AGENZIA REGIONALE PREVENZIONE E AMBIENTE DELL'EMILIA-ROMAGNA

Servizio IdroMeteoClima

arpa agenzia regionale prevenzione e ambiente dell'emilia-romagna

Early warning system for coastal hazards in Emilia-Romagna including the experimental system developed within the MICORE Project

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COASTANCE

10 February 2011 - Technical meeting - Component 3

Regione Emilia-Romagna

Servizio Geologico, Sismico e dei Suoli

Regione Emilia-Romagna

ERMES AMBIENTE

Contents

- Civil protection scheme (existing and new proposal)
- Thresholds
- Storm Impact Indicators – SII's
- Forecast models
- Visualization tools

Emilia-Romagna - Responsible authorities

HydroMeteoClimate Service
ARPA-SIMC
→ Real time monitoring and forecasts of the meteo and sea-state conditions

Regional government
SGSS
→ Vulnerability analysis and risk evaluation; static cartography

Civil Protection
→ Responsible for Early Warning and for the communication to final end user

Regional coastal services (Fe_Ra_FC_Rn); Municipalities; Coast Guard

Existing civil protection scheme

Emilia-Romagna (Italy)

Hydro-Meteo-Climate Service

ARPA-SIMC

1

Real time forecasts and monitoring of meteo and sea-state conditions: **exceeding of thresholds** ?

WEATHER WARNING FOR A COASTAL EVENT

Regional task force meeting

C F — **ARPA-SIMC** — **SGSS (RER)** — **RER - Civil Protection** — C O R

Analysis of possible impact

2

COASTAL **Warning**

3

Which ACTIONS and directions to people?

CIVIL PROTECTION ALERT for Coastal Risk

Civil Protection – Regional Government – Provinces and Municipalities – coast guard are involved to take actions

New Early-Warning System

The New Early-Warning system in development within MICORE will provide:

A great improvement of:

Forecast Module

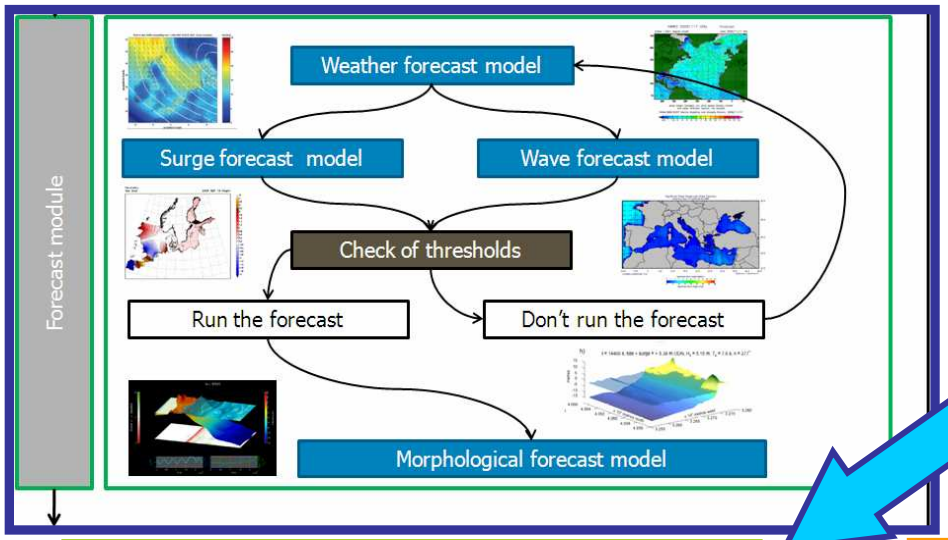
Decision support system

A new:

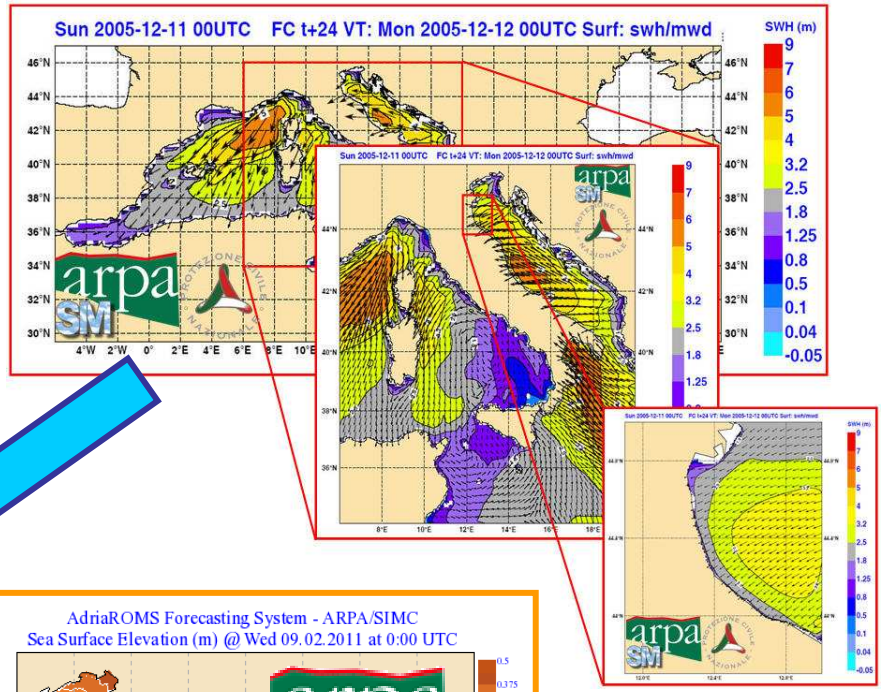
Visualization module and communication

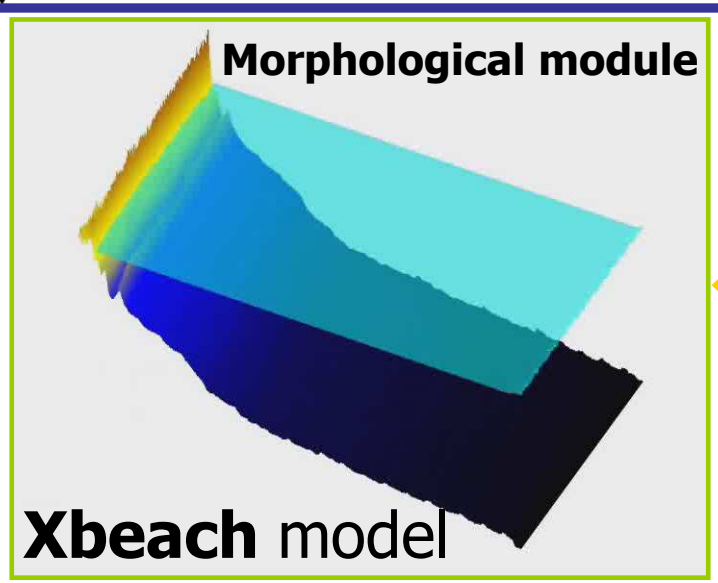
Numerical Models

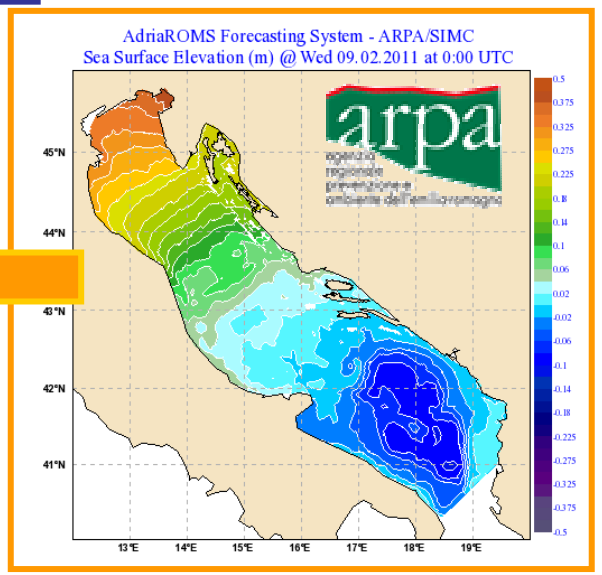
Forecast module



SWAN-MEDITARE (Sea-State)







AdriaROMS
(Sea level)

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New weather warning for coastal event

The new WEATHER WARNING FOR A COASTAL EVENT
(Proposal under discussion)

Centro Funzionale
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AVVISO METEO

Avviso N. 481 /CF del 08/03/2010 (giorno di emissione dell'avviso)
Documento redatto dalla Sala Operativa Meteo

Data e ore di inizio validità di tale avviso 09/03/2010 ore 12 UTC
Data e ore di fine validità di tale avviso 11/03/2010 ore 12 UTC

Area	Altezza d'onda			Direzione prevalente d'onda	Livello del mare			Combinazione Onda/Livello	
	T1	T10	T100	ENE	T1	T10	T100	SI	NO
A	X	☐	☐	ENE	☐	X	☐	SI	☐
B	X	☐	☐	ENE	☐	X	☐	SI	☐
C	X	☐	☐	ENE	☐	X	☐	SI	☐
D	X	☐	☐	ENE	☐	X	☐	SI	☐

The HydroMeteoClimate Service is responsible for the weather warning emission

Information about:
- Coastal wave height
- Water level
- Surge/tide + wave height

	T1	T10	T100
Onde (m)	3.3	4.7	5.9
Livello (m)	0.8	1.0	1.3
Onde/Livello	Onda>2m & Livello>0.7m		

Critical thresholds for storm expected impact (from MICORE D.1.2 report)

Thresholds

Table 3: List of criteria used to define thresholds for each beach type and the chosen values.

