



Nord Est SUD Ouest
INTERREG III C



Projet BEACHMED – e
La Gestion stratégique de la défense des
littoraux pour un développement soutenable des
zones côtières de la Méditerranée

APPEL D' OFFRE

Ligne d'action: Composante 2

Projet et réalisation d'instruments techniques pour la caractérisation du phénomène érosif à l'échelle Méditerranéenne et pour l'exploitation soutenable des ressources

Design and execution of technical instruments for the characterisation of erosive phenomena at Mediterranean scale and the sustainable exploitation of resources

Mesure 2.1

Le suivi de l'érosion: suivi quantitatif du phénomène érosif à échelle régionale et locale

Erosion monitoring: quantitative monitoring of erosive phenomena at regional and local scales

2.1.1

Relèvement systématique des lignes de rivage à travers des technologies satellitaires

Systematic shoreline survey using satellite technologies

2.1.2 Méthodes innovantes dans la réalisation des réseaux de suivi pour une approche intégrée de la gestion de l'érosion et pour une évaluation, à l'échelle de plusieurs cellules sédimentaires, de l'ensemble des déplacements de sable

Innovative methods for the execution of monitoring for an integrated approach to erosion management and for the evaluation of sand movements at the scale of several sedimentary cells

2.1.3

Méthodologie pour l'évaluation du recule de la ligne de rive et de la distribution des sédiments après les rechargements des plages

Methodology for the evaluation of shoreline retreat and distribution of sediments further to artificial renourishment

€ 1.053.530

?



Shoreline drawn by different operators on low altitude air photographs

In blue – GPS shoreline – difference 3-4 m



GPS (green) vs. Lidar (red) - difference ≈ 1 m

Error on shoreline
position:

Maximum error on
shoreline

Length of Italian beaches:
km 4772

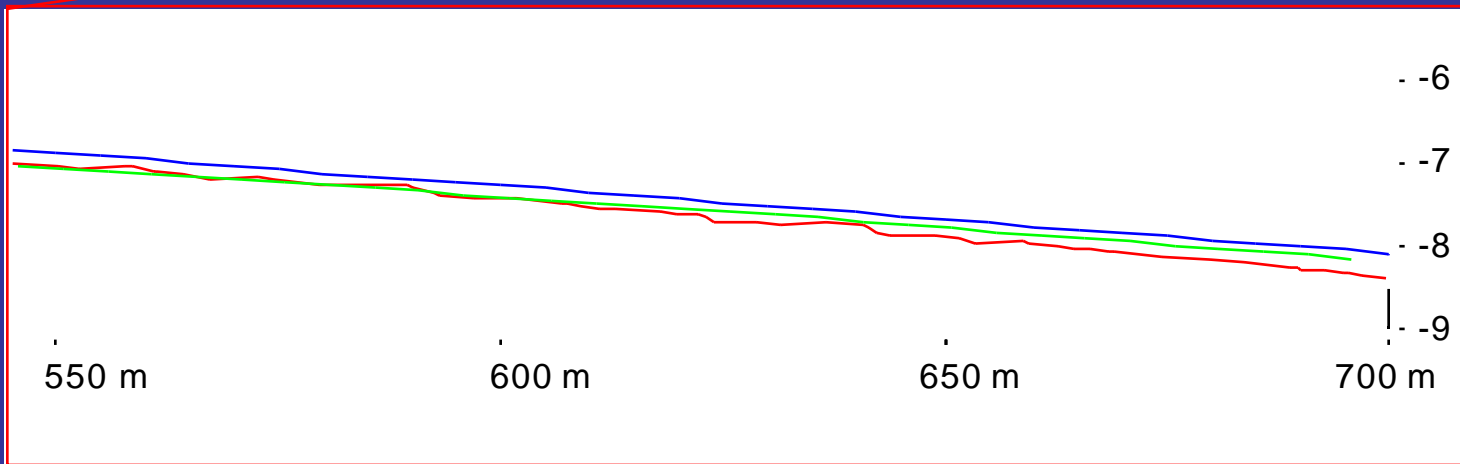
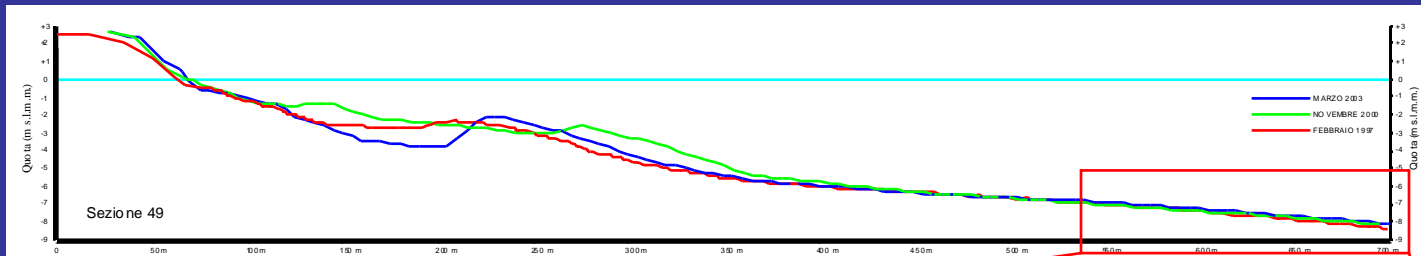
Maximum error on the
estimation of
variability

