Assessment, Strategy And Risk Reduction for Tsunamis in Europe

Collaborative Project 603839 FP7-ENV2013 6.4-3

Total Cost: 7,884,882.47

EC Contribution: 5,999,677.80

Duration: 3 years (2013-2016)

Start Date: 01 November 2013

Consortium:26 partners, from 16 countries

Project Coordinator: Maria Ana Baptista

Leading Institution: Instituto Português do Mar e da Atmosfera, IPMA

Project Web Site: www.astarte-project.eu

Key Words: Tsunamis; social resilience; early warning; coastal impacts; structural performance; source mechanisms

THE CHALLENGE

Tsunamis are low frequency but high impact natural disasters. In 2004, the Boxing Day tsunami killed hundreds of thousands of people from many nations along the coastlines of the Indian Ocean. Tsunami run-up exceeded 35 m.

THE CHALLENGE

Seven years later, and in spite of some of the best warning technologies and levels of preparedness in the world, the Tohoku-Oki tsunami in Japan dramatically showed the limitations of scientific knowledge on tsunami sources, coastal impacts and mitigation measures.

THE CHALLENGE

The experience from Japan raised serious questions:

- How to improve the resilience of coastal communities ?
- How to upgrade the performance of coastal defenses ?
- How to adopt a better risk management ?
- What are the strategies and priorities for the reconstruction of damaged coastal areas?

THE CHALLENGE

After the Indian Ocean tsunami the Intergovernmental Oceanographic Commission established the Intergovernmental Coordination Groups to implement a Global Tsunami Warning System.

The Group for the Tsunami Early Warning System in the North-eastern Atlantic, the Mediterranean and connected seas NEAMTWS was formed in 2005.

The ASTARTE consortium was built in close collaboration with the operational institutions of the NEAM region.

THE CONSORTIUM

The ASTARTE Consortium consists of research groups that contributed to the progress of tsunami science and technology in Europe and the five Tsunami Watch Providers (CTWP) in the NEAM region.

Tsunami Watch Providers (TWPs) are accredited centers that disseminate tsunami alert messages to other Member States

There are currently 5 CTWPs: France, Greece and Turkey already in operation
and two future centers in Portugal and Italy

NEAMTWS Member States, National Tsunami Warning Centres and Tsunami Watch Providers

THE OBJECTIVES

- To asses long term recurrence of tsunamis;
- To improve the identification of tsunami generation mechanisms;
- To develop new cost-effective computational tools for hazard assessment;
- To ameliorate the understanding of tsunami interactions with coastal structures;
- To enhance tsunami detection, forecast and early warning skills in the NEAM region;
- To establishing new approaches to quantify vulnerability and risk

- **The ultimate goal of ASTARTE is to reach a higher level of tsunami resilience in the NEAM region!**

