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ACCORD EUROPÉEN ET MÉDITERRANÉEN SUR LES RISQUES MAJEURS

(EUR-OPA)

PROJECT – BeachRisks (CERU + CEPRIS + ICoD)

Beach and Coastal Resorts Risks

Centro Europeu de Riscos Urbanos Lisboa - Portugal	Centre Euro-Méditerranéen pour l'Evaluation et la Prévention du Risque Sismique Rabat - Maroc	(ICoD) Euro-Mediterranean Centre on Insular Coastal Dynamics Valetta - Malta

Report on BEACHRISKS Final Seminar

Lagos, 12 – 13 September 2019

COORDINATOR: Paula TEVES-COSTA (CERU, Portugal)

PARTICIPANTS: Nacer JABOUR (CEPRIS, Morrocco); Anton Micallef (ICoD, Malta)

CERU – 2019

Introduction

The CERU organized a workshop in Lagos, Algarve (south of Portugal), on the 12 and 13 September 2019, with the support of Lagos municipality.

The workshop was especially devoted to agents of the municipal civil protection services, tourism authorities and operators, as well as general citizens.

The objectives of this workshop were to: (1) present to a broad audience the scope of the BEACHRISKS project; (2) present the state-of-the-art on the Portuguese tsunami warning system, tsunami signalling and awareness activities that are ongoing in Portugal, as well as in the other project partners countries (Morocco and Malta); (3) present other coastal and beach risks important for the touristic population; (4) present the role of different stakeholders facing coastal risks in touristic regions.

The Workshop

This workshop took place in Lagos, on the 12 and 13 September 2019, at the City Council Auditorium. The vice-Mayor of Lagos, Paulo Jorge Correia dos Reis, opened the Seminar. Also invited for the opening ceremony were the coordinators of the three Specialised Centres involved in the project, Anton Micallef (ICoD), Nacer Jabour (CEPRIS) and Paula Teves Costa (CERU).

CERU invited for this workshop representatives of Civil Protection Departments of several Portuguese municipalities (Cascais, Lagos, Albufeira, Portimão Lisboa, Setúbal and Torres Vedras), to present their activities and share their experiences concerning coastal and tsunami risks. Representatives of civil associations, of the institute responsible to form the lifeguards, ISN (*Instituto de Socorro a Náufragos – Portuguese Maritime Authority*), and of the Algarve tourism region (RTA), as well as the Lagos Harbour Master, were also invited.

The workshop was attended by 30 participants. Besides civil protection technicians, professors, researchers, engineers, as other professionals attended the workshop

The program of the workshop, as well as the participants list, are presented in annex.

Following is a briefly summary of the workshop's sessions, focusing on the presented communications. At the end, a section of conclusions and recommendations is presented.

1. Opening Ceremony

The vice-Mayor of Lagos, Paulo Jorge Correia dos Reis, welcomed all participants, highlighting the importance and pleasure of hosting this workshop in his city. Since many years, Lagos municipality has been collaborating and provided support to the projects developed by CERU on seismic and tsunami hazard and risk. Being a municipality where tourism is the main economic activity, the vice-Mayor outlined the importance of addressing tourists and visitors in risk awareness and emergency management.

Anton Micallef, coordinator of the Euro-Mediterranean Centre on Insular Coastal Dynamics, Malta (ICoD), saluted the audience and praised this initiative. Profiting the words of the vice-Mayor, he emphasized the importance of taking into consideration tourists and visitors and emphasized also the importance of the community resilience.

Nacer Jabour, coordinator of the Euro-Mediterranean Centre for Evaluation and Prevention of Seismic Risk (CEPRIS), presented his personal greetings, thanking the invitation of CERU and the Lagos municipality to participate in this workshop.

Paula Teves Costa, CERU's Director, closed the opening ceremony thanking the Lagos municipality for its support, not only for this workshop but also for past CERU projects. She also thanked all entities and persons that will present communications. She mentioned that the present workshop, an activity of BEACHRISKS project, comes after a series of EUR-OPA sponsored projects, VULRESADA, INSPIRED and BAYWATCH. Paula Teves Costa regretted the small audience attending the workshop, particularly from tourism related agents and the general public. Finally, she thanked the vice-Mayor of Lagos for his hospitality, all the people present in the room, and wished to all participants a profitable workshop.

2. Summary of the Workshop's Technical Sessions

Theme 1 – BEACHRISKS Project

Paula Teves Costa presented the project objectives and expected results and deliverables. Outlining the performed activities, Paula Teves Costa mentioned the Cascais Seminar on tsunami risk held the 27th October 2018, attended by 100 participants including hotel and tourism agents, harbour and marine officials, beach concessionaires, lifeguard's association and anonymous citizens, mainly from Cascais County. The opening of the seminar was made by the Mayor of Cascais. One invited presentation was done by Domenico Mangione, from the Italian Civil Protection.

Other Informative sessions/activities for professionals and general public included the Workshop in the Hydrographic Institute (November 2017), the International Day for Disaster (Torres Vedras, Lisbon, Ponte de Lima), and the Risks exhibition in Setúbal Municipality (2017, 2018). CERU participated in Malta workshop on Beach and Coastal Resort Risks (St Julians, Malta, September 2018) and collaborated with the activities promoted by Neptune Serenity National, Association for Drowning Prevention. CERU also participated on activities related with the evocation of the 50th anniversary of the 28th February 1969 earthquake, sponsoring an exhibition that has been displayed in

Torres Vedras, Albufeira, Loulé, and is planned to be shown in Almada, Coimbra, Portimão, Viseu, LAmego and Lisboa. CERU participated, as observer, in the Cascais Civil protection exercise on beach evacuation in case of tsunami alert (June 2019).

Considering informative leaflets on tsunami risk, evacuation routes and other coastal risks, CERU promoted the Leaflet on evacuation routes (in Portuguese and in English) for Praia da Batata (in Lagos), the leaflet (in Portuguese) on tsunami risk, in general, to be distributed in all coastal municipalities (adapted from "A Guide for the Caribbean Adjacent Regions", and a leaflet (in Portuguese and in English) on Beach and Coastal Risks to be distributed in all coastal municipalities.

Ongoing activities by CERU are the Tsunami friendly hotel questionnaire for which there is a continued distribution and collection of replies, the study on the implementation of evacuation routes and signalling in Porto Mós Beach (Lagos). Paula Teves Costa ended her presentation mentioning that, despite the large number of results outlined, there is still a lot of work to do.

Nacer Jabour presented the Tsunami Risk Mitigation in Morocco from Warning to Evacuation. He began by mentioning the large storms that hit the Atlantic coasts of Morocco in November 2018 (7 m high waves near Rabat) that caused noticeable damage but no casualties. The Atlantic coast of Morocco have suffered the effects of several tsunamis in the past, being the largest the 1st November 1755. For this event numerical modelling predicts in Assilah 14 m runup and 150 m inundation distance and the impact on coastal buildings was already evaluated. The same study that considers building vulnerability was also done for Tangiers and Rabat where inundation distance is estimated as 3 km along the river. Inundation depth has been computed also for other coastal communities like in Al Jadida.