Economic value of each
m

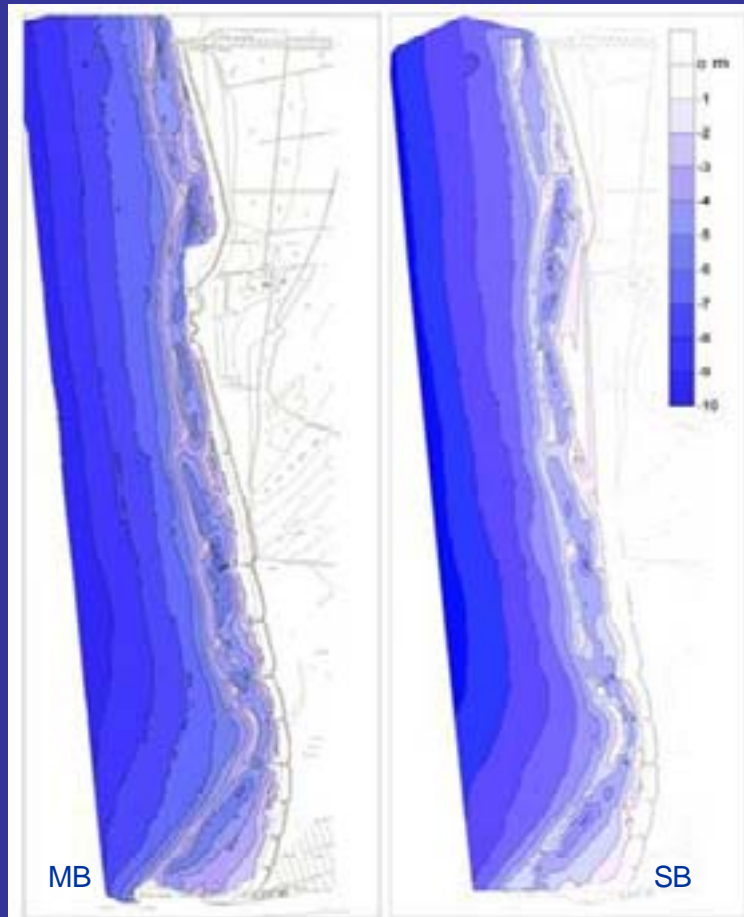
Consequent over/under
estimation of beach value
= € 14.160.000.000
Budget: € 1.053.530

Length of Mediterranean
beaches = 21047 km

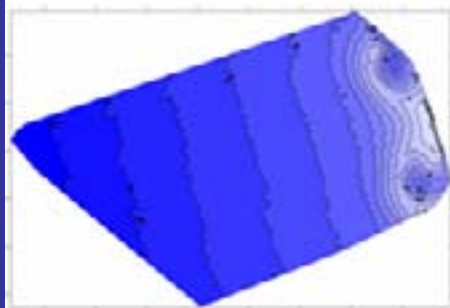




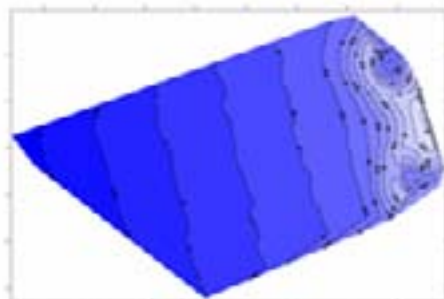
Multibeam and Singlebeam data processing



