El Sistema de Alerta e Aviso para el riesgo de maremotos en Portugal

Actividades de Proteccion Civil

Patrícia Pires

ANPC
AUTORIDADE NACIONAL
DE PROTECÇÃO CIVIL

Civil Protection

Activity carried out by the State, by the Regions, by the local authorities, by every citizen and by public and private companies, with the aim of **preventing** collective risks associated with major accidents, emergencies and disasters, **attenuating** its effects, **protecting** people and the environment and assisting those in danger

(*in: Lei de Bases de Proteção Civil - Lei 27/2006*)

Principles

PRIORITY * PREVENTION * PRECAUTION
SUBSIDIARITY * COOPERATION * COORDINATION
UNIQUE COMMAND * INFORMATION

ANPC mission

Plan, **coordinate** and carry out the **civil protection policy**, namely in what concerns **risk prevention and response** to major accidents and disasters, directing the fire brigades activities and performance

Plan national needs in the framework of civil emergency planning towards possible war or crises situations

(*in: Lei Organica da ANPC- Decreto-Lei 73/2013*)

Objectives

PREVENT * MITIGATE * SUPPORT * RESCUE

WHY
TSUNAMI RISK?

Tsunami 1755

Vorstellung von Lisabon vor und in dem erbenden des 1 Novembris 1755

Tsunami in Portugal

QUADRO 2 - LISTA DE TSUNAMIS NA COSTA PORTUGUESA

				LOCALIZAÇÃO DA FONTE					
DATA (aa mm dd)	HORA DO SISMO (hh mm ss)	CAUSA	SUB-REGIÃO	LATITUDE N	E LATITUDE	H - DEPTH (km)	SIEBERG AMBRASEYS IT	ESPRAIAMENTO R Run up (m)	REGISTADA PELOS MAREGRAFOS A Max. Amplitude (m)
60 BC	Un	ER	SWIT	36.00	-10.70	-	4	-	-
382 AD	Un	ER	SWIT	36.00	-09.50	-	4	-	-
1531.01.26	04:30:00	ER	TE	38.90	-09.00	-	4	-	-
1722.12.27	17:30:00	ER	SWIT	37.02	-07.48	-	3	-	-
1746.12.26	-	-	-	-	-	-	-	-	-
1752.04.28	-	-	-	-	-	-	-	-	-
1755.11.01	09:40:00	ER	SWIT	36.70	-09.80	-	6	> 10	-
1755.11.02	-	-	-	-	-	-	-	-	-
1755.11.16	15:30:00	ER	SWIT	43.40	-11.00	-	2	-	-
1755.12.21	-	-	-	-	-	-	-	-	-
1756.01.31	-	-	-	-	-	-	-	-	-
1756.03.29	Un	ER	TE	38.70	-9.20	-	2	-	-
1761.03.31	12:01:00	ER	GFD	34.50	-13.00	-	3	2.4	-
1809.07.04	-	-	-	-	-	-	-	-	-
1926.12.18	14:45:00	ER	TE	38.70	-9.20	-	2	-	-
1929.11.18	20:32:00	ES	GB	44.50	-56.90	-	1	-	0.19 (Lexões)
1930.03.04	18:03:00	ESA	MAD	32.65	-16.97	-	4	> 5	-
1941.11.25	18:04:00	ER	D	37.42	-19.01	25	1	-	0.10 (Lagos)
1969.02.28	02:40:32	ER	SWIT	36.01	-10.57	22	2	-	0.30
1969.07.17	05:00:00	D	D	D	D	-	1	-	0.13 (Lagos)
1975.05.26	09:11:51	ER	GFD	35.90	-17.50	15	1	-	0.30 (Lagos)

Data – data dos acontecimentos; Hora de ocorrência; Cause: ER (Sismoe); ESA (Escorregamento sub-aéreo); ES (Escorregamento submarine); Sub-regiões da região Atlantica (AT) region: SWIT – Southwest Iberian Transpressive zone; TE – Tagus Estuary; GFD – Gloria Fault Domain; GB – Grand Banks; MAD – Madeira. Lat and Lon Latitude and Longitude in degrees; H – focal depth in km; IT- intensidade do tsunami (escala de Sieberg Ambraseys); R – run-up height in (m); A - Amplitude Max – amplitude maxima registada nos maregrafos; D desconhecida.