In Morocco the sea-level is being monitored in real-time by several coastal tide-gauges belonging to 4 different government and research agencies and institutes. An example of the seismic and sea-level monitoring was given related to the Mw=6.4 event in the Mediterranean that occurred the 25th May 2016. CNRST and ING are operating are preparing a National Tsunami Warning Center and participated in the International Tsunami Exercises preparing and broadcasting messages to the Moroccan authorities.

CEPRIS is promoting the tsunami risk awareness in Morocco with posters and leaflets on French and Arabic and with visits to schools. In 2019 the first beach evacuation exercise was performed with the help of school students in Rabat.

Anton Micallef presented the Tsunami Ready Beach, an Initiative in the Maltese Islands. He began by providing the geomorphic characterization of Malta coastline, with pocket shaped beaches that may amplify the tsunami waves. The rocky coast is also used for bathing, posing also a risk in case of inundation by a tsunami. The Maltese coast is used for fishing but, above all, for coastal tourist resorts that lay very close to the sea and can be easily inundated. In Malta a large number of marinas is also found. In short, the occupation of Maltese coasts shows a large economic vulnerability to the tsunami impact and thus its mitigation calls for strong political engagement. Coastal hazards in Malta include landslides and volcanic and earthquake generated tsunamis, as the history of the Mediterranean recalls.

Next, Anton Micallef presented the workshop held in Malta on Beach and Coastal Resorts Risks, September 2018. Here, the concept of Tsunami Ready Concept was introduced and suggested to be adapted to Beaches and Hotels. There is already some work done on guidelines for Hotels, but none so far for beaches. He mentioned also that "ready" might not be the best word to convey the concept. In Malta it is the national Tourism Authority that has a leading role in beach management and is concerned with beach uses safety. The Blue Flag Eco Label was investigated on the possibility to include some tsunami mitigation actions. The label contains 34 mandatory criteria in 4 main categories, being two of them "safety & services" and "environment information & education". These could be used on behalf of tsunami mitigation.

Regarding the future actions, Anton Micallef mentioned that 2 potential sites for the Tsunami Ready Beach testing, profiting from guidelines already available. One is a rocky beach while the other is a sand beach. Next follows identification of training needs to safety agents and lifeguards and placement of tsunami signals.

During the open discussion of this theme, that included many contributions, some ideas and opinions can be retained:

- Many municipalities do not consider yet the tsunami susceptibility map for urban planning, while a few other already do it under the Municipality Directive Plan.

- Tsunami hazard is seasonal and the municipality emergency planning should consider this characteristic.

- It may be difficult, without proper legislation, to influence the private companies to avoid building in zones at risk, but the public administration should take that into consideration for the public services and that is not seen in many instances.

- In 20 years the awareness of the community to the tsunami risk has changed dramatically and there is no excuse for disregarding the tsunami risk in private and public buildings.

- One problem may arise to the public administration in case of a disaster or damage the owner of the property can demand one indemnity if he was allowed to build on an hazardous area.

Theme 2 - Tsunami Warning Systems, Signalling and Awareness

Frederico Mendes Paula presented the activities on tsunami awareness and preparedness conducted by the Lagos municipality. "Being Aware to Prevent" has been the leitmotiv for the Lagos municipality to engage in a series of projects, the most recent ones in cooperation with CERU and other EUR-OPA centres. The first one was the study "Seismic Risk in Lagos Historical Centre" from 2002 to 2005. It contained an evaluation of the probabilistic earthquake hazard and the soil characterization in terms of seismic amplification. This information was joined to the characterization of the buildings to obtain damage scenarios in case of an earthquake. The first tsunami inundation map of Lagos was also obtained by the project.

In 2012-2013 Lagos participated in the project VULRESADA: Management of coastal areas regarding seismic and tsunami risk: social economic impact evaluating

vulnerability, resilience and adaptation of the cities of Cascais and Lagos, in Portugal, tangiers and M'dieq, in Morocco". This project resulted in an evaluation of the Lagos historical centre built up heritage in terms of earthquake vulnerability, allowing for a definition of policies to mitigate the weaknesses identified.

Considering the need to engage the population to adopt routine procedures to mitigate damages, Lagos municipality participated in the INSPIRED project, involve people in risk reduction inform and involve population in seismic and tsunami risk prevention, to contribute to minimize damages and increase resilience in the cities of Cascais and Lagos, in Portugal, tangier and M'dieq, in Morocco, 2014-2015. Leaflets and an itinerant exhibition were produced as a result of the project, together with an analysis of social vulnerability in the urban limits of Lagos town.

The tsunami signalling of one Lagos beach was performed under the BAYWATCH project, 2016-2017, tsunami risk prevention in hotels and beach concessions. The effectiveness of the tsunami signalling was evaluated by a questionnaire. Another questionnaire to hotels, beach and marina concessionaires was also launched.

Lagos has also a permanent activity "Lear to grow in security" where Civil Protection agents visit schools every year, teaching and performing emergency simulations and exercises.

Paulo Henriques presented the Tsunami Awareness and Alert System in Tagus Estuary and its implementation in Lisbon. The tsunami hazard in Lisbon has been comprehensively investigated culminating in the 2019 study conducted by IPMA, IST and FCUL. This is an innovative study since it includes also de contribution of sea level rise to the inundation hazard. Given that the studies and history show that the risk of inundation of Lisbon by a tsunami is significant, the Lisbon municipality engaged in an European Community funded project addressing the implementation of a tsunami warning and alert system in the Tagus estuary. Ongoing activities include the deployment of a pilot warning system based on sirens (2 already installed) controlled by a central station connected to the tsunami warning system at IPMA; and public awareness raising campaigns. Two interactive information panels and emergency evacuation signs are planned for the near future. The evacuation routes and possible assembly points are already defined.

Carlos Estibeira presented the beach evacuation exercise in Cascais due to tsunami alert. This exercise comes as a natural follow-up of the municipality of Cascais addressing the tsunami risk, namely the evaluation of hazard and the definition of assembly areas and evacuation routes and deployment of 3 alerting sirens. The summary of these activities already informed to the population by leaflets in Portuguese and English. The exercise was conducted as part of a large European Project exercise CASCADE. As a preparation of the evacuation exercise affecting two contiguous beaches the tsunami signals were installed following the ISO 20712-1 recommendations. The size of the signs and its placement high above the ground were chosen so that they could be seen from far away and stand out from the common city signs. The tsunami scenario chosen for the exercise considered that the tsunami waves would arrive short after 11:00 the 31st May, one sunny day and a time when the beach was already used by several sunbathers. The exercise was preceded by a preparatory period that included all concerned agencies and stakeholders, from the Maritime

Authority to the beach concessionaires, bars and restaurants. Frequent beach users were also informed beforehand. At 11:00 the 3 sirens announced the beginning of the evacuation exercise, with loud signals and messages broadcast in Portuguese and English. The evacuation was conducted on the beach by the lifeguards and the Coast Guard that also informed the boats on the Marina facing the beach. Outside the beach evacuation was guided by the Police and municipality Police. At the assembly point the evacuated people were received by the municipality Civil Protection and Fire Brigade.

