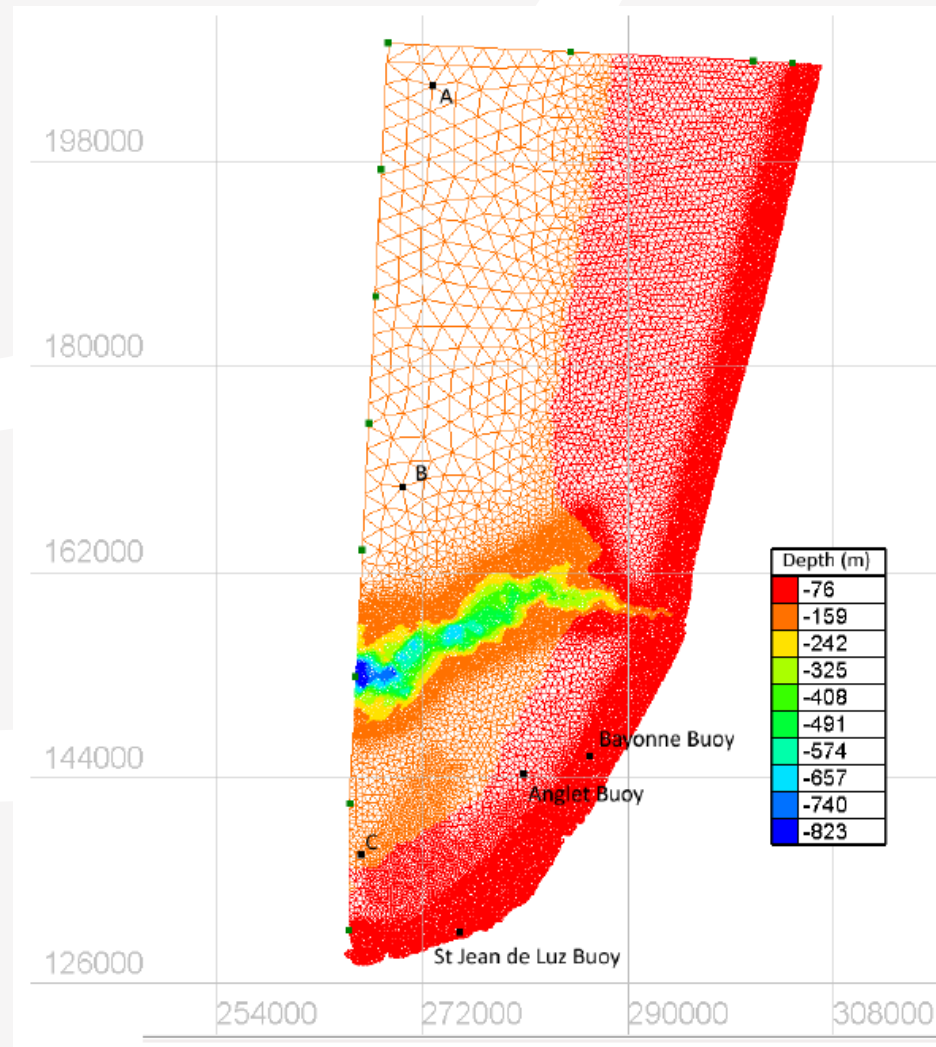
Zarautz, Gipuzkoa



Plage du centre, Bidart

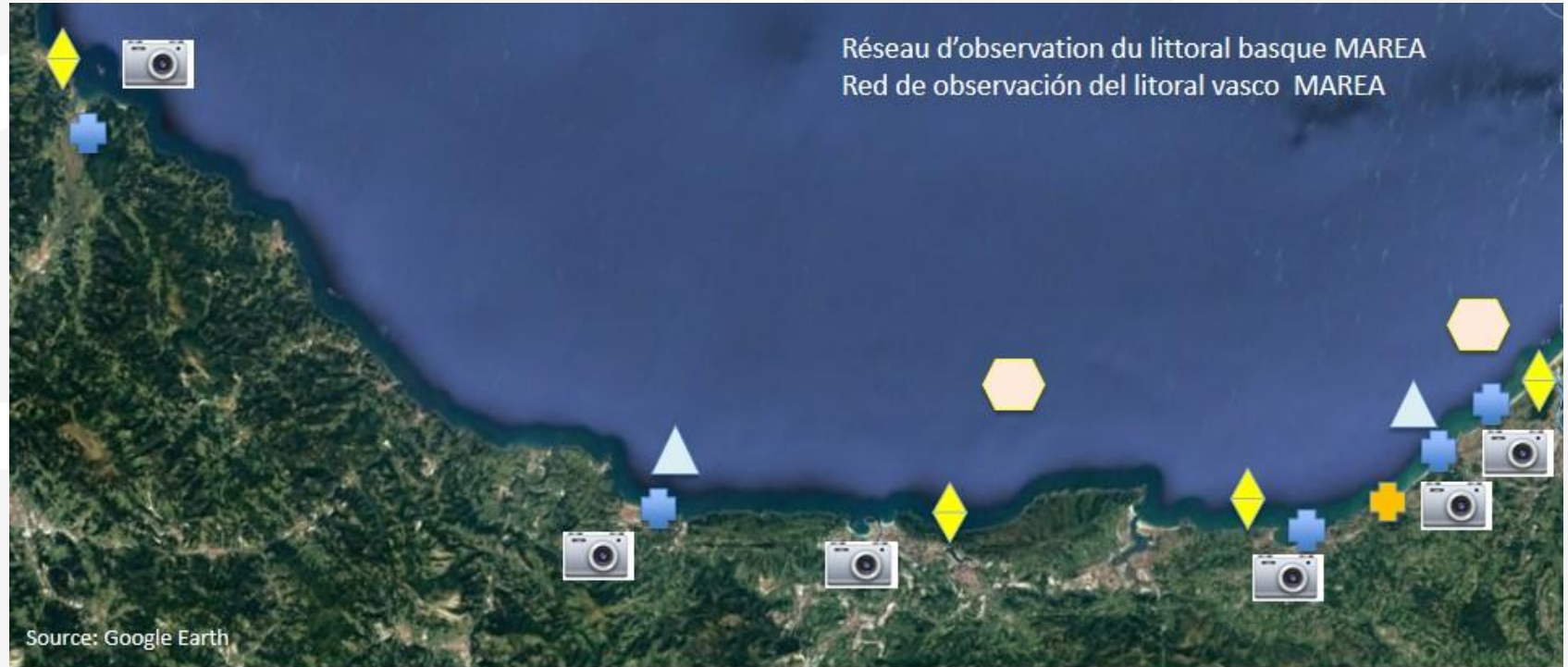


1. Statistics studies to quantify extreme sea levels (past and present coastal storms) and predict the frequency of storm surges and extreme sea levels in Basque country



Model of extreme sea levels during the last 50 years (thèse F.Arnoux, UPPA-CD64)

2. Install a Basque and real time sea level observation network (as a complement to public data like SHOM, Candhis...)



Marégraphes/mareógrafos



Bouées en haute mer : houle et courant (offshore)

Boyas en alta mar : oleaje y corriente (offshore)