Preparedness

risk assessment
emergency planning
early warning
exercises

risk assessment

Estudo do Risco Sismico de de Tsunamis do Algarve (ERSTA)

- Scientific study coordinated by ANPC (2007-2009)

Download:

http://www.prociv.pt/Documents/ERSTA_ANPC.pdf

risk assessment

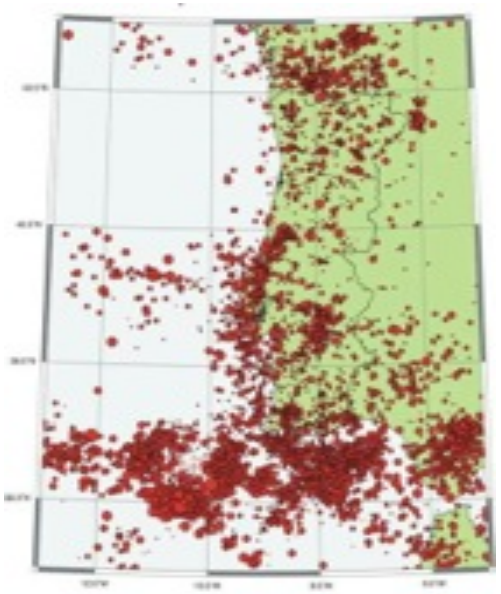
ERSTA - Estudo do Risco Sismico e de Tsunami do Algarve

- Compilation of a wide range of Technical and Scientific outputs resulting from the development of different risk studies.

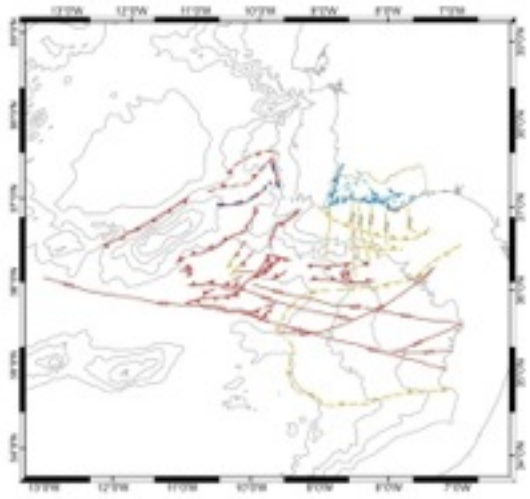
- Development of a based GIS simulator in order to support prevention and intervention planning activities

- Supporting the Special Emergency Planning development (PEERSTA).

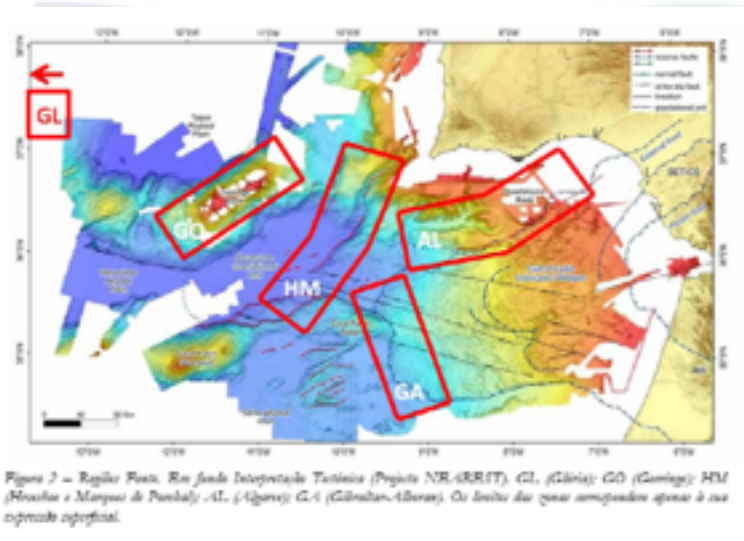
risk assessment



Epicentral map
1961-2007 (IM)