This exercise allowed the identification of strengths and weaknesses to be addressed in future actions.

As a follow-up and to maintain and improve community awareness the sirens are sounded every 15th day of a month, exactly at 11:00 framed by advertising and awareness activities. The maintenance and rules for activation of the system in a real situation has been the subject of a protocol between the municipality of Cascais and the National Civil Protection Agency. Another follow-up of the exercise has been the identification of areas where the municipality Emergency Plan needs to be updated. More advertising and awareness campaigns are also planned, as well as extending the tsunami signalling and siren coverage to other areas of the municipality. Cascais objective is to cover all coastline with siren alert and tsunami signalling.

Paulo Moleiro da Silva presented the case of Portimão, how the challenges of tsunami early warning and tsunami have been addressed by the municipality. Tsunamis is one of the many hazards and risks for which the Portimão municipality is prepared to address by (among others): i) detailed emergency plans supported on hazard and risk evaluation studies; ii) civil protection and fire brigade teams; iii) expert technical rescue units. The annual budget for civil protection is a little over 1 M€, ~10% of that dedicate to tsunami related activities.

The tsunami warning system that is under implementation in Portimão follows the risk assessment study performed by IST on 2016 that provided maps for the susceptibility of tsunami penetration. In 2016 the first siren was installed following a protocol signed with a private company. 3 more sirens are planned to be installed shortly in Praia da Rocha. The sirens are programmed to broadcast loud signals and voice messages. They are planned to be activated following information from the Portuguese tsunami warning system operated at IPMA. The Portimão alerting system has been advertise publicly by local and national media. A more comprehensive coverage of Portimão and neighbouring beaches will require a total of 7 sirens. The 5th November, the World Tsunami Awareness Day, Portimão will conduct a major drill testing the tsunami evacuation plan.

Work in progress comprises the production of informative products in various languages with orientations for the population and tourists and the development of awareness actions aimed at the population of risk areas and hotels / restaurants. The next step will be installation of universal signals in the areas at risk guiding the population to the safe areas. Also, satellite redundancy for siren activation is planned. Additional information routes, like geographically directed SMS, must be investigated and implemented. Finally, Paulo Moleiro Silva mentioned two very recent governmental resolutions that regulate the tsunami warning signals and the audio siren signals to be used to alert the population at risk.

Frederico Mendes Paula presented the tsunami awareness and signalling situation in Lagos. Due to the shorth time of arrival of a tsunami to Lagos (typically 20 minutes) the population at risk cannot wait for information from the tsunami warning system, they must take action immediately after a strong earthquake is felt. For this to be effective tsunami signalling is essential. It has been designed so that the 12 m elevation is considered as a safe level, based on modelling. First signals were deployed in 2015 and its effectiveness evaluated by a questionnaire in situ in 2016. For the moment only Praia da Batata has tsunami signals, but these are planned to be extended to the other beaches of the municipality on a 2nd phase, except for the Meia Praia beach that must be addressed differently since no natural vertical safe areas are available close by. The deployment of tsunami signals was informed to the general population by information leaflets distributed in Portuguese and English. The self-protection measures, even in the absence of tsunami alerting messages or installed signals, were also informed to the general public, inhabitants, visitors and tourists, on one leaflet, published also in both languages. Regarding the evaluation questionnaire more than 90% of the enquired people found the tsunami signalling useful and that they felt safer for being informed. However, only 17% had identified the evacuation route and meeting point. These contradictory replies maybe a consequence of: i) beaches are "polluted" with emergency information (drowning, Instable cliffs, tsunamis, etc.); ii) beach users are not predisposed to receive information about risks.

During the open discussion of this theme, that included many contributions, some ideas, information and opinions can be retained:

- Cascais experience with a monthly activation of the tsunami warning sirens has been very positive, triggering positive responses from the population. One accidental broadcast of an alert message resulted in a spontaneous beach evacuation by the population and authorities.

- For the siren activation and message contents there is a need for coordination.

- Siren activation should be automatic and triggered by a national authority, which is not the case today. Protocols between the relevant partners are needed. As today, all siren activation is made manually.

- For tsunami hazard, that impacts the coast a few minutes only after the earthquake, the most effective measures are self-protection, for which a continuous program for education and awareness must be conducted.

- The role of the lifeguards is governed by law and only the Maritime Authority and Police have the mandate to evacuate the beach. Lifeguards can make recommendations and help the best self-protection actions by bathers.

Theme 3 – Other Coastal Risks and Emergency Planning

Liliana Oliveira presented the CERU funded leaflet on beach and coastal risks to be published in Portuguese and English. Portugal is one of the most beautiful countries in the world. Its long coastline bathed by the Atlantic Ocean has the most amazing beaches in the world. The purpose was to provide any beach visitor, tourist or local population, with a general guide on the risks that can be found at the beach, to make

their permanence as safe and pleasant as possible. The leaflet addresses Solar Exposure, Unstable cliffs and dunes, Safe swimming areas, Rip Currents, Drowning, Tsunamis, Thunderstorms, Gelatinous organisms, Beach Swim Safety Flags, Alerts and other information.

Helena Rocha presented the Neptune Serenity activities on drowning prevention and signalling knowledge. Neptune Serenity association is responsible and social accountable to contribute to the education and training of drowning prevention, being its aim to change the Portuguese mindset. Drowning prevention begins with promoting swimming competences and is complemented by a correct knowledge of signals. The main product of the association is the "Drowning Prevention Wall" that is distributed to any school willing to participate. The effectiveness of the drowning prevention campaigns has been evaluated by a survey on 30 groups of schools. Addressed subjects were: interdiction to swimming pools; Danger and risks in swimming pools; Recommendations in swimming pools; Swimming not allowed in the beaches; Risk at the beach; organization of beaches; Areas allowed to swim and holding the flag with yellow signage. The estimated population addressed by the survey was nearly 500 000. Some significant results were obtained. Nearly 50% of the surveyed population is convinced that know the signage, while only 20% of the respondents really proved to know it. Best and less known signals were also identified by the survey. Globally, the average level of signal knowledge was bad, with 75% having a negative score (more wrong than right). Surprisingly the degree of knowledge is not different according to age.

The study clearly demonstrates the need for an awareness campaign and information on this signage. This degree of poor knowledge will affect the behaviour and attitudes in and around water in future bathing seasons and out of the bathing season in Portugal and around the world, posing a serious health and life risk.