METHODOLOGY

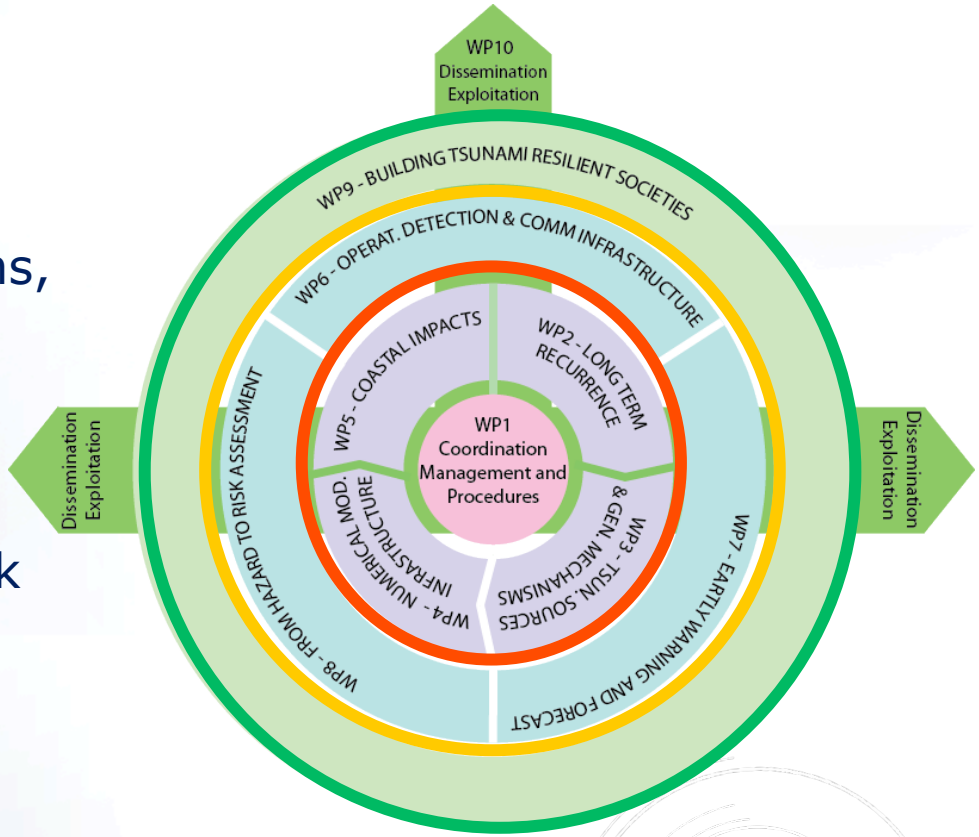
WP1 is devoted to Project coordination and management

WPs 2-5 focus on tsunami recurrence, generation mechanisms, numerical modeling and coastal impacts

WPs 6-8 focus on detection and communication infrastructures, early warning and forecast and risk assessment

WP9 aims at building tsunami resilient societies in Europe

WP10 is devoted to dissemination and exploitation of results.



TEST SITES

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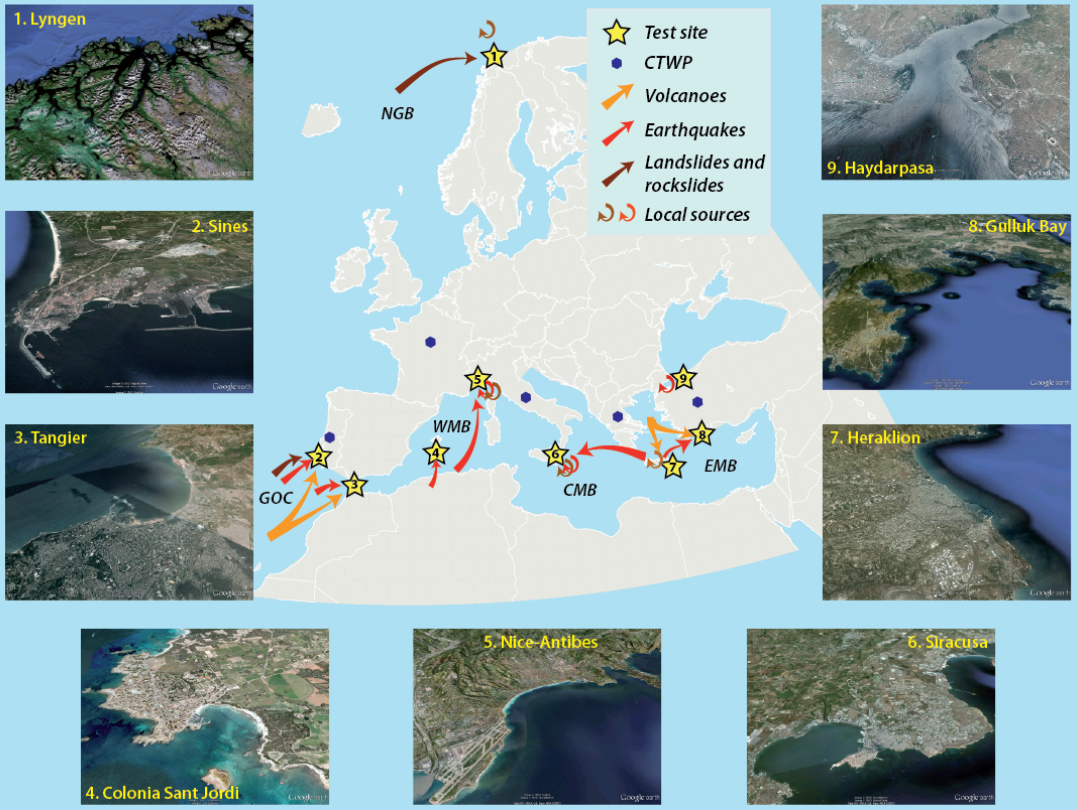
ASSESSMENTS, STRATEGY AND RISK REDUCTION FOR TSUNAMIS IN EUROPE