Active faults



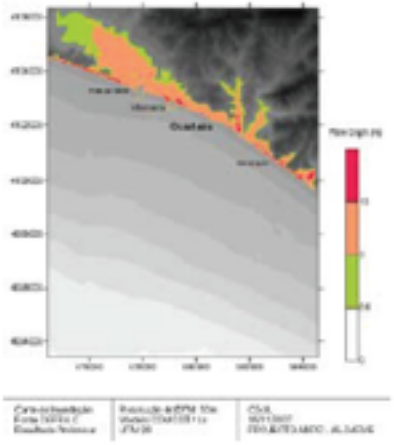
Tsunamigenic regions

Inundation maps

FIGURA 2

A área potencialmente inundada pelo tsunami de 1 de Novembro de 1755

A zona de Quarteira corresponde actualmente a uma zona de elevado risco devido à extensa ocupação urbana. Nas Figuras seguintes apresentam-se cartas preliminares de inundação para estas zonas.



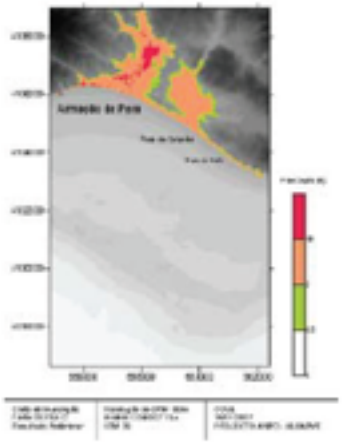


FIGURA 9

Inundação (Flow depth), em metros, para Armação de Pêra.

FIGURA 10

Inundação (Flow Depth), em metros, para Quarteira.

Arrival times

Nas figuras seguintes apresentamos as cinco cartas de tempos de propagação.

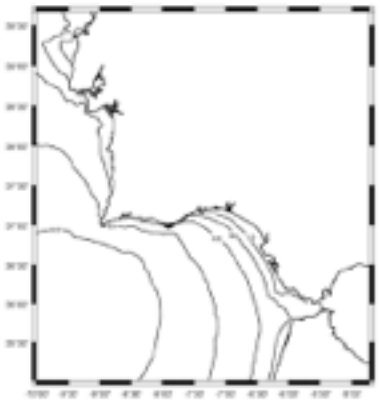


FIGURA 3
Tempos de Chegada para a fonte AC
(Falha Alboran-Cadiz).

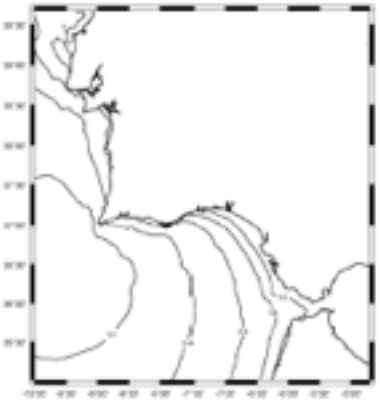


FIGURA 4
Tempos de Chegada para a fonte FF
(Falha da Ferradura).