Leonor Teixeira presented the awareness campaigns conducted by the Albufeira municipality on the cliff rock fall hazard. Leonor began by a presentation of the Albufeira municipality and its coastline and beaches. Considering the several hazards that may impact Albufeira, cliff rock fall is evaluated as Medium with a return period of 25 to 50 years. Typically, one rock fall can cause 6 to 20 victims and potential damage to property up to 200 k€. The susceptibility of the coast to rock fall was already evaluated and mapped in the whole municipality. The tragedy in Maria Luisa beach, the 21st august 2009 was remembered as the event to be avoided. Mitigation measures comprise warning signalling and awareness campaigns. These are conducted on site by volunteers guided by Civil Protection agents, bathers are informed of the risks and leaflets are distributed. In 9 years (2010-2018) a total of 80 000 people is estimated to have been informed by these campaigns. Experience have shown that, despite all the warnings and campaigns, bathers insist on placing themselves at risk. However, this behaviour should not discourage the continued awareness activities.

Nuno Sousa presented the planning support to population in disaster situation in Setúbal municipality. Topics addressed in the presentation were emergencies, disasters, catastrophes, security and planning. Security is a primary condition that allows freedom of choice, in the absence of threats, for actions that guarantee a favourable survival. Emergency planning is the critical path to community

preparedness. It is a process achieved through consultation, equipping, training, exercises, and critiques. Key words in the planning process are: Risks / Threats; Uncertainty; Information; Knowledge; Legal Framework; Mandate; Leadership; Organization; Policies; Strategy; Plans; Process; Resources; Teams. In Setúbal, the designed support area is located in Parque Sant'iago and its use was tested by the SETLOG exercise in 2015. Another exercise mentioned was the MITREX 2018 where the emergency situation was caused by an industrial accident in Mitrena.

Pedro Rios from PAFO made a presentation on Emergency Assistance. PAFO is an association for the prevention against incidents, accidents and disasters in the Portuguese speaking countries. The leitmotiv is to stay always ahead of disaster. One of the main goals is to promote the participation of civil society in the definition and adequacy of concepts and or technical and or scientific matters. Better safe than sorry. Are you ready? The most common incidents and accidents concerned are: Rip Currents; Shore break; Lightning; Tsunamis; Jellyfish stings, shark attacks (wildlife); Heat (heat stocks) and Sunburn; HAB's Harmful Algal Blooms (Red Tides); Water Quality; Maritime Debris; Dehydration; Pollution; High Winds; Falling Coconuts; Stingrays; Drowning.

Theme 4 – Risks in touristic regions – the role of different agents

1st Lieutenant Henrique Pombo presented the role of the National Maritime Authority on risk and emergency preparedness. The area of responsibility of the NMA includes beach areas, sea areas, rocky areas, port areas and river areas. Many of these domains are very attractive to tourism, sports and economical activities, comprising very densely populated regions subject to several risks coming from the sea but also from land. The safeguard of life at sea is just one of the many responsibilities of the NMA. In NMA organization, the Harbour Master is the local maritime authority responsible for exercising State authority, namely concerning the inspection policing and security of navigation people and goods in their respective area of jurisdiction. In emergency operations, there is a close cooperation between the NMA and Civil Protection defined by law. Next, 1st Lieutenant Henrique Pombo presented a brief history of the ISN (the Portuguese Lifesaving Institute) and its role as the technical and regulatory body to maritime rescue and assistance to bathers. One of the roles is to certify Lifeguard schools and respective courses, and to certify Lifeguards and issue the respective professional card. For example, in 2019 2290 lifeguard exams were performed by the ISN resulting the 1851 lifeguards certified.

In summary, the National Maritime Authority has responsibilities regarding the safety and security of citizens in the sea and in the Public Maritime Domain which includes the beaches. The Local Maritime Authority has the Relief Operations Commander duties within its jurisdiction. During the bathing season, Lifeguards and Navy military personnel performing duties in coastal areas, can be a good help in response to tsunamis or other emergencies. The crew members from the Lifeguard Stations can also cooperate in actions of this nature. Lifeguard training should include some information on response to Beach Risks (Lifeguard manual update).

Luís Segura presented the Beach and Coastal Resorts Risks as seen from the Algarve Tourism Region (RTA). RTA recognizes that the coastal area of the Algarve houses the

great majority of the population as well as the largest bulk of its economic activity, so it must be considered as a risk zone. Tourism in Portugal is one of the most important economic activities, bringing more than 1 000 M€ in revenue. Tourists and visitors in Algarve are a major component of the present population at any time and not only during the summer. The seismic and tsunami risks are known from published research studies that include the vulnerability of buildings and infrastructures.

Luís Segura next mentioned an investigation on risk perception produced by the University of Coimbra where 14% of the inquires in Algarve considered the risk as "great" while 7% considered it "high". Most of inquires considered that information on tsunami at the beach or in tourist areas is "important" or "very important". The need for a tsunami alarm system was considered even more "important" or "very important". However, tsunamis come last on a 28 possible risk occurrence list. 89% answered not knowing the possibility of their area being hit by a tsunami while 95% answered that never adopted measures of protection against being hit by a tsunami.

During the open discussion of themes 3 and 4, that included many contributions, some ideas, information and opinions can be retained:

- By a very recent national law, most of the responsibilities and attributions that the National Maritime Authority had on the beach were transferred to the municipalities. The transition period ending in 2020.

- Cliff rock fall is closely related to coastal erosion enhanced by the rise of sea level due to climate change. The retreat of the coast is posing many houses and infrastructures at risk and legal actions may be expected if new buildings are allowed on areas at risk. Municipalities and concerned authorities must proceed with extreme care.

Round Table and General Discussion

Discussion was performed among the participants in order to identify the main conclusions.

Anton Micallef praised the broad scope of subjects addressed, not only tsunamis. Everything is related when mitigation of beach risks is the main goal. There are gaps in risk perception that must be addressed. In Portugal, when compared to other countries, there seems to be a good cooperation between the different concerned agencies. He is proud of the Portuguese accomplishments so far. It is essential that lifeguards receive training on the tsunami risk. In many countries, lifeguards are considered Civil Protection agents and they are the first on the beach in case of an event. Marinas need also to be addressed in awareness and mitigation campaigns to avoid panic and conduct proper evacuation.

Paula Teves Costa the large progress in addressing beach and coastal risks seen in Portugal for the last years. However, only a small number of coastal municipalities are taking actions. More involvement is needed for the future. As the presentations on the BEACHRISKS project showed, there is still a lot to do.

Nacer Jabour was impressed, and saluted, the great work done by the municipalities present at the workshop. They provide lessons to the other municipalities. Portugal can also profit from lessons from other ocean basins like the Indian and Pacific oceans.

