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## MAritime REgion cooperation for MEDiterranean

### Adaptation to Climate Change on Coastal Area

#### Diagnosis phase Report

February 2012

Thematic coordinated by

**LAZIO REGION**

ICZM Monitoring Centre

## EMILIA-ROMAGNA REGION

Partner	Emilia-Romagna Region. Directorate General for Environment, Soil and Coast Protection
Region	Emilia-Romagna
Name of the person filling in the questionnaire (role)	Roberto Montanari - Officer, Coastal Protection Unit
Name of the structure	Soil and Coast Protection and Land Reclamation Service
E-mail address	rmontanari@regione-emilia-romagna.it
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### The questionnaire:

#### State of the art: inventory of the cooperation projects on adaptation to climate change

1. Have you participated in former European programmes on adaptation to climate change in coastal areas?

yes	<input checked="" type="checkbox"/>
no	<input type="checkbox"/>

If so, could you provide the names of these projects and any links to their websites?

**cadsealand**

**Beachmed-e (Interreg III C Sud):** <http://www.beachmed.eu>

**PlanCoast (Interreg III B CADSES):** [www.plancoast.eu](http://www.plancoast.eu)

**COASTANCE (MED):** [www.coastance.eu](http://www.coastance.eu)

**Micore** <http://www.micore.eu/>

2. Could you describe the main Results, Experiences and Best Practices that you identified in these projects?

*Cadsealand: analysis of the storminess in the period 1950 – 2000; definition of the STORM parameters for North Adriatic; main coastal thematic mapping (land use; geomorphology) and shoreline change analysis (based on DSAS)*

**Beachmed-e: identification and characterisation of a new off-shore deposit for beach nourishment, installation of a wave detection buoy for marine climate monitoring 3 miles off-shore from regional coast, good practices for consolidation of restored/ reconstructed coastal dunes, through vegetation planting (that drove after to the” Bevano Protocol”), signature of a political document “European regions charter for littoral protection and for the promotion of an European interregional Observatory for Mediterranean coast protection (Bologna Charter)”.**

**PlanCoast: manual and practices for coastal area planning and integrate marine spatial planning, set up and tested within the Ferrara Province spatial planning process. Definition of coastal risk indicators for: long and short term flooding; erosion; salt water intrusion.**

**Vulnerability analysis and maps of Ferrara coastal zone.**

**COASTANCE: (ongoing) development of a regional action plan against coastal erosion and submersion risk for the adaptation to climate change effects, development of a costal information and managerial system based on 118 sedimentary cells, development of best practices for beach sediments management and of a program for the sustainable exploitation of sediments deposits for beach nourishment purposes.**

**Micore: re-analysis of storminess extended to 2010; sea-storm thresholds definition; development of a prototype of early warning system usind the x-beach model specifically implemented for Emilia-Romagna coast; Catalogue of historical sea-storms (1946-2010)**

**State of the art: inventory of the atlases and databases regarding coastal risks: erosion, submersion, flood**

3. *Have you already acquired information or been informed on floods and submersions which already occurred in the past, and which have significant adverse impact on coastal zones?*

yes	X
no	

*If so, what kind of information do you have in order to describe the characteristics of the floods already occurred in the past?*

**Reports, maps, images, sea storm reports.**

**The Catalogue of historical sea-storms (1946-2010) contains information and maps about damages and impacted localities;**

4. *Have you already defined a methodology to identify priority areas of risks (erosion, submersion, flood)?*

yes	X
no	

**The methodology is to be shared among regions and implemented to fulfill 2007/60/EC directive. Nowadays the sharing process is ongoing through technical meetings with regions of the same Hydrographic District.**

**It is a statistical modelling method based on the calculation on water rising and ingression considering the worse scenario: set up + surge + tide (for 1, 10, 100 return time events). Such results will be integrated with cartographic information acquired during other projects such as:**

- *Catalogue of historical sea-storms*
- *Run-up computation along cross shore beach profiles*

5. Have you already produced risk maps on coastal areas?

yes	
no	X

If so, could you briefly describe the overall methodology that you have adopted to produce risk maps?

.....

6. Did your risk maps refer to the EU flood directive (2007/60/EC) requirements?

yes	
no	

7. Have you produced atlases and/or databases regarding coastal area management?

yes	X
no	

If so, could you provide the names of these atlases and/or databases (in case of web tools, please specify the link to the web page)?