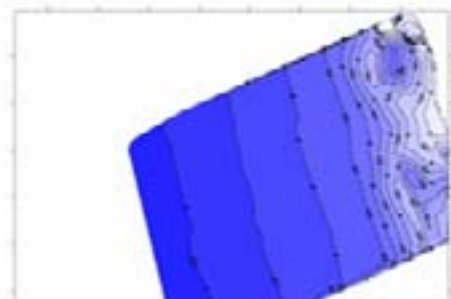
ELABORAZIONE DATI MULTIBEAM



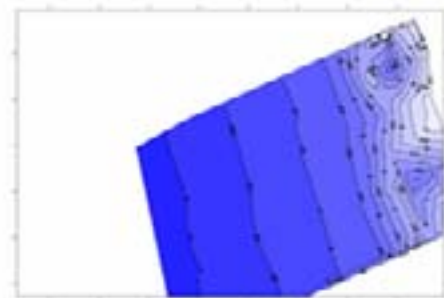
ELABORAZIONE DATI SINGLEBEAM



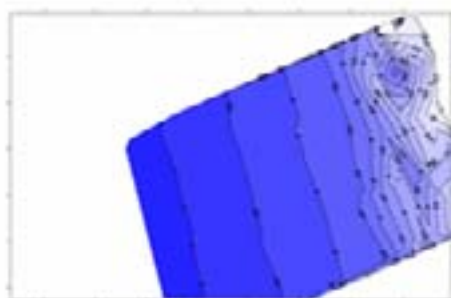
Distanza beams 50 ml



Distanza beams 100 ml



Distanza beams 150 ml



Distanza beams 200 ml



Artificial nourishment of 2
km of beach extended up

to de

(a

1.4

Mean survey
error

Maximum error
on the comparison:

2

Maximum error on
calculated volumes:

280

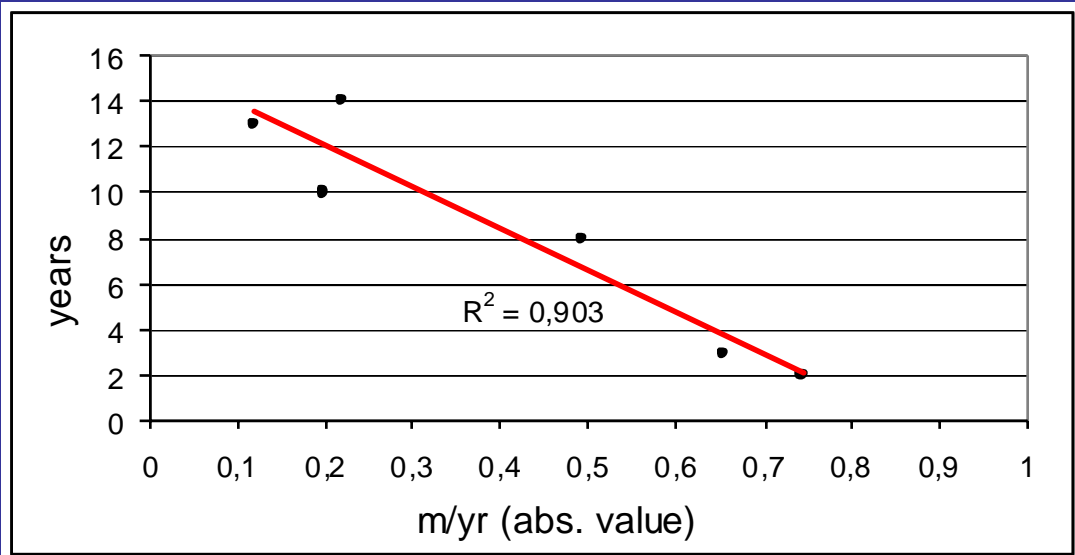
Cost of sand

Costo of error:

€ 1.680.000

€ 5.600.000

Budget: € 1.053.530





**Optimisation des Techniques
Intégrées de Monitoring
Appliquées aux Littoraux**

March 2006 – April 2008



PARTENARIAT

France:

- 1) EID Méditerranée (Hérault)

Spain:

- 2) Institut de Ciències del Mar (Catalunya)

Greece:

- 3) IACM-FORTH (Creta)
- 4) OANAK (Creta)
- 5) Université Democritus de Thrace / Laboratoire de l'Hydraulique et des Travaux Hydrauliques (East Macedonia / Thrace)

Italy:

- 6) Università degli Studi di Genova / Department For The Study of the Territory and Its Resources (DIPTERIS) (Liguria)
- 7) Università degli Studi di Bologna / DISTART (Emilia Romagna)
- 8) Università degli Studi di Roma « La Sapienza » / Dipartimento di Scienze della Terra (Lazio)
- 9) ARPA / Ingegneria Ambientale (Emilia Romagna)
- 10) Università degli Studi di Firenze / Dipartimento di Scienze della Terra (Toscana)



Quantitative analysis of beach morphological and sedimentological evolution analysis

Required precision and accuracy according to reduced time scale for the observation of phenomena

Characteristics of data variability.