Beach type	Storm impact	Parameter	Thresholds	Criteria
Natural with dunes	Morphological change (dune erosion/destruction)	Wave height (Hs)	T1 wave height = 3.3 m	DSF (Dune Stability Factor)
		Water Level (surge + tide)	T1 WL = 0.85 m above MSL	
Anthropic	Inundation and damage to infrastructures	Wave height (Hs)	Hs = 2.00 m	Comparison of "real" damaging events (run-up + surge + tide) with max topographic elevation
		Water Level (surge + tide)	WL = 0.7 m above MSL	

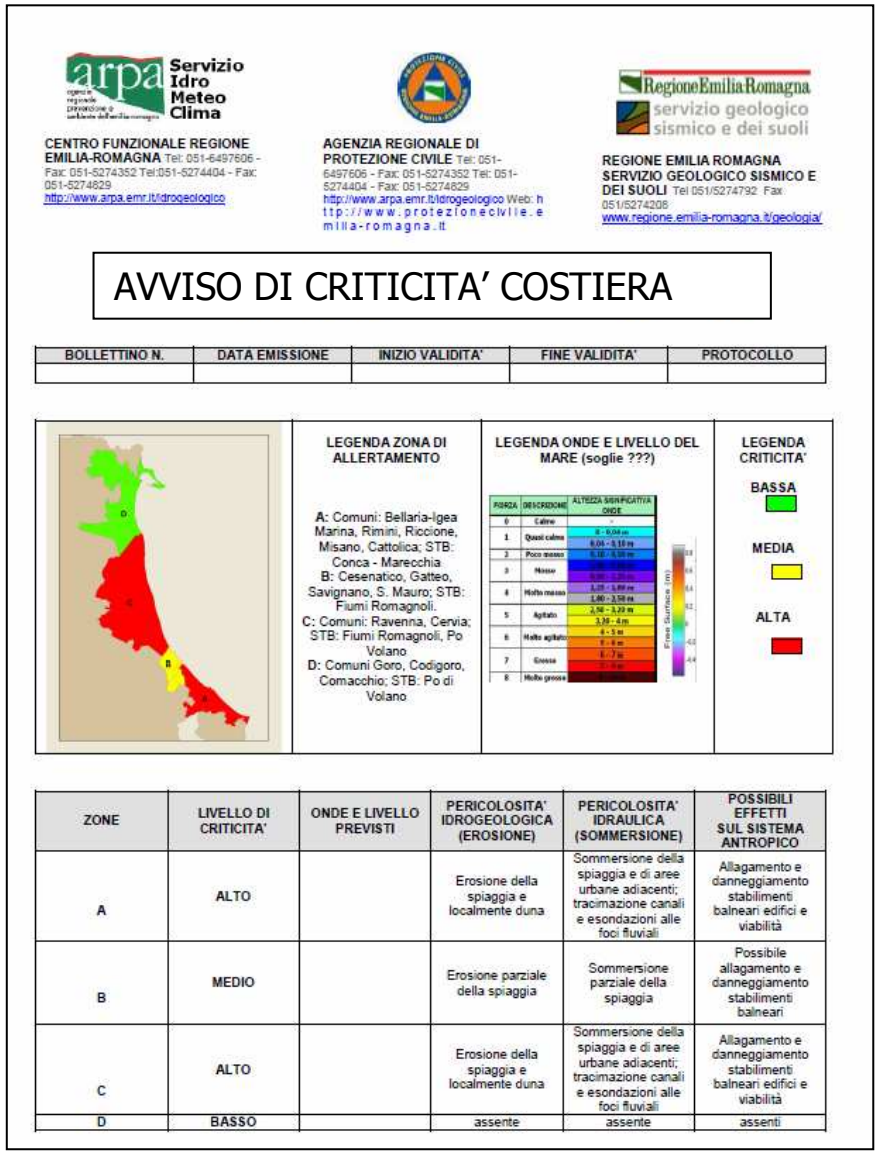
MICORE Deliverable D1.2 Version: 29/07/09, p.40

This is ok for weather warning for a coastal event!

But is **not enough** for the coastal hydro-geological warning (see SSI's)

New improved COASTAL WARNING

-under discussion-



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RegioneEmiliaRomagna servizio geologico sismico e dei suoli

REGIONE EMILIA ROMAGNA SERVIZIO GEOLOGICO SISMICO E DEI SUOLI Tel 051/5274792 Fax 051/5274208
www.regione.emilia-romagna.it/geologia/

AVVISO DI CRITICITA' COSTIERA

BOLLETTINO N.	DATA EMISSIONE	INIZIO VALIDITA'	FINE VALIDITA'	PROTOCOLLO

LEGENDA ZONA DI ALLERTAMENTO

A: Comuni: Bellaria-Igea Marina, Rimini, Riccione, Misano, Cattolica; STB: Conca - Marecchia
B: Cesenatico, Gatteo, Savignano, S. Mauro; STB: Fiumi Romagnoli.
C: Comuni: Ravenna, Cervia; STB: Fiumi Romagnoli, Po Volano
D: Comuni Goro, Codigoro, Comacchio; STB: Po di Volano

LEGENDA ONDE E LIVELLO DEL MARE (soglie ???)