Capteurs immergés proches du rivage : houle et courant (nearshore)

Sensores sumergidos a proximidad de la playa : oleaje y corriente (nearshore)



Capteurs déployés sur les plages/digues en zone de déferlement (onshore)

Sensores desplegados sobre las playas/diques en zona de rompimiento de las olas (onshore)



Mesures géophysiques et évaluation du stock de sédiments

Medidas geofísicas y evaluación de los stocks de sedimentos



Systèmes vidéos 24h/24h : détection des submersions et suivis des profils de plage

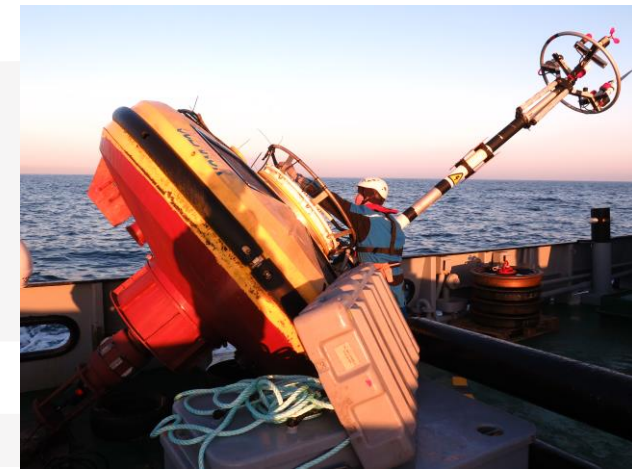
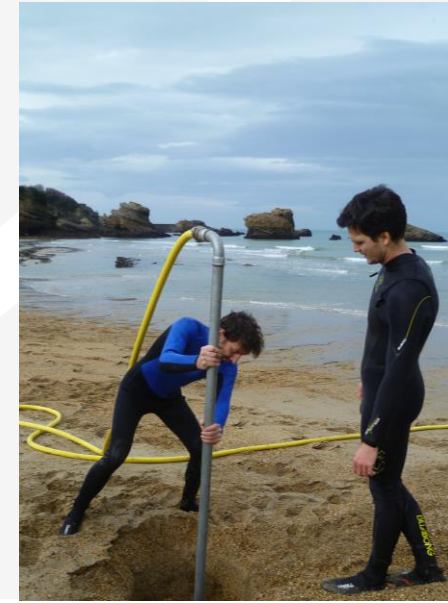
Sistemas videos 24h/24h : detección de las sumersiones y seguimientos de los perfiles de playa