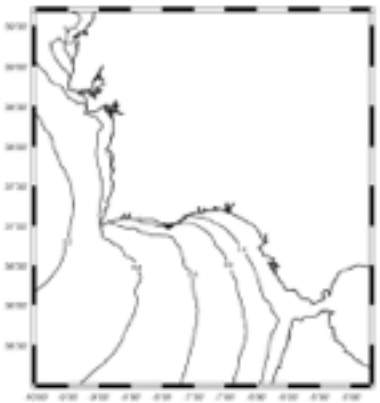
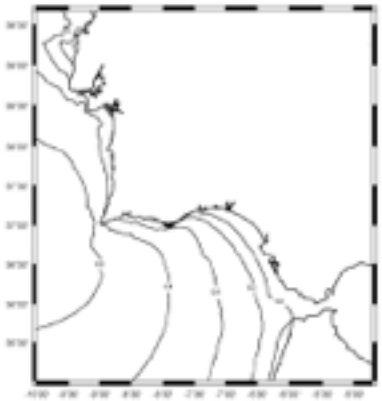


FIGURA 5
Tempos de Chegada para a fonte GN
(Falha Gorringe Norte).



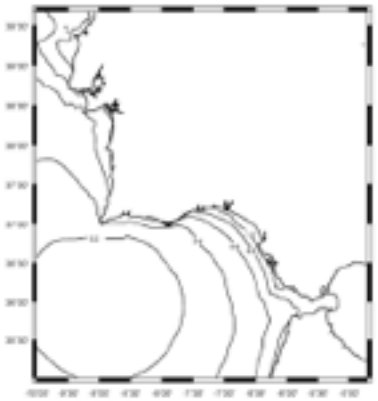


FIGURA 6
Tempos de Chegada para a fonte MP
(Falha do Marques de Pombal).

FIGURA 7
Tempos de Chegada para a fonte FBP
(Falha do Banco de Portimão).

risk assessment

- National Risk Assessment, based in *Risk Assessment and Mapping Guidelines for Disaster*

4.9.2.2 - Grau de gravidade

Para a ocorrência-tipo em análise considerou-se o grau de gravidade crítico, resultante, sobretudo, de um número elevado de mortos, feridos, desaparecidos e deslocados, bem como de uma elevada perda financeira.

Tabela 23 - Grau de gravidade da ocorrência-tipo para tsunamis

Impacto		Classificação	Grau de gravidade
População	• Número muito acentuado de mortos e feridos • Elevado número de deslocados	Crítica	Crítico
Socioeconomia	• Grande número de edifícios destruídos ou severamente danificados	Crítica	
Ambiente	• Destruição ou perturbação grave de importantes habitats marinhos, dunares e lagunares	Acentuada	

4.9.2.3 - Grau de risco

De acordo com a matriz de risco, da combinação dos graus de gravidade e de probabilidade da ocorrência-tipo considerada para a ocorrência-tipo de tsunamis, resulta um grau de risco elevado.

emergency planning

- **National level**
- **District level**
- **Local level**

emergency planning

Plano Nacional de Emergência de Protecção Civil

- **National level**

- available at planos.prociv.pt

emergency planning

Plano Especial de Emergência de Protecção Civil para o Risco Sísmico e de Tsunamis na Região do Algarve

- **Regional level**

available at
planos.prociv.pt

emergency planning

Setúbal municipality

Figure 28: *Marinas and parking places identified in Setúbal that are found within the inundation area of the tsunami hazard scenario (HIDROMOD).*

in: Handbook of Tsunami Hazard and Damage Scenarios

early warning

NEAMTWS

candidate Tsunami Watch Providers (TWP), no accreditation yet

- **CENALT (FR): now issuing messages for Atlantic**
- **IPMA (PT): planning issue at short term**

TNC = Tsunami National Contact
TWFP = Tsunami Warning Focal Point
CTWP = Candidate Tsunami Watch Provider

early warning

NEAMTWS message

Tsunami Watch Initial – Type 1

TSUNAMI MESSAGE NUMBER 001
NEAM REGIONAL TSUNAMI WATCH PROVIDER
ISSUED AT 0947Z 01 NOV 2014

... TSUNAMI WATCH...
THIS ALERT APPLIES TO FRANCE (ATLANTIC) ... IRELAND ... MOROCCO (ATLANTIC) ... PORTUGAL ... SPAIN (ATLANTIC) ... UNITED KINGDOM