LEGENDA CRITICITA'

BASSA

MEDIA

ALTA

ZONE	LIVELLO DI CRITICITA'	ONDE E LIVELLO PREVISTI	PERICOLOSITA' IDROGEOLOGICA (EROSIONE)	PERICOLOSITA' IDRAULICA (SOMMERSIONE)	POSSIBILI EFFETTI SUL SISTEMA ANTROPICO
A	ALTO		Erosione della spiaggia e localmente duna	Sommersione della spiaggia e di aree urbane adiacenti; tracimazione canali e esondazioni alle foci fluviali	Allagamento e danneggiamento stabilimenti balneari edifici e viabilità
B	MEDIO		Erosione parziale della spiaggia	Sommersione parziale della spiaggia	Possibile allagamento e danneggiamento stabilimenti balneari
C	ALTO		Erosione della spiaggia e localmente duna	Sommersione della spiaggia e di aree urbane adiacenti; tracimazione canali e esondazioni alle foci fluviali	Allagamento e danneggiamento stabilimenti balneari edifici e viabilità
D	BASSO		assente	assente	assenti

Regional task force is responsible for the early-warning emission

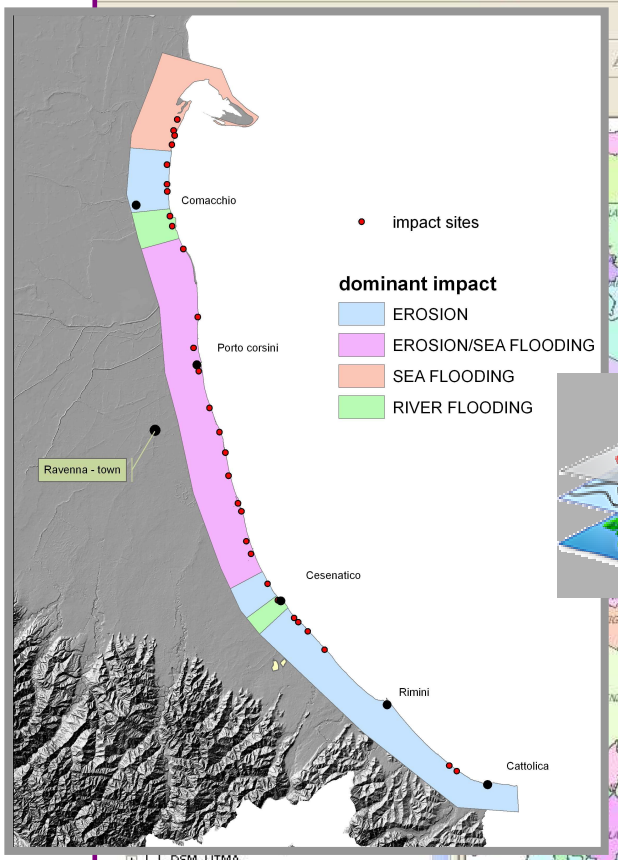
Specific information on the possible impact in macro-areas classified with reference to coastal vulnerability

More information about the impact of the storm:

- Beach erosion
- Coastal flooding
- Level of the impact for each area (red, yellow, green)