At European level, data standardisation and management.

Methodologies based on remotely sensed data, validated with traditional systems

Innovative method for the characterisation of the beaches according to their sedimentological and morphological variability

Procedures for data control (GCP & SCP)

Large partenariat – cross-validation of methodologies

The project will develop, certify and apply
these methodologies on pilot areas
defining a prototype with a model of erosion monitoring that can be
directly used by local administrations.



OBJECTIVES

1 -We will develop methodologies for beach morphology surveying directed towards monitoring of their evolution on different time scales, evaluating their precision

Satellite images
Sea Control Points
Intrinsic variability of beaches

2 - We will elaborate the means for the determination of shoreline position after renourishment works, and the distribution of sediments on emerged and submerged beaches

Granulometric characteristics
Intrinsic variability of beaches
Numerical models

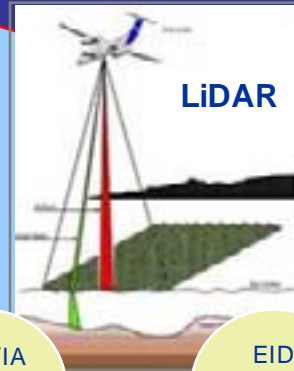
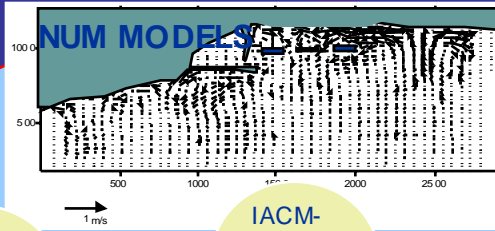
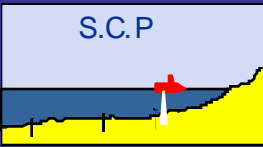
3 - We will define, verify and demonstrate new methods for the evaluation of sand movements at several sedimentary cells

LiDAR
Mathematical models
VHR Seismic Reflexion
Webcams

protocols
workshops



ADMINISTRATIONS



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UNIROMA
"La Sap."
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ARPA/IA
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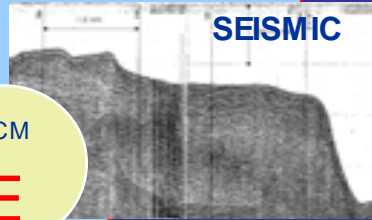
OANAK
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UNIV. DEMOCRITUS
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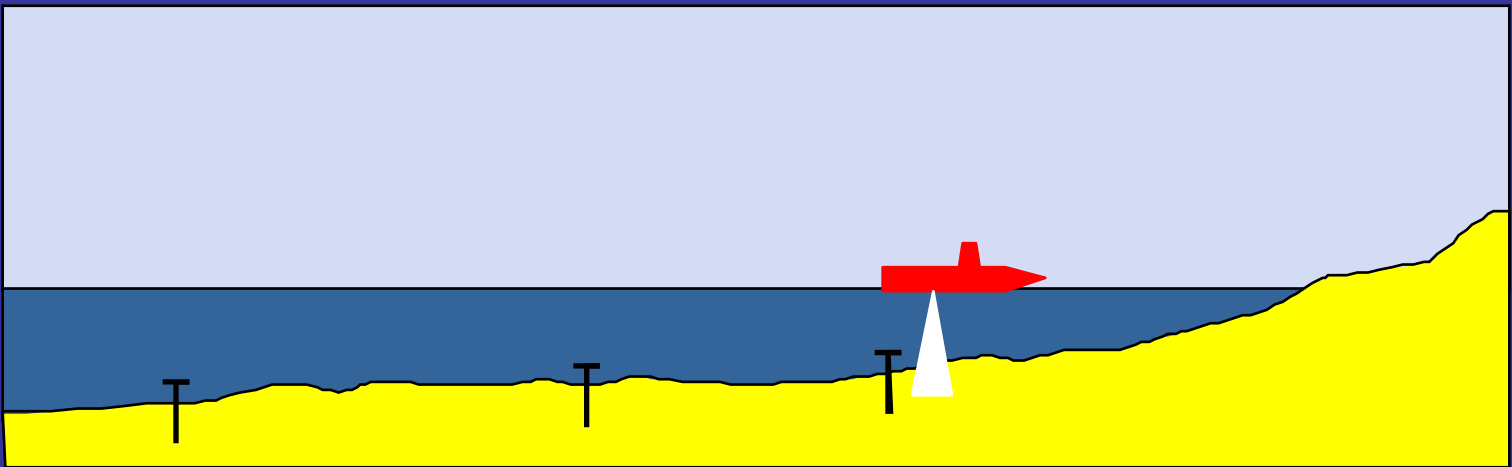