There is a need to consider on the beach also the secondary effects of an earthquake and tsunami, like rock falls or resonance in harbours. He remembered that the next 5th November will be the World Tsunami Awareness day that will be celebrated in Morocco by a workshop. Self-protection measures following any of a tsunami sign must be promoted. The tsunami warning system must wait for the earthquake analysis before issuing the 1st message, being the 2nd message broadcast only after confirmation of the tsunami arrived at some point of the coast.

Carlos Estibeira saluted the very important exchange of experiences that the workshop allowed. Considerable advances have been done in Portugal that must be valued at the European and Worldwide levels. Self-protection measures in case of a tsunami are likely the most effective mitigation measures and its promotion is a task that needs to be continued and improved. This workshop was considered as very valuable for those purposes with many lessons learned like “who is who”. He noted that the Cascais drill was the natural follow-up of the municipality and Civil Protection activities. It involved a considerable preparation effort involving all concerned parties that sited at the same table. There were some difficulties like the weather forecast, engaging people to help at the beach that included more than 100 municipality fonctionnaires that didn’t work that morning. Today, there are a few municipalities that operate warning sirens but in the future there is the need to agree that some National Authority has the authority to push de button.

1st Lieutenant Henrique Pombo informed that the AMN, with the help of experts, is undergoing a revision of the training manual for lifeguards that will include the tsunami risk, among others, and how to respond to them. By law, LG training and responsibilities are restricted to the water, not to the beach. He pointed that the experience obtained in the workshop will be transferred to ISN and LG trainers.

Leonor Teixeira emphasized the need to involve all economic agents working in the coastline in all risk assessment and management activities, in additional to the general population, visitors and tourists.

Pedro Rios gave the example of the European Association of Firefighters as providing one international network for experience exchange, being the national language the most common difficulty found. One of the outcomes has been the SAFE Hotel project, already concluded. In his opinion, between economics and human life, human life comes first.

Frederico Mendes Paula mentioned that, not discounting the global view, it is the local authorities, municipalities (7 attending the workshop) that play the essential role in the preparation for the next event. Cooperation between stakeholders is important and, as an example, he mentioned the protocol to be signed between CERU and the Portuguese Association of Municipalities with Historical Centres, currently with 94 members.

From the audience, several participants emphasized the importance of the workshop in sharing experiences and best practices between Civil Protection agents and between CP and science experts. Torres Vedras municipality offered its facilities as the venue for a future workshop. Cascais CP offers training on coastal risks.

One member of the audience mentioned the importance of politicians to be aware of the work that has been done so far, in the light of the new responsibilities the municipalities will receive for the management and safety of the coast. Schools have been correctly used as the main target for awareness campaigns by Civil Protection authorities, but CP should be also included in the school curricula.

Paulo Henriques mentioned that the Civil Protection paradigm is changing, being today more knowledge based. Early warning systems, for all risks, need more than sirens, like geographically located SMS, as has been used for forest fires. Smartphone apps is another technological development to be explored.

Regarding sirens, they are not installed in Malta yet. In Morocco there are sirens operated by the fire brigades, but they haven't been used for tsunami drills yet.

Mónica Araújo (Cascais) mentioned the importance of sharing best practices to save time in establishing awareness and mitigation measures. New and great ideas arise from teamwork. Cascais offers their Civil Protection School to host training actions for CP and tourism operators.

Lagos CP mentioned the importance of regulations to the tsunami signalling and siren sounds.

Paula Teves Costa mentioned the tasks ahead for the near future: implement the Tsunami Ready Beach program; homogenization of tsunami signals; organize seminars specially addressed to hotels (learning the risks and safety measures); provide information to tourists to be available in Hotels and Tourism offices; engage all stakeholders like beach concessionaires and marinas; training of lifeguards. The role/responsibilities of lifeguards need to be clarified. They must be trained to provide advice to bathers in case tsunami signals are recognized.

Conclusions and Recommendations

Conclusions and Recommendations resulted from the contribution of several participants

Conclusions

- The workshop was very important by the experiences, methodologies, best practices, exchanged between Civil Protection agents of coastal municipalities concerned with the mitigation of the tsunami risk and by the expert contribution from abroad (Morroco and Malta)
- It was also was very important for the self-motivation of the people involved in addressing the mitigation of coastal risks
- Coastal risks are very diverse, complex, and many need to be addressed jointly
- Risk signalling at the beach and risk information is essential but an agreement on the language must be reached

- Coordination is needed between all partners, agencies, authorities, stakeholders
- Urban planning must be side-by-side with risk assessment
- The economic agents must be involved in all phases of coastal risk management
- There is a continued need to inform and train the population, considering that in Algarve a large number of non-residents is present at any time
- Self-protection is essential. People must know how to react without external aid
- Some municipalities showed their willingness to participate in future activities, particularly the Tsunami Ready Beach, already proposing one Hotel for testing.
- Unfortunately, the workshop didn't reach the attendance objectives, particularly from tourism related agents and the general public.

Recommendations

- A more anticipated and broader announcement of the workshop is recommended to attain a larger audience from tourism operators, Civil Protection authorities and other stakeholders
- To organize one workshop dedicated to Civil Protection agents with the purpose to share and homogenise procedures, signals and learn from best practices
- To organize one workshop dedicated to Tourism operators, Hotel managers, security and safety officers and authorities to inform on the risks and safety measures

Closure

Paula Teves Costa thanked to all participants and informed on the next CERU workshops organization. One will be dedicated to Civil Protection agents, for discussion on the homogenization of tsunami and evacuation signalling, that will be hosted by Torres Vedras municipality, and other addressing hotels responsible , to increase theis awareness on risks and to encourage the implementation of signalling and to inform on safety and emergency measures, that will be hosted by Albufeira Municipal Civil Protection.

Regards training, the next efforts will address marinas, owners and users, to provide guidance on tsunami emergency measures and mitigation.

Taking profit of the presence of the CERU's Director, Paula Teves Costa, in Lagos, a protocol between the Portuguese Association of the Municipalities with Historical Centres, represented by its president the Mayor of Lagos, Hugo Pereira, and the CERU was signed. This protocol concerns the collaboration of the two institutions on the

developments of studies and activities with the objective to mitigate risks on urban historical centres.

Visit to Praia da Batata tsunami signalling

After the end closure ceremony all participants went to visit Para da Batata tsunami signalling. Frederico Paula conducted the visit.

Most discussed issue was the location and visibility of the signs. As natural, the signs are not visible from all places in the beach. The need to adequately inform vacationers, people in the beach, as well as concessionaires was also highlighted.

It was emphasized and praised that these signs had been in place for over 4 years and that they had not been subjected to acts of vandalism (one of the concerns of the local authorities).