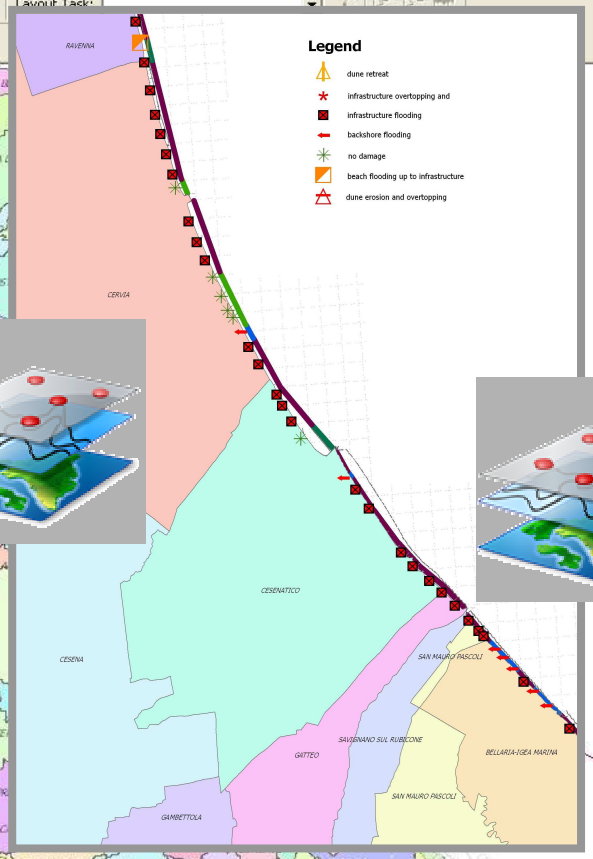
Decision support system module

Visualization tools from the Geological Survey Service



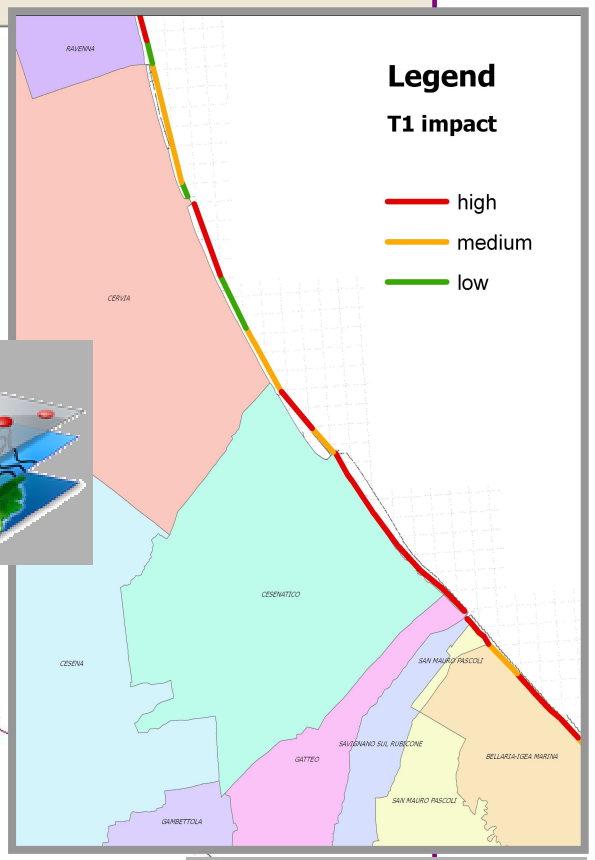
Historical Impacts

(from MICORE Catalogue)



Hazard maps

T1 –T10 –T100



RISK maps