... TSUNAMI INFORMATION ...
THIS INFORMATION APPLIES TO ALBANIA ... ALGERIA ... BOSNIA AND HERZEGOVINA ... BULGARIA ... CROATIA ... CYPRUS ... EGYPT ... FRANCE (MEDITERRANEAN) ... GEORGIA ... GREECE ... ISRAEL ... ITALY ... LEBANON ... LIBYA ... MALTA ... MONTENEGRO ... MOROCCO (MEDITERRANEAN) ... PALESTINE ... ROMANIA ... RUSSIA ... SLOVENIA ... SYRIA ... TUNISIA ... TURKEY ... UKRAINE

THIS MESSAGE IS ISSUED AS ADVICE TO GOVERNMENT AGENCIES. ONLY NATIONAL AND LOCAL GOVERNMENT AGENCIES HAVE THE AUTHORITY TO MAKE DECISIONS REGARDING THE OFFICIAL STATE OF ALERT IN THEIR AREA AND ANY ACTIONS TO BE TAKEN IN RESPONSE.

AN EARTHQUAKE HAS OCCURRED WITH THESE PRELIMINARY PARAMETERS
ORIGIN TIME - 0940Z 01 NOV 2014
COORDINATES – 35.90 NORTH 10.22 WEST
DEPTH - 30 KM
LOCATION – SW CAPE SAN VINCENT, PORTUGAL
MAGNITUDE – 8.5

EVALUATION OF TSUNAMI WATCH
IT IS NOT KNOWN THAT A TSUNAMI WAS GENERATED. THIS WATCH IS BASED ONLY ON THE EARTHQUAKE EVALUATION.
AN EARTHQUAKE OF THIS SIZE HAS THE POTENTIAL TO GENERATE A TSUNAMI THAT CAN STRIKE COASTLINES WITH A WAVE HEIGHT GREATER THAN 0.5M AND/OR CAUSE A TSUNAMI RUN-UP GREATER THAN 1M.
AUTHORITIES SHOULD TAKE APPROPRIATE ACTION IN RESPONSE TO THIS POSSIBILITY. THIS CENTER WILL MONITOR SEA LEVEL DATA FROM GAUGES NEAR THE EARTHQUAKE TO DETERMINE IF A TSUNAMI WAS GENERATED AND ESTIMATE THE SEVERITY OF THE THREAT.
A TSUNAMI IS A SERIES OF WAVES AND THE FIRST WAVE MAY NOT BE THE LARGEST. TSUNAMI WAVE HEIGHTS CANNOT BE PREDICTED AND CAN VARY SIGNIFICANTLY ALONG A COAST DUE TO LOCAL EFFECTS. THE TIME FROM ONE TSUNAMI WAVE TO THE NEXT CAN BE FIVE MINUTES TO AN HOUR, AND THE THREAT CAN CONTINUE FOR MANY HOURS AS MULTIPLE WAVES ARRIVE.

EVALUATION OF TSUNAMI INFORMATION

BASED ON HISTORICAL EARTHQUAKE AND TSUNAMI MODELLING THERE IS NO THREAT THAT A TSUNAMI HAS BEEN GENERATED THAT CAN CAUSE DAMAGE OR MAJOR EFFECT IN THE REGION. THIS MESSAGE IS FOR INFORMATION ONLY.