Annexes

- **Seminar Program**
- **Participants list**
- **Some photos of the Seminar**

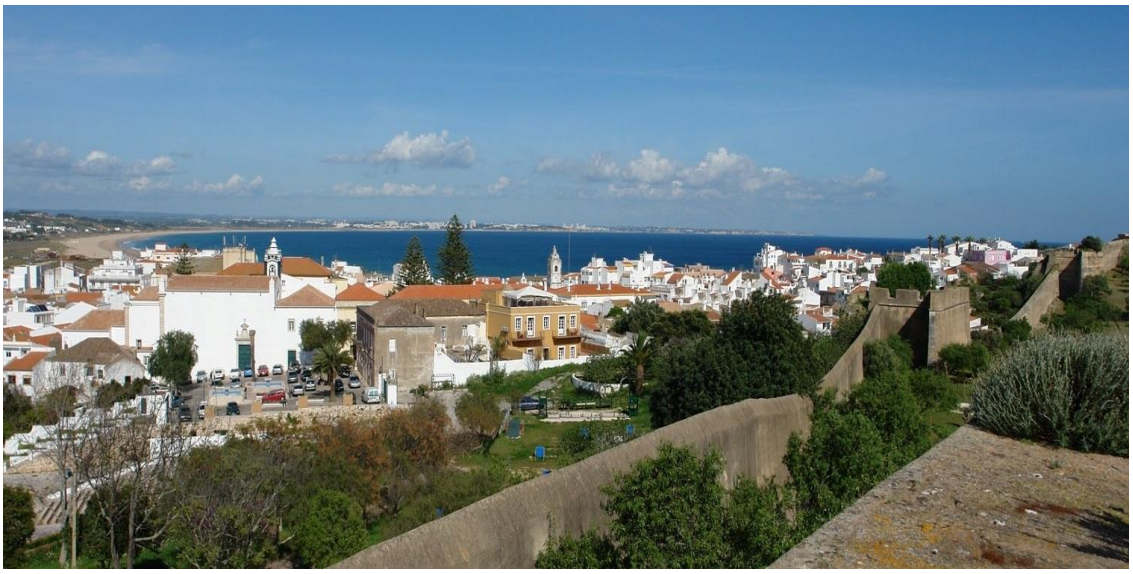
PROJECT BEACHRISKS

WORKSHOP ON BEACH AND COASTAL RESORTS RISKS

CENTRO EUROPEU DE RISCOS URBANOS. LISBOA, PORTUGAL (CERU)

CENTRE EURO-MÉDITERRANÉEN POUR L'ÉVALUATION ET LA PRÉVENTION DU RISQUE SISMIQUE RABAT, MAROC (CEPRIS)

EURO-MEDITERRANEAN CENTRE ON INSULAR COASTAL DYNAMICS. MALTA (ICoD)



CÂMARA MUNICIPAL DE LAGOS AUDITORIUM

12 and 13 September 2019

SPONSOR

CÂMARA MUNICIPAL DE LAGOS

AGENDA MEETING

Thursday, 12th September

09:30 - REGISTRATION

10:00 - OPENING SESSION

Paulo Jorge Reis (Vice-president of Lagos Municipality)
Anton Micallef (ICoD)
Nacer Jabour (CEPRIS Director)
Paula Teves Costa (CERU Director)

10:40 - THEME 1. BEACHRISKS PROJECT
Moderator: Frederico Mendes Paula (Lagos Municipality)

10:40 - BEACHRISKS PROJECT – PRESENTATION AND IMPLEMENTATION IN PORTUGAL
PROJETO BEACHRISKS – OBJECTIVOS E RESULTADOS ESPERADOS
Paula Teves Costa (CERU)

11:10 - COFFEE BREAK

11:10 - THEME 1. BEACHRISKS PROJECT (CONT.)
Moderator: Frederico Mendes Paula (Lagos Municipality)

11:40 - TSUNAMI RISK MITIGATION IN MOROCCO FROM WARNING TO EVACUATION
Jabour Nacer (CEPRIS)

12:00 - PILOT TSUNAMI READY BEACH INITIATIVE IN MALTA
Anton Micallef (ICoD)

12:20 - DISCUSSION ON THEME 1

13:00 - LUNCH BREAK

14.30 - THEME 2. TSUNAMI WARNING SYSTEMS, SIGNALLING AND AWARENESS
Moderator: Luis Matias (CERU & IDL-FCUL)

14:30 - TSUNAMI RISK - AWARENESS AND PREPAREDNESS IN LAGOS
RISCO DE TSUNAMI – SENSIBILIZAÇÃO E PREPARAÇÃO EM LAGOS
Frederico Mendes Paula (Lagos Municipality)

14:50 - TSUNAMI AWARENESS AND ALERT SYSTEM IN TAGUS ESTUARY: IMPLEMENTATION IN LISBON

SISTEMA DE AVISO E ALERTA DE TSUNAMI NO ESTUÁRIO DO TEJO: IMPLEMENTAÇÃO EM LISBOA
Paulo Henriques (Lisboa Municipality)

15:10 - CIVIL PROTECTION EXERCISE
BEACH EVACUATION IN CASCAIS DUE TO TSUNAMI ALERT
EXERCÍCIO DE PROTEÇÃO CIVIL
EVACUAÇÃO DE DUAS PRAIAS EM CASCAIS DEVIDO A ALERTA DE TSUNAMI
Carlos Estibeira (Cascais Municipality)

15:30 - COFFEE BREAK

16.10 - THEME 2. TSUNAMI WARNING SYSTEMS, SIGNALLING AND AWARENESS (CONT.)
Moderator: Luis Matias (CERU & IDL-FCUL)

16:10 - THE CHALLENGE OF TSUNAMI WARNING
O DESAFIO DO AVISO EM CASO DE TSUNAMI
Paulo Moleiro da Silva (Portimão Municipality)

16:30 - TSUNAMI AWARENESS AND SIGNALLING IN LAGOS
SINALÉTICA DE AVISO DE TSUNAMI EM LAGOS
Frederico Mendes Paula (Lagos Municipality)

17:00 - DISCUSSION ON THEME 2

Friday, 13th September

09:10 - THEME 3. OTHER COASTAL RISKS AND EMERGENCY PLANNING
Moderator: Paula Teves Costa (CERU)

09:10 - BEACH AND COASTAL RISKS (CERU LEAFLET)
RISCOS COSTEIROS E NA PRAIA
Liliana Oliveira (CERU)

09:30 - DROWNING PREVENTION – SIGNALLING KNOWLEDGE
PREVENÇÃO DO AFOGAMENTO – O CONHECIMENTO DA SINALÉTICA
Helena A. Rocha, Pedro Cruz, Olga Marques & José Palácios (Neptune Serinity – Associação de Prevenção do Afogamento)

09:50 - AÇÕES DE SENSIBILIZAÇÃO SOBRE O PERIGO DAS ARRIBAS
Leonor Teixeira (Albufeira Municipality)