SEVENTH FRAMEWORK PROGRAMME

ASTARTE: FROM SOURCE TO COAST



TEST SITES

- Test sites can be impacted by regional and local tsunami sources, which put different levels of stress on detection and forecasting;

- Different tsunami source types, such as earthquakes, landslides, volcanoes and rockslides

- Different values at risk including industry, harbours and other infrastructures, and ecosystems

- Different coastal communities such as fishing communities, coastal cities and tourist developments.

- Test sites include a broad geographical coverage, in both North-east Atlantic and Mediterranean coasts

END-USERS

- National Tsunami Warning Centers
- Member-state Civil Protections
- Member-state coastal authorities
- European and Member-state regulatory bodies related with civil engineering;
- Non-Governmental Organizations related with environmental policy.

EXPECTED RESULTS

- **To improve the knowledge on tsunami generation** involving novel empirical data and statistical analyses so that the long-term recurrence and associated hazards of large events in NEAM region can be established

- **To develop numerical techniques for tsunami simulation** concentrating in: real-time codes and novel statistical emulations, and in new/refined methods for assessment of tsunami hazard, vulnerability and risk

- **Better tools for tsunami forecast and early warning** for the candidate Tsunami Watch Providers and National Tsunami Warning Centers

- **Guidelines** for tsunami Euro Codes and Guidelines for decision makers

- **In summary, ASTARTE will contribute to foster tsunami resilient communities in NEAM region**

WEB SITE

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ASSESSMENTS, STRATEGY AND RISK REDUCTION FOR TSUNAMIS IN EUROPE

SEVENTH FRAMEWORK PROGRAMME

ASTARTE • NEWS AND EVENTS • RESULTS • CONSORTIUM • CONTACTS

Assessment, STrategy And Risk Reduction for Tsunamis in Europe

ASTARTE | News and Events | Results | Consortium | Contacts

Objectives | Methodology | Test Sites | Expected Results | Related projects

The Challenge

Tsunamis are low frequency but high impact natural disasters. In 2004, the Boxing Day tsunami killed hundreds of thousands of people from many nations along the coastlines of the Indian Ocean. Tsunami run-up exceeded 35 m. Seven years later, and in spite of some of the best warning technologies and levels of preparedness in the world, the Tohoku-Oki tsunami in Japan dramatically showed the limitations of scientific knowledge on tsunami sources, coastal impacts and mitigation measures. The experience from Japan raised serious questions on how to improve the resilience of coastal communities, to upgrade the performance of coastal defenses, to adopt a better risk management, and also on the strategies and priorities for the reconstruction of damaged coastal areas. Societal resilience requires the reinforcement of capabilities to manage and reduce risk at national and local scales.

The Concept

The on-going set up of the North Eastern Atlantic, Mediterranean and connected seas region (NEAM) tsunami warning system (TWS) needs to consider these lessons when

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LATEST NEWS

25.07.2014 13:09

Astarte presentation at Conference on Collaboration and Technology (CRIWG 2014) Santiago - Chile

Abstract. In the aftermath of natural disasters, members of the affected communities are often the *de facto* first responders. Local volunteers can

FACT SHEET

European Commission

Natural Hazards

ASTARTE

At a glance

Title: Assessment, STrategy And Risk Reduction for Tsunamis in Europe

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FP7 – Collaborative Project

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The challenge

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Project objectives

The ultimate goals of ASTARTE are to reach a higher level of tsunami resilience in the North-East Atlantic (NEAM) region, which includes the Mediterranean Sea, to improve preparedness of coastal populations and, ultimately, to help saving lives and assets. The main objectives are:

(i) Assessing long term recurrence of tsunamis; (ii) Improving the identification of tsunami generation mechanisms; (iii) Developing new computational tools for hazard assessment; (iv) Ameliorate the understanding of tsunami interactions with coastal structures; (v) Enhance tsunami detection capabilities, forecast and early warning skills in the NEAM region; (vi) Establishing new approaches to quantify vulnerability and risk and to identify the key components of tsunami resilience and their implementation in the NEAM region.