3. Hydrodynamic and morphodynamic characterization of coastal storms, from the high-sea to the shore break zone at high frequency

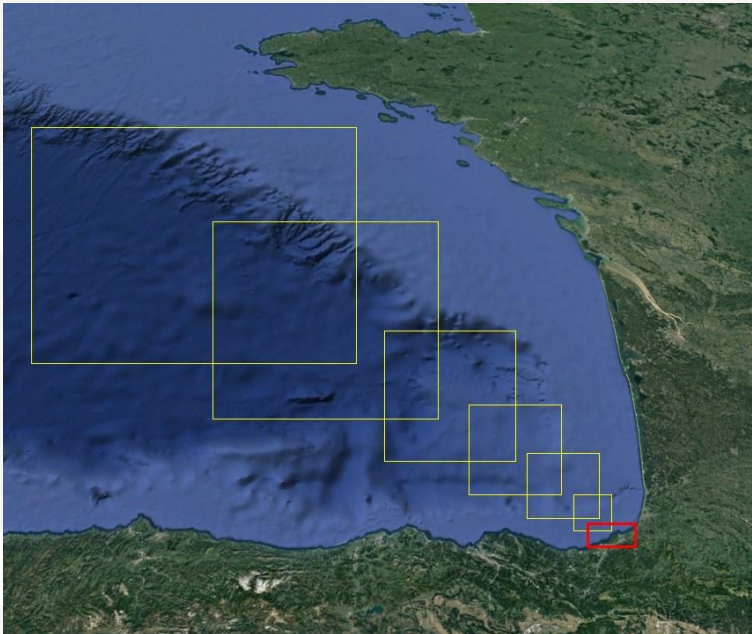
« **Scanner of storms** » : high frequency measurements in offshore, nearshore and onshore – shore break zone

- Offshore buoy and 2 submerged sensors : **speed and direction of currents, wave energy, wave height**
- 20 pressure and current sensors on beaches and dikes : speed and direction of the currents, wave energy, wave height
- 6 Video systems to analyze in real time **coastal morphodynamic evolutions** and **estimate wave run up**
- 3 Tide gauge high frequency
- Regular survey of bathymetry and beach profile



4. Develop monitoring systems, being able to measuring in real time local and extreme hydrodynamics conditions

- Zoom of large scale publics previsions (Meteo France)
- In complement of official tools and oceanographic previsions, partners of MAREA will implement local data in very high-resolution coupled wave-hydrodynamic models (zoom)
- Develop tools be able to predict **local impacts of storms on Basque beaches and cliffs** (models precisions 20m – 10 cm) = **where and when there is a local risk submersion and/or erosion**
- Why :
 - **help decision-making** to optimize infrastructures protections and **improve local crisis management**
 - Give a more information to the citizens (diminution of dangerous behaviour)
- How ? Combination of official macro-scale data and local-data which comes from the MAREA's network



4.bis Elaboration of risk indicators and local alert tools about :

- Erosion
- Submersion
- Damages on dikes and build infrastructures
- Roughness of the sea surface in Basque ports

Objectives :

- Transpose results for public managers by numeric and pedagogic interfaces (help decision making)
- Sharing information (free)



5. Characterization of the sediment dynamics and help decision making

- Furthermore, the partners of MAREA realize many campaigns in order to analyze the dynamics of the sedimentary stocks (before, during and after a storm)
 - ⇒ Explorations geophysics and drilling : position of substratum, thickness of sand
 - ⇒ Photogrammetry and 3D modeling (cliff)
 - ⇒ Bathymetry survey, beach profiles
- Develop hydrosedimentary model to simulate locally **sediments dynamics**, at different spatio-temporal scales :
 - Short term : storm on a beach
 - Mid term : anticipate erosion process - hydrosedimentary cell
 - Long term : impacts of sea level rise and climatic change in Basque coast
- Define recommendations about coastal and sedimentary management = **Basque Sediment Management Plan**



6. Workshops about risk culture

- Meeting between local politics, technicians, experts and international scientists
- Learn about different problematics of « risk culture » and suggest operational solutions adapted at context of the Basque country
 - How evaluate the perception of coastal risks by the citizens ?
 - How improve prevention and risk consciousness ?
 - Help politics to communicate with their citizen
 - Discuss about good practices with other public managers from other coastal territories



First workshop the 29th September 2017 in Bayonne :
« Hazard and prevention : how raise people's awareness and communicate »



Contact :

Caroline LUMMERT
Coordonnatrice scientifique
GIS Littoral Basque

[c.lummert@communaute-
paysbasque.fr](mailto:c.lummert@communaute-paysbasque.fr)

05 59 44 74 35