ESTIMATED INITIAL TSUNAMI WAVE ARRIVAL TIMES AT FORECAST POINTS WITHIN THE WATCH AREA ARE GIVEN BELOW. ACTUAL ARRIVAL TIMES MAY DIFFER AND THE INITIAL WAVE MAY NOT BE THE LARGEST. A TSUNAMI IS A SERIES OF WAVES AND THE TIME BETWEEN SUCCESSIVE WAVES CAN BE FIVE MINUTES TO ONE HOUR.
LOCATION, FORECAST POINT COORDINATES, ARRIVAL TIME, ALERT LEVEL (ADVISORY, WATCH)

PORTUGAL - VILA DO BISPO 37.04N 8.89W 0955Z 01 NOV WATCH
PORTUGAL - VILAMOURA 37.07N 8.12W 1009Z 01 NOV WATCH
SPAIN - LA BARROSA 36.37N 6.18W 1006Z 01 NOV WATCH
SPAIN - TORRE DEL PUERCO 36.34N 6.16W 1010Z 01 NOV WATCH
MOROCCO - ASILAH 35.42N 6.07W 1007Z 01 NOV WATCH

MOROCCO - EL BEHARA 34.68N 6.40W 1023Z 01 NOV WATCH
FRANCE - CAPBRETON 43.64N 1.45W 1243Z 01 NOV WATCH
FRANCE - LACANAU 44.98N 1.20W 1254Z 01 NOV WATCH
IRELAND - SCHULL 51.53N 9.59W 1317Z 01 NOV WATCH
IRELAND - TOP CROSS 51.83N 10.17W 1324Z 01 NOV WATCH
UNITED KINGDOM - FALMOUTH 50.14N 5.07W 1417Z 01 NOV WATCH
UNITED KINGDOM - MULLION 50.02N 5.26W 1424Z 01 NOV WATCH

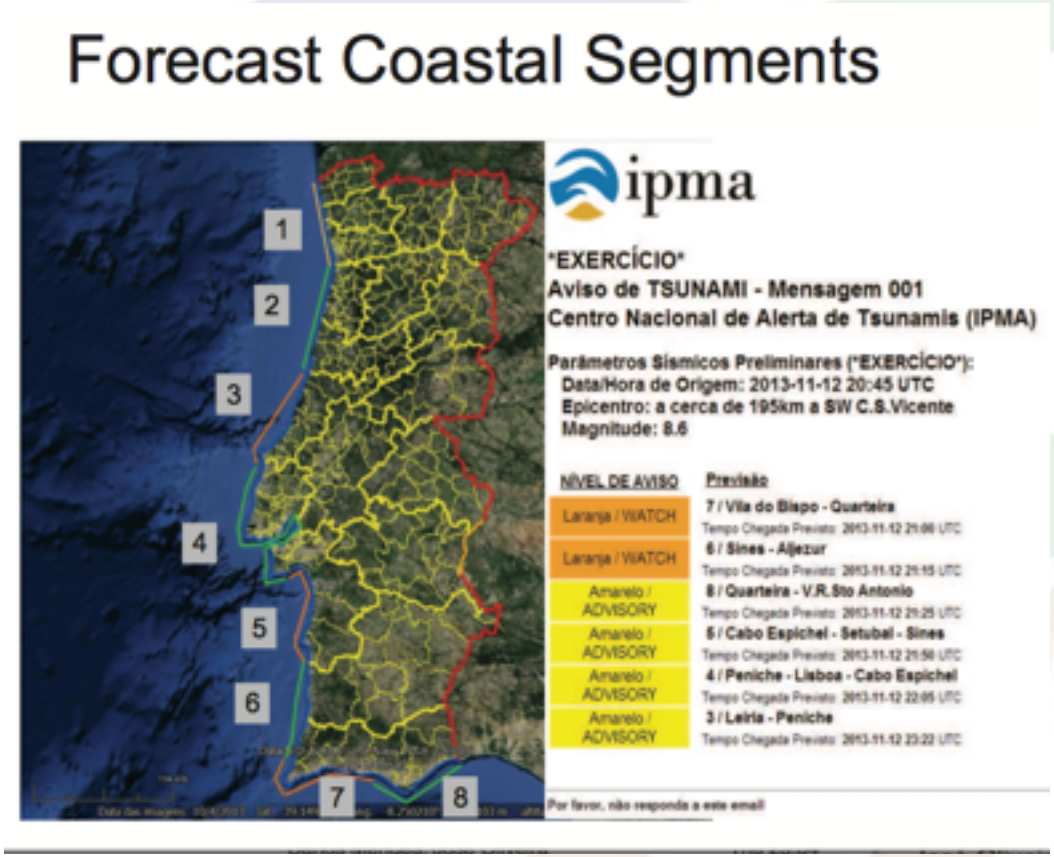
SUPPLEMENT MESSAGES WILL BE ISSUED AS SOON AS NEW DATA AND EVALUATION ALLOWS. THE TSUNAMI ALERT WILL REMAIN IN EFFECT UNTIL AN END OF ALERT IS BROADCAST.