Methodology

ASTARTE consists of 10 work packages (WPs). Following WP1, which is devoted to Project coordination and management, WPs 2-5 focus on tsunami recurrence, generation mechanisms, modeling and coastal impacts. Altogether these WPs will provide an up-to-date knowledge background to the Project. They involve dedicated fieldwork, including research cruises, in locations that are considered highly significant to obtain new critical background information. Most ship time costs will be provided in kind by the Consortium partners, with only a very small amount charged to the Project. WPs 6-8 focus on detection and communication infrastructures, early warning and forecast and risk assessment. These WPs open into WP9, which aims at building tsunami resilient societies in Europe, and WP10, which is devoted to the dissemination and exploitation of results. ASTARTE considers 9 test sites in the Mediterranean and Northeast Atlantic where interconnections between WPs will be implemented, interactions with stakeholders and the society at large will take place, and practical applications will be tested.

Expected results

ASTARTE will result in: (i) an improved knowledge on tsunami generation involving novel empirical data and statistical analyses so that the long-term recurrence and associated hazards of large events in sensitive areas of the NEAM could be established; (ii) the development of numerical techniques for tsunami simulation concentrating in real-time codes and novel statistical emulations, and (iii) refined methods for the assessment of tsunami hazard, vulnerability and risk. ASTARTE will also provide better forecast and warning tools for candidate tsunami watch providers (CTWPs) and national tsunami warning centers (NTWCs), and guidelines for tsunami Euro Codes and decision makers so that sustainability and resilience of coastal communities could be increased. In summary, ASTARTE will develop critical scientific and technical elements required for a significant enhancement of the Tsunami Warning System (TWS) in the NEAM region in terms of monitoring, early warning and forecast, governance and resilience. Overall, this will lead to the goal of the European/NEAM Horizon 2020 strategy: to foster tsunami resilient communities.

Project Partners	Country
INSTITUTO PORTUGUES DO MAR E DA ATMOSFERA	PT
FUNDACAO DA FACULDADE DE CIENCIAS DA UNIVERSIDADE DE LISBOA	PT
MIDDLE EAST TECHNICAL UNIVERSITY	TR (TURKEY)
BOGAZICI UNIVERSITESI	TR (TURKEY)
COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES	FR
CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	FR
ALMA MATER STUDIORUM-UNIVERSITA DI BOLOGNA E VULCANOLOGIA	IT
ISTITUTO NAZIONALE DI GEOFISICA E VULCANOLOGIA	IT
UNIVERSIDAD DE CANTABRIA	ES
UNIVERSITAT DE BARCELONA	ES
TECHNICAL UNIVERSITY OF CRETE	GR
NATIONAL OBSERVATORY OF ATHENS	GR
UNIVERSITAET HAMBURG	DE
HELMHOLTZ-ZENTRUM POTSDAM DEUTSCHES GEOFORSCHUNGSZENTRUM	DE
UNIVERSITAET BREMEN	DE
STIFTELSEN NORGES GEOTEKNISKE INSTITUTT	NO (NORWAY)
UNIVERSITY COLLEGE DUBLIN, NATIONAL UNIVERSITY OF IRELAND	IE
NATURAL ENVIRONMENT RESEARCH COUNCIL	GB
DANMARKS TEKNISKE UNIVERSITET	DK
NSTITUTUL NATIONAL DE CERCETARE-DEZVOLTARE PENTRU FIZICA PAMANTULUI	RO
SPECIAL RESEARCH BUREAU FOR AUTOMATION OF MARINE RESEARCHES FAR EAST BRANCH RUSSIAN ACADEMY OF SCIENCE	RU (RUSSIAN FEDERATION)
CENTRE NATIONAL POUR LA RECHERCHE SCIENTIFIQUE ET TECHNIQUE	MO (MOROCCO)
U.S. DEPARTMENT OF COMMERCE	US (UNITED STATES)
PORT AND AIRPORT RESEARCH INSTITUTE	JP (JAPAN)
UNIVERSITY OF SOUTHERN CALIFORNIA	US (UNITED STATES)
UNIVERSITY OF TOKYO	JP (JAPAN)