10:10 - PLANNING SUPPORT TO POPULATION IN DISASTER SITUATION
PLANEAMENTO DO APOIO À POPULAÇÃO EM SITUAÇÃO DE CATÁSTROFE
Nuno Sousa (Setúbal Municipality)

10:30 - COFFEE BREAK

11:10 - EMERGENCY ASSISTANCE

ASSISTÊNCIA NA EMERGÊNCIA
Pedro Rios (President of Portuguese Association of Fire Officers – PAFO, *Associação Lusófona de Prevenção a Incidentes, Acidentes e Desastres*)

11:30 - THEME 4. RISKS IN TOURISTIC REGIONS – THE ROLE OF DIFFERENT AGENTS
Moderator: Filipe Machado Dias (Torres Vedras Municipality)

11:30 - THE ROLE OF THE NATIONAL MARITIME AUTHORITY ON RISK AND EMERGENCY PREPAREDNESS
João Filipe Henriques Pombo (ISN / AMN – National Maritime Authority)

11:50 – RISKS IN TOURISTIC REGIONS
Luís Segura (Região de Turismo do Algarve – RTA)

12:10 - DISCUSSION ON THEMES 3 and 4

12:40 - LUNCH BREAK

14:00 - GENERAL DISCUSSION AND CONCLUSIONS(Round Table)
Moderator and reporter: Luis Matias (CERU & IDL-FCUL)

Paula Teves Costa (CERU & IDL-FCUL)
Anton Micaleff (ICoD)
Nacer Jabour (CEPRIS)
Frederico Mendes Paula (Lagos Municipality)
Carlos Estibeira (Cascais Municipality)
João Filipe Henriques Pombo (ISN)
Luís Segura (Região de Turismo do Algarve – RTA)

16:00 - SIGNATURE OF PROTOCOL BETWEEN CENTRO EUROPEU DE RISCOS URBANOS and ASSOCIAÇÃO PORTUGUESA DOS MUNICÍPIOS COM CENTRO HISTORICO

16:10 - FAREWELL MESSAGE

Hugo Pereira (Mayor of Lagos)
Paula Teves Costa (CERU Director)

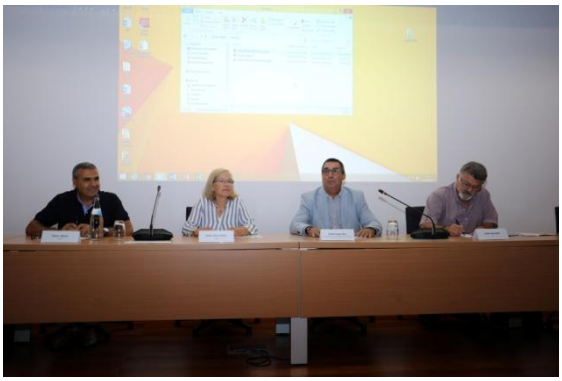
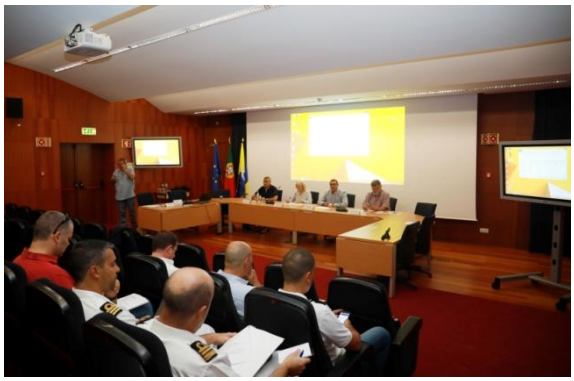
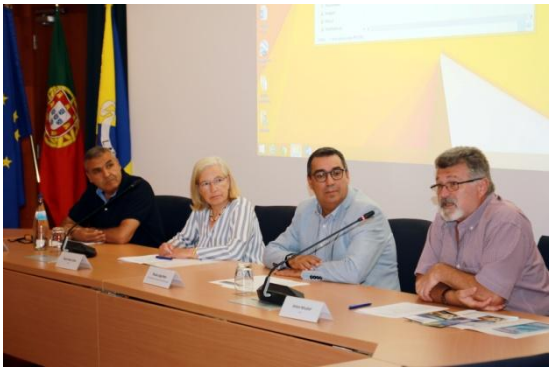
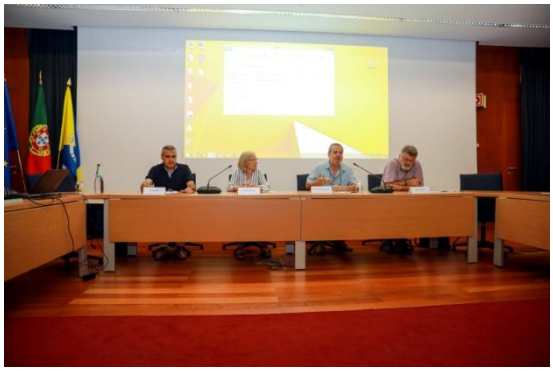
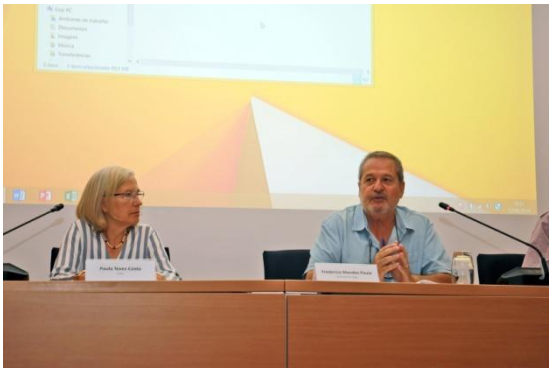
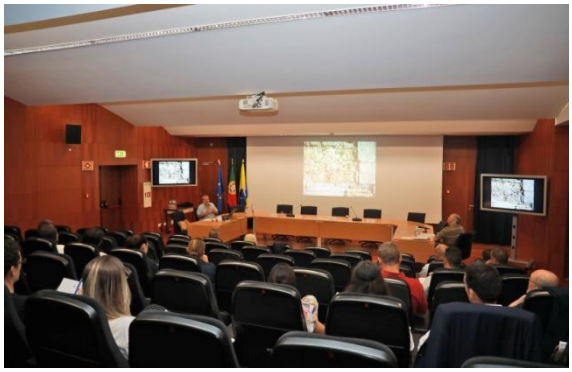
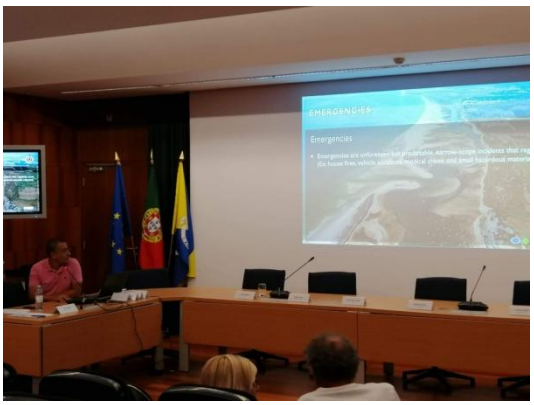
17:00 - VISIT TO PRAIA DA BATATA EMERGENCY SIGNPOSTING
Frederico Mendes Paula (Lagos Municipality)