early warning

IPMA - national level

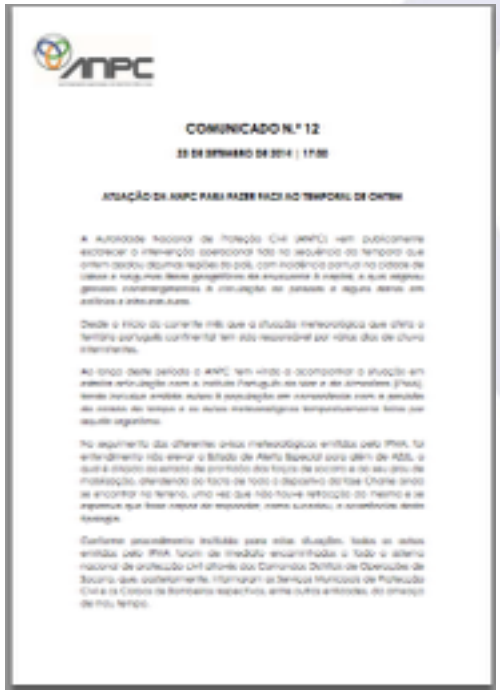
ANPC and IPMA:

Definition and consolidation of national tsunami messages



early warning

- The usual tools?



early warning

Proposal of an Alert and Early Warning National System based on:

- sirens
- protocols with media (TV and radio)

early warning

Challenges:
 -political decision
 -implementation on site: who will pay?

exercises

- Bilateral exercises with CENALT
- NEAMWave’12
- NEAMWave’14

exercises

NEAMWave'14 Main objectives:

- Test communications from national level to municipal level;
- Test messages perception;
- Define actions to implement
- Test international assistance