Coast and Marine Information System including several databases among which:

- Coastal defence database
- Nourishment database
- Offshore sand deposits
- Coastal- Hazard maps
- Etc

Most of them are accessible at the address <http://geo.regione.emilia-romagna.it/geocatalogo/>

<http://geo.regione.emilia-romagna.it/costa/viewer.htm?Title=Servizio%20Geologico%20Sismico%20e%20dei%20Suoli>

**Within the COASTANCE project we set up a subdivision of the regional coast in 118 littoral cells and classified them, for management purposes, by sedimentary balance, interventions realised, physical characteristics and dynamics. The system, named SICELL, will become a web tool**

*available for technical regional offices and local Administrations. Its description and general maps can be accessed at the following link: <http://www.ermesambiente.it/difesa suolo/>*

8. Have you adopted a specific guideline to produce these tools?

yes	<b>X</b>
no	

*If so, do you think your guideline should be shared and adopted by the MAREMED partnership?*

***For the Coast and Marine Information System EuroSION guidelines has been followed; for the metadata and annex 1 -2 from Inspire.***

***Yes, it could***

9. Could you list some general surveys concerning erosion and submersion events carried out in your Region over the past five years?

***LiDAR 2010 carried out after the sea storm of march 2010***

***SAR Interferometry 2002-2009 data analysis for subsidence detection***

***Regional network for the monitoring of sea-storm impact based on GPS survey on the dry beach. Operative since 2010.***

**Cartographic and morphological data**

10. Have you already acquired morphological data describing your coastal zone?

<b>X</b>	<i>Shoreline acquisition?</i>
<b>X</b>	<i>Equilibrium beach section acquisition?</i>
<b>X</b>	<i>Erosion trend?</i>
<b>X</b>	<i>Sand grain size?</i>
<b>X</b>	<i>Chemical and Physical characteristics of sediments?</i>
<b>X</b>	<i>Sand Dune acquisition?</i>
	<i>Other.....</i>

11. What kind of tools do you use for coastal monitoring?

<b>X</b>	<i>Webcam</i>
<b>X</b>	<i>Topobathimetric measurement</i>
<b>X</b>	<i>Satellite images</i>

<b>X</b>	Lidar
<b>X</b>	Other <b>SAR Interferometry</b> .....

12. Have you developed common cartographies together with your neighbour region?

yes	
no	<b>X</b>

13. Have you collected information evaluating the subsidence phenomenon along your coast?

yes	<b>X</b>
no	

**Meteorological and wave climate data, climate change effects.**

14. Have you collected information on high tide level in your region?

yes	<b>X</b>
no	

15. Have you collected information evaluating sea level evolution of your Region in the medium/long term (100÷200/500 years)?

yes	
no	<b>X</b>

16. Have you collected information evaluating offshore meteorological characteristics (wind speed, wind direction, atmospheric pressure, water and air temperature, ...) along your coasts?

yes	<b>X</b>
no	

If so, could you specify the period of time the data collected refers to?

	<5 years
	5÷20 years
<b>X</b>	>20 years

**The Emilia-Romagna has its rain gauge and climatic monitoring network, inland and on the coast. Moreover along the coast there are 3 anemometric stations.**

17. Have you collected information evaluating offshore (about -100 m) wave characteristics (Wave height  $H$ , Wave period  $T$  and main direction) along your coasts?

yes	<b>X</b>
no	

If so, could you specify the period of time the data collected refers to?

	<5 years
	5÷20 years
<b>X</b>	>20 years

**Buoys of the national network (RON) are active and located off-shore from Ancona and from Delta Po (Punta della Maestra) since more than 20 years, but not always with continuous data collection.**

**Acqua Alta CNR multi sensor platform**

18. Have you collected information evaluating nearshore (about -20 m) wave characteristics (Wave height  $H$ , Wave period  $T$  and main direction) along your coasts?

yes	<b>X</b>
no	

If so, could you specify the period of time the data collected refers to?