T1 –T10 –T100

GIS BASED SYSTEM ... GEMENT AND ...

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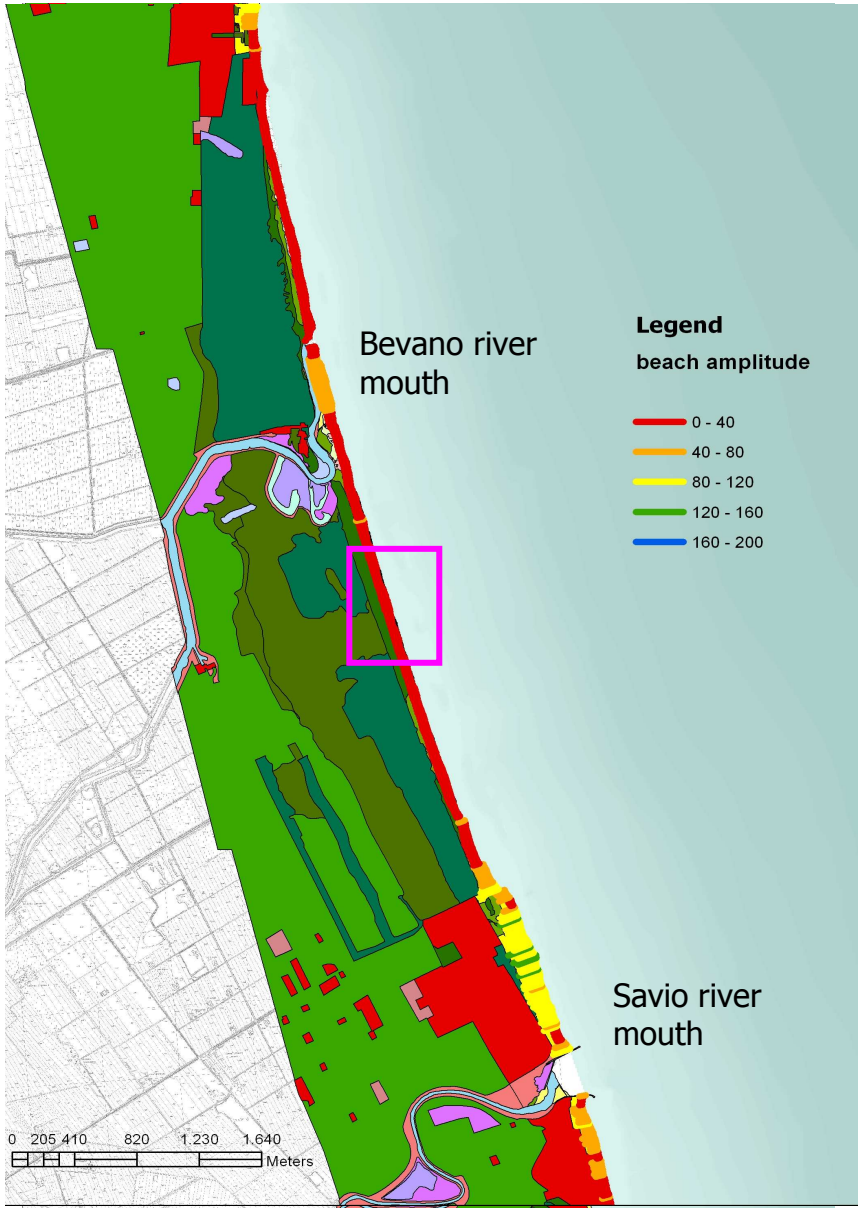
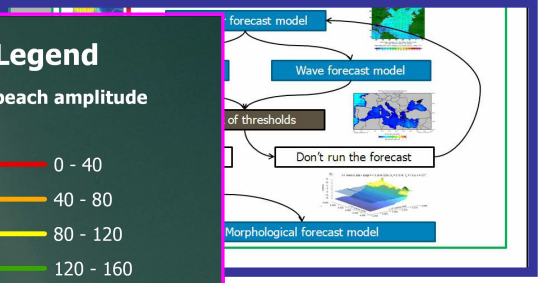
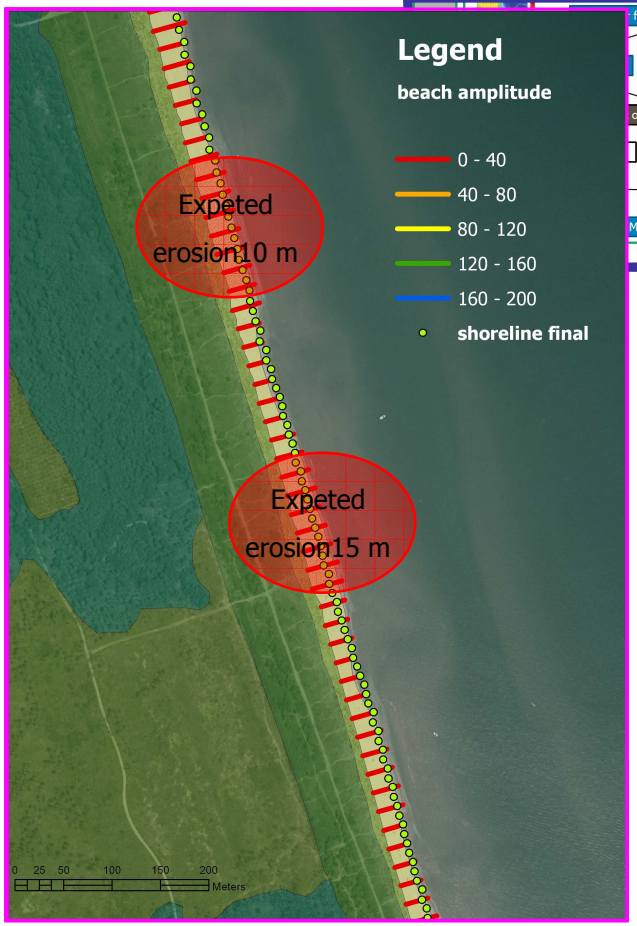
Forecast for SII: BEACH EROSION