Response

national level
#international level

National authority

5 regional commands
18 district commands
278 (?) Municipal services

+

Regional autonomies

SIOPS - integrated system for relief operations operations system

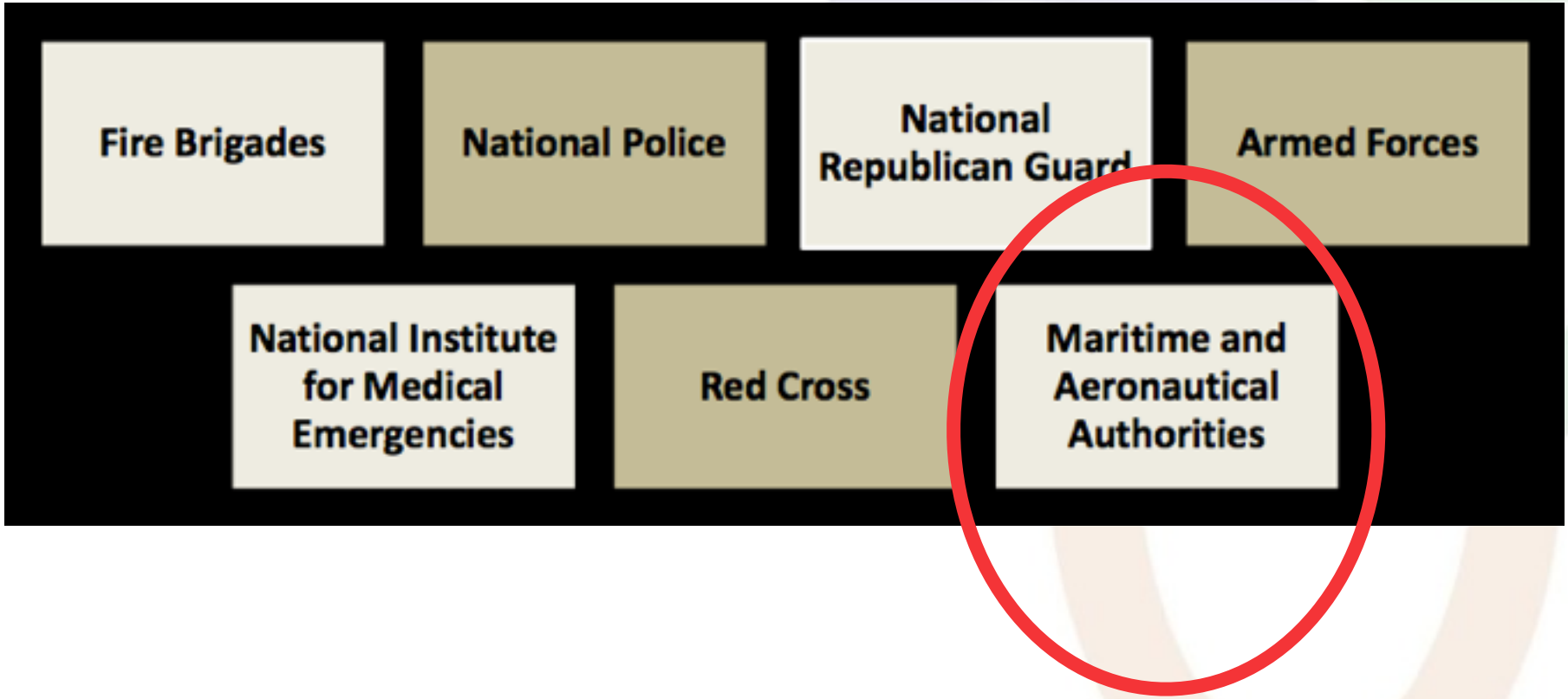
Set of structures, rules and procedures.
Aims to respond to situations of imminent or occurrence of a major accident or catastrophe.
All agents acting at the operational level under a single command, in relief operations

(*in: Decreto - Lei 72/2013*)




SIOPS

Civil Protection Agents



Maritime Authority

SIOPS - Alert levels

Monitoring phase
Routine procedures

Special Alert levels

Reinforcement and increase of the relief operations forces readiness associated with each response mechanisms

The relationship between the probability of an harmful occurrence and its expected consequences determine the activation off a Special Alert Level suitable to relief operations response.

International cooperation

Bilateral

Europe

- **Spain** (1992 and 2003)
- **France** (1995 and 2004)
- **Russia** (1999)

Africa

- **Morocco** (1994)
- **Cape Verde** (1998)

International cooperation

Multilateral

EU

NATO

UN

European Council – Partial Agreement on Major Risks

Ibero-American Association

OIPC – Civil Protection International Organisation

Technical International Committee for Fire

International cooperation

Missions

Next steps

- NEAMWAve14 exercice (2014)
- Manual about tsunami risk (2014)
- Guidelines for evacuation plans (2014)
- Conclusion of tsunami risk maps for mainland coastline (2015)

Challenges

- An operational national tsunami warning centre at short term
- Issuing tsunami messages with expected wave hight
- Raise awareness of political level/ municipalities / population
- Implement an efective early warning system to reach population

El Sistema de Alerta e Aviso para el riesgo de maremotos en Portugal

Actividades de Proteccion Civil

Patrícia Pires

ANPC
AUTORIDADE NACIONAL
DE PROTECÇÃO CIVIL