<b>X</b>	<5 years
	5÷20 years
	>20 years

**NAUSICAA regional buoy, installed within Beachmed-e project, is active since 2007, 3 miles off-shore from Cesenatico coast.**

**Other measurements are acquired by the sensors installed on some Eni platforms; such data integrated to ARPA-SIMC real time information system.**

**Social economic data, exposed values**

19. Have you already developed land use maps for your coastal area?

yes	<b>X</b>
no	

If so, please indicate a reference below, or the website of publication.

**Please see the Land Use web GIS at the following:**

<http://archiviocartografico.regione.emilia-romagna.it/bookshopfe/mappeonline.html>

A specific land use classification of 1,5 km coastal strip is available on the <http://geo.regione.emilia-romagna.it/geocatalogo/> for the years 1945 – 1982 – 1998 and 2005

20. Have you already assigned economic values to your coastal area?

yes	<b>X</b>
no	

If so, could you briefly describe the methodology adopted to evaluate the economic values of your coastal area?

**The economic value of the coastal area has been estimated considering the GDP of the main sectors of the coastal economy: tourism industry, touristic and commercial harbours, fishery, aquaculture. Thus defined, the coastal system GDP is estimated to contribute up to 7% of total regional GDP. Further evaluations on real estate, infrastructures, industrial settlements, natural heritage are not structured.**

**Future scenarios**

21. Are there any key studies containing future scenarios for your area with a focus on:

X	Climate change
<b>X</b>	Changes in population size
<b>X</b>	Population dynamics
<b>X</b>	Economic evolution
<b>X</b>	Land use changes
<b>X</b>	Spatial planning
	Other.....

**In Plancoast project were processed some maps showing:**

- **effects of sea-level rise on Ferrara coastal plain, considering from IPCC scenario**
- **future Ferrara coast shoreline at the 2015, 2030, 2090 calculated on the base of change rates**

**For population and economic evolution scenarios 2014-2024, please see the following document:**

[http://www.regione.emilia-romagna.it/wcm/statistica/progetti/progetti/previsioni/attivita/pag/scenari/descr/Documentazione/RER\\_s cenari\\_base.pdf](http://www.regione.emilia-romagna.it/wcm/statistica/progetti/progetti/previsioni/attivita/pag/scenari/descr/Documentazione/RER_s cenari_base.pdf)

**For spatial and urban planning, please see the relative WebGIS:**

<http://archiviocartografico.regione.emilia-romagna.it/bookshopfe/mappeonline.html> “DB Regionale Piani strutturali Comunali PSC”



*For land use, please see the relative WebGIS*

<http://archiviocartografico.regione.emilia-romagna.it/bookshopfe/mappeonline.html> "Uso del Suolo"

22. *Could you list some interventions in your Region concerning adaptation measures to climate change in coastal areas, realised over the past 10 years?*

*Years 2002 and 2007 beach nourishment interventions with off-shore deposits sediments (1,7 Million of cubic meters along 10 km of critical coastal stretches) in order to widen and elevate the beach quota. "Da Vinci Gates" in Cesenatico harbour, completed in year 2005, in order to block marine ingression by events with water level up to 2,20 m, on medium sea level, accompanied by the realisation of artificial dunes "Giardini al mare" along inland promenade, with the same quota (+2,20 m), southward to the harbour, and a "managed retreat" intervention by the municipal Master Plan/ realignment of buildings in the area northward to the harbour.*

23. *Could you identify problems that hinder the development of risk maps in coastal zones (budget; technical competences; technical tools; lack of data or lack of shared data...)?*

*----- no comment .*

24. *What would you suggest to the European Regional Development Fund (ERDF) for the next financial program (2013-2020)?*

*To foresee a budget line for next financial period on erosion monitoring systems in the Mediterranean and a pilot action programme to finance demonstrations of best practices for adaptation of coastal zones to climate change.*

*To re- launch the EUROSION Initiative, with a particular focus on the Med basin and giving the Regions a strong role in its definition and development.*

*To foster the creation of an Interregional Observatory for the coast of the Med basin (as introduced within the "Bologna Charter" 2007), a network among regional observatories able to cover data acquisition, collection, elaboration at the Med basin scale.*

To foresee a budget for multidisciplinary analysis projects focused on the impact of shoreline retreat on coastal system (morphology, ecology, hydrology, ecc.)

Promoting new interventions based on environmental engineering applicable at regional scale (dune reconstruction; backshore restoration...