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6 marzo 2006 ore 16:01

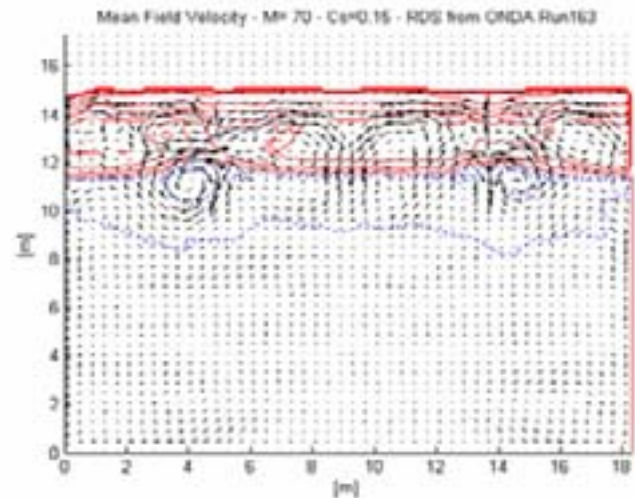
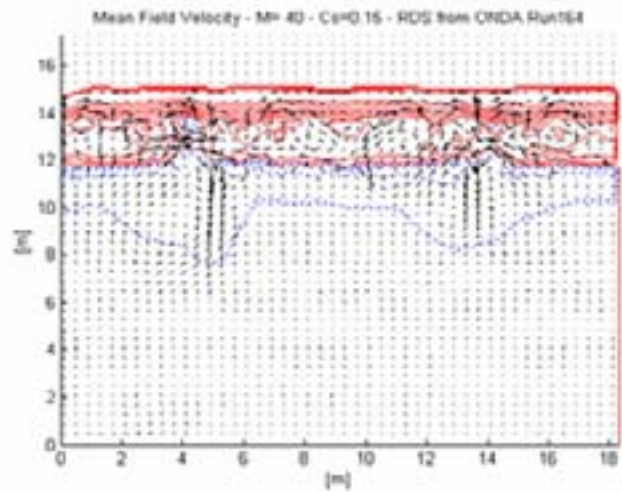


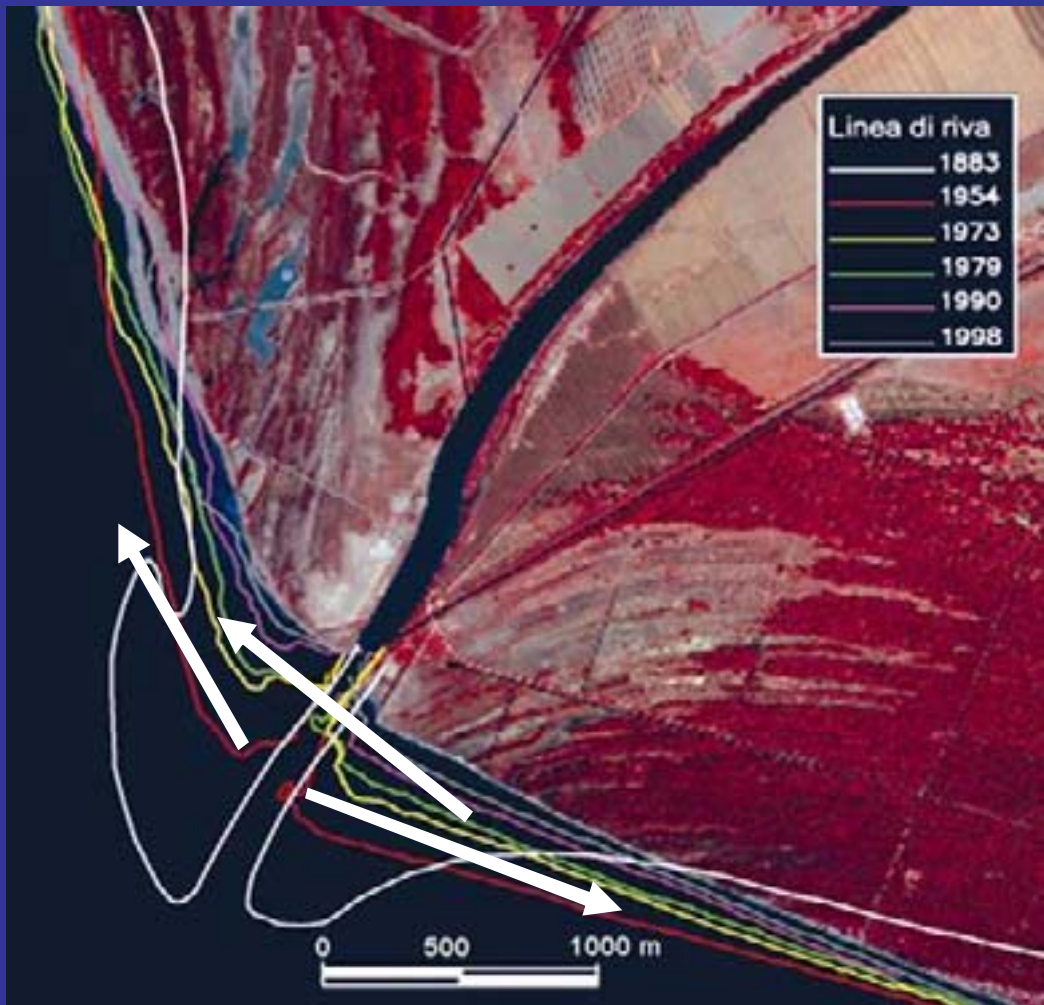
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6 marzo 2006 - time-exposure ore 16