Forecast module





x-beach morphological model outputs

DYNAMIC MAPS – final shoreline position re-run of December 2008 event

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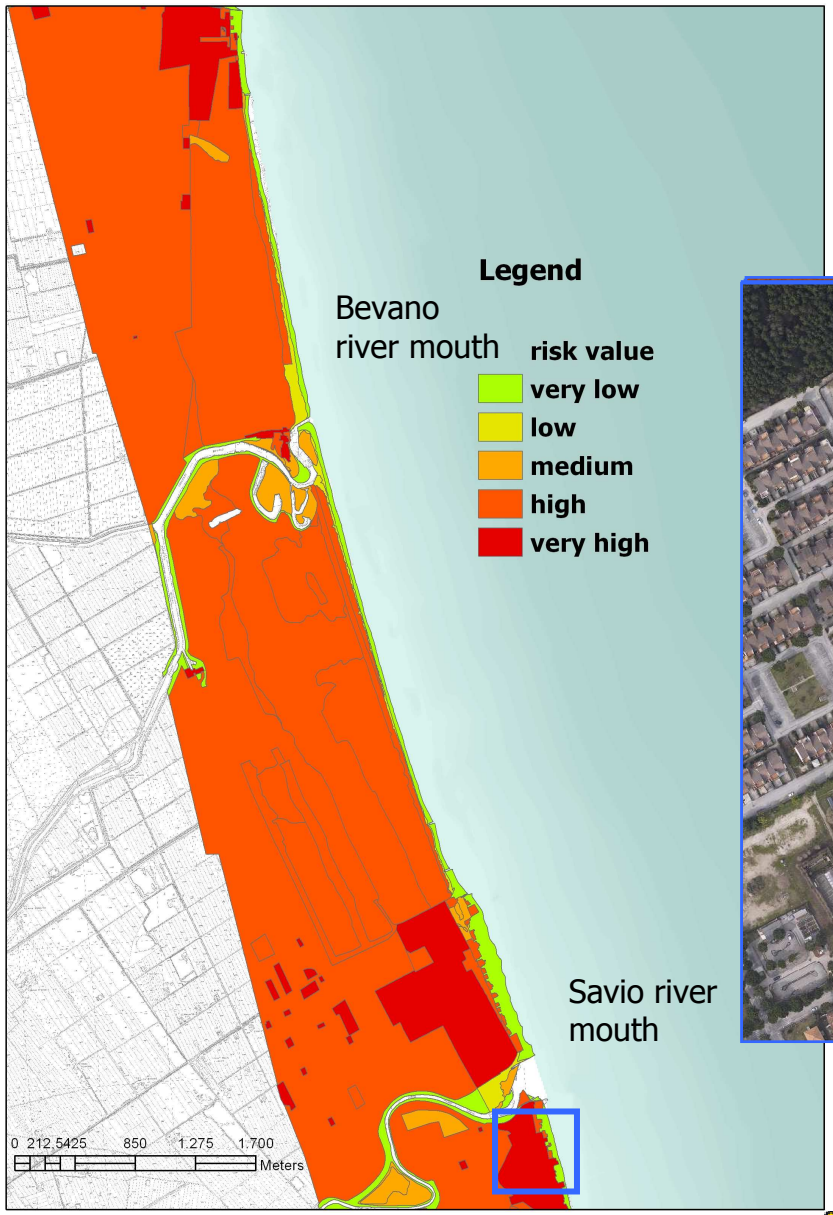
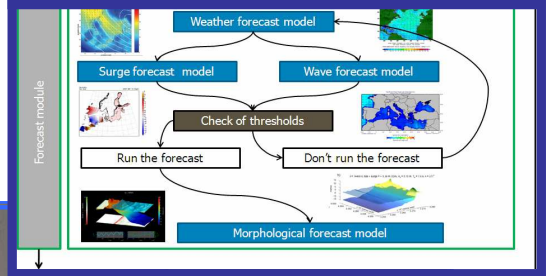
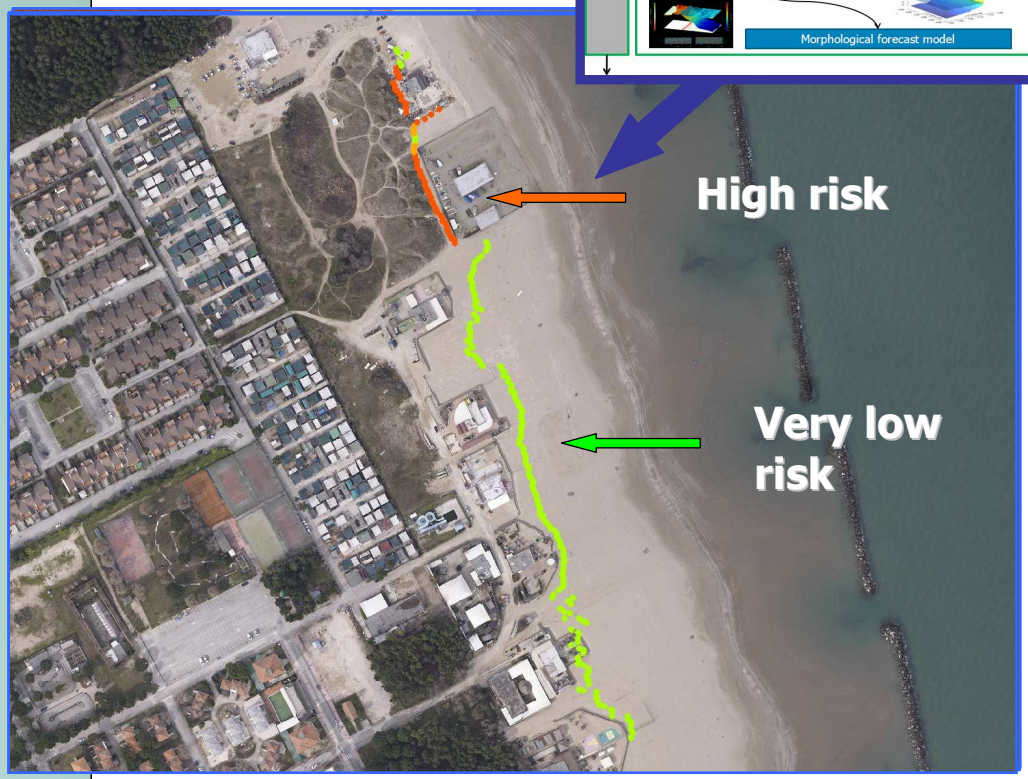
Forecast for SII: FLOODING