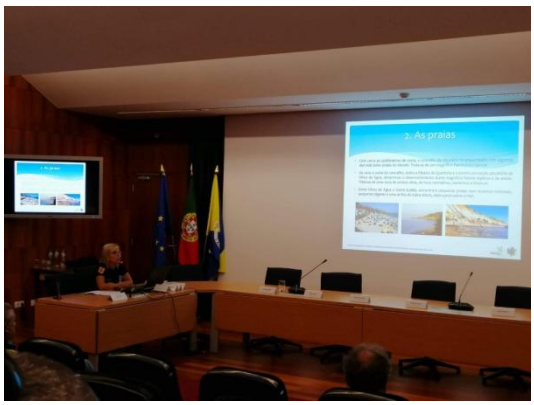
20:00 - WORKSHOP DINNER

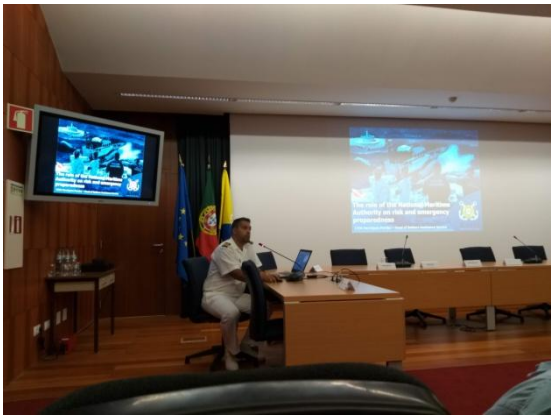
Participants List

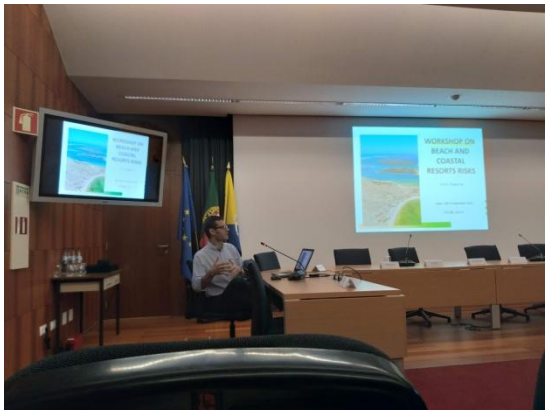
Anthony Stephen Micallef	Euro-Mediterranean Centre on Insular Coastal Dynamics (ICoD) - Director (Valleta - Malta)
Carlos Estibeira	Chefe de Divisão - SMPC Cascais
Luis Duarte	Capitão-de-Fragata, Capitania do Porto de Lagos
Filipe Jorge	Arquitecto (Argumentum)
Filipe Lendeiro	Técnico de Proteção Civil - SMPC Lagos
Filipe Machado Dias	Técnico de Proteção Civil - SMPC Torres Vedras
Frederico Mendes Paula	Arquitecto - CM Lagos
Helena Amaral Rocha	Professora Natação (Un. Lusíada & Esc. Laranjeiras)
João Pombo	Militar da Marinha - Instituto de Socorros a Náufragos
José Jácome	Solicitador & Membro da Ass. Municipal de Lagos
Lara Sá	Geóloga - SMPC Cascais
Leonor Teixeira	Coordenadora do SMPC - Albufeira
Liliana Oliveira	Investigadora CERU
Luis de Abreu	Professor (aposentado)
Luis Manuel Marques Matias	Investigador/ Professor - CERU & IDL (FCUL)
Luís Segura	Planeamento (Região de Turismo do Algarve)
Maria Helena Simão	CM Loulé (Técnica Superior)
Miguel Paixão	Eng. Proteção Civil - CM Albufeira
Mónica Araújo	Coordenadora Municipal de Proteção Civil - Cascais
Nacer Jabour	Coord. CEPRIS (Centre Euro-Méditerranéen pour l'Évaluation et la Prévention du Risque Sismique), Rabat - Morocco
Nuno Sousa	Bombeiro Municipal (Serviço Municipal de Protecção Civil - CM Setúbal)
Óscar da Encarnação	Técnico de Proteção Civil - SMPC Albufeira
Patricia Gavina	Marlagos (Técnica Superior de Segurança e Higiene no Trabalho)
Patricia Pacheco	Técnica de Proteção Civil - SMPC Lagos
Paula Teves Costa	CERU (Presidente) & IDL (FCUL)
Paulo Henriques	Geólogo - SMPC Lisboa
Paulo Jorge Reis	Vereador da Protecção Civil - CM Lagos
Paulo Moleiro da Silva	Adj. Comando de Bombeiros (Serviço Municipal de Protecção Civil - Portimão)
Pedro Rios	Associação Lusófona de Prevenção de Incidentes Acidentes e Desastres
Rui Graça	Coordenador Municipal de Proteção Civil - Faro
Telma Guerreiro	Técnica de Proteção Civil - SMPC Loulé

Seminar Photos






WORKSHOP ON
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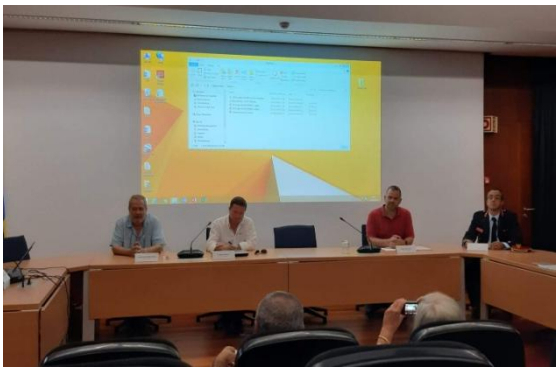

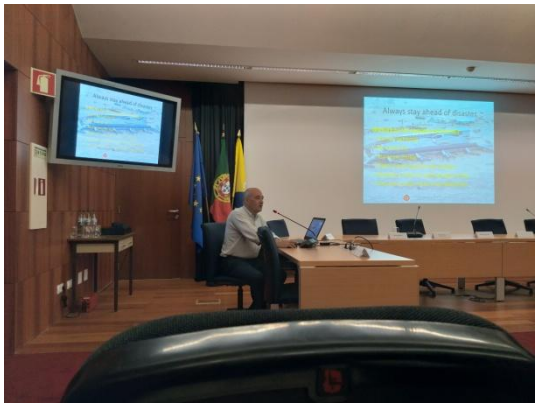
Always stay ahead of disaster