CURRENT PROBLEMS

- Non uniform methods, little is known (or declared) on their precision.
- Some methods are internationally known, but procedural standards still need to be defined (e.g. webcams & satellite images).
- Some methods have not yet been tested on certain parts of the Mediterranean coast, such as LiDAR
- Other methods must be improved and applied, such as numerical models and networks for calibration of data
- The public administration is often unaware both of what is necessary for the quantification of erosive phenomena, and of the existing methods that have a good cost-benefit rapport.

METHODOLOGIC APPROACH

Phase A :

Depart of projet;

Bibliographical research;

Research and organisation of existing data within each region;

Exchange of first experiences and data among partners

Phase B :

Deeper studies on methodologic aspects;

Evaluation of innovative methodologies;

Methodological exchanges about most adequate common practices;

Planning of data acquisition surveys;

First field works;

Methodologic tests;

Divulgation of first results

Phase C :

Realisation of Pilot projects (study cases);

Divulgation of results and conclusions

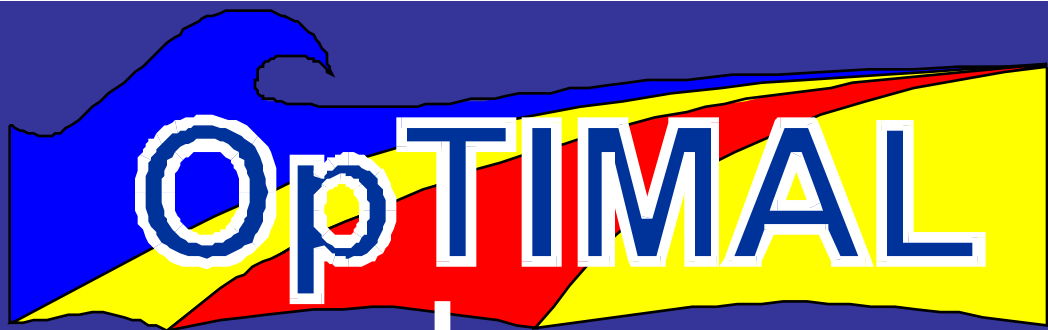
Transfer of knowledge

EFFECTIVE RESULTS

- Optimisation cost/benefit - Innovative techniques evaluation
- Protocoles
- Technical reports
- Cartography
- Updating of websites (regions, Beachmed)
- Exchange of experience among partners
- Training and professional qualification for public administration
- Workshops for public administration

LONG TERM IMPACTS

- Increase in the autonomy of regional administrations on design and execution of coastal defence within coastal planning
- Contribution to a concept of high precision monitoring of erosion and the effects of defence strategies (especially renourishment activities) allowing to include this component systematically in the integrated coastal zone management for sustainable development in the Mediterranean



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