Forecast module





maximum run-up and expected impacts

re-run of December 2008 event

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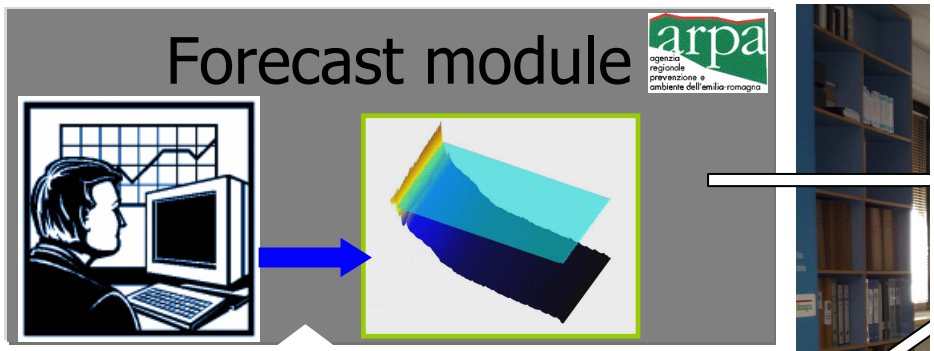
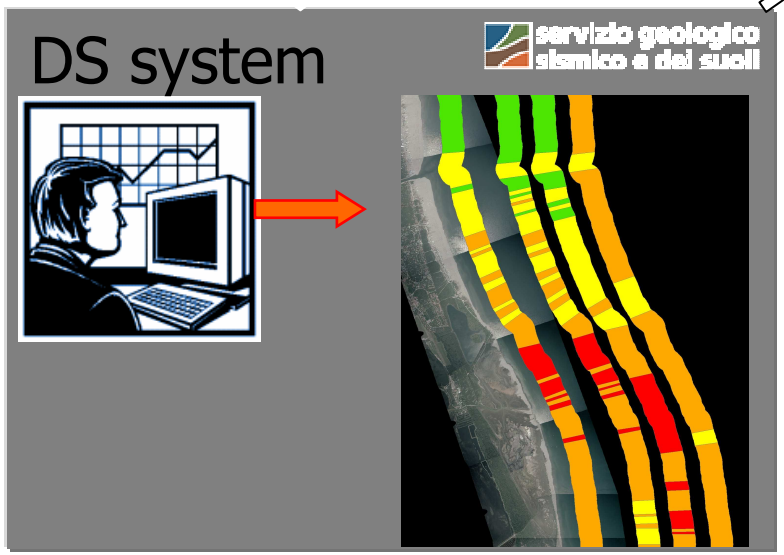
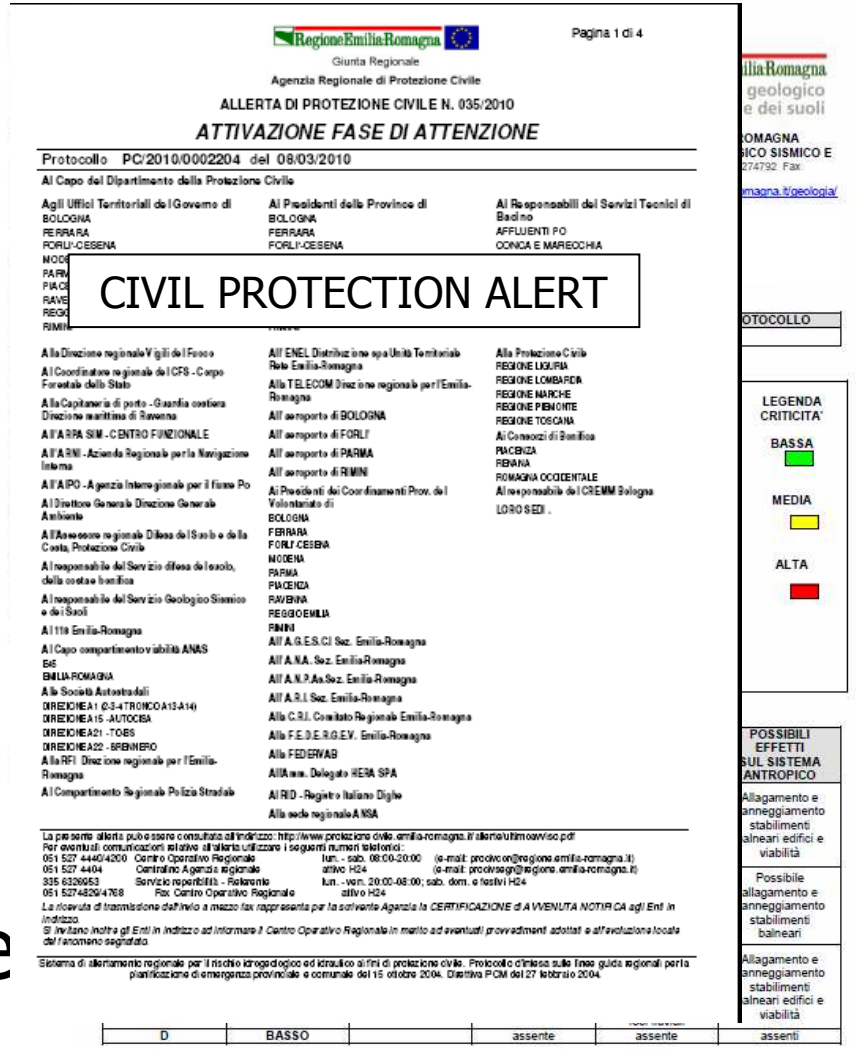
Which supports the centralized management centre







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THANK YOU FOR YOUR ATTENTION

QUESTIONS ?

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10 February 2011 - Technical meeting - Component 3