http://www.astarte-project.eu/files/astarte/documents/deliverables/d10-52/ASTARTE_FACTSHEET_nov_08_2013.pdf

NEWSLETTER

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ASSESSMENTS, STRATEGY AND RISK REDUCTION FOR TSUNAMIS IN EUROPE

SEVENTH FRAMEWORK PROGRAMME

EU FP7 Project [603839] ASTARTE - "Assessment, STrategy And Risk Reduction for Tsunamis in Europe"

astarte **Newsletter**

ISSUE No,1 *This is the publication of the ASTARTE project. It is published at every six months.* *April 2014*

IN THIS ISSUE...

- The "TSUNAMI" challenge
- ASTARTE project has started!
- Objectives of ASTARTE
- Methodology of ASTARTE
- Expected results from ASTARTE
- Project and WP kick-off meetings
- Test sites
- Completed deliverables
- Related ongoing EC projects

"The experience from Japan raised serious questions on how to improve the resilience of coastal communities..."

***ASTARTE** aims:*

Assessment of generation mechanisms, evaluation of uncertainties, development of new numerical and experimental techniques for propagation, coastal amplification and inundation, networking in detection and warning, achievements on structural and social resilience against tsunamis with 26 partners from 16 countries.

The "TSUNAMI" challenge

Tsunamis are low frequency but high impact natural disasters. In 2004, the Boxing Day tsunami killed hundreds of thousands of people from many nations along the coastlines of the Indian Ocean. Tsunami run-up locally exceeded 35 m. Seven years later, and in spite of some of the best warning technologies and levels of preparedness in the world, the Tohoku-Oki tsunami in Japan dramatically showed the limitations of scientific knowledge on tsunami sources, coastal impacts and mitigation measures. The experience from Japan raised serious questions on how to improve the resilience of coastal communities, to upgrade the performance of coastal defenses, to adopt a better risk management, and also on the strategies and priorities for the reconstruction of damaged coastal areas. Societal resilience requires the reinforcement of capabilities to manage and reduce risk at national and local scales.

The screenshot (at left top) from the video of ANN recorded at the balcony of the Miyako City Mayor Office has reflected the devastating scale of the Great East Japan Earthquake and Tsunami on March 11, 2011. The tsunami overtopped the seawall and carried all size of debris with boats and even the cars.

The photo at the left bottom was taken by International Survey Team from Tohoku University, METU, KOERI, TUC (ASTARTE Partners) in May-June 2011.

ASTARTE project has started!

ASTARTE (Assessment, STrategy And Risk Reduction for Tsunamis in Europe), an international project on tsunamis funded by EC-FP7 (Contract No. 603839), has officially started in November 1, 2013. The project is organized to foster tsunami resilience in Europe, through innovative research on scientific problems critical to enhance forecast skills in terms of sources, propagation and impact. ASTARTE will apply lessons on coastal resilience learned from disaster surveys following tsunamis and hurricane surges. Within ASTARTE, we will acquire new information to complete the European knowledge base, and we will benefit from the strongest integration ever attempted in the field. This will involve close cooperation with coastal populations, civil protection, emergency management and other local organizations.

http://www.astarte-project.eu

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SOME RESULTS

ASTARTE publications

On the use of Green's summation for tsunami waveform estimation: a case study

J. M. Miranda[1], M. A. Baptista[2] and R. Omira[3]
+ Author Affiliations

Accepted 2014 July 7.
Received 2014 July 7.
In original form 2013 December 6.

Summary

The method presented here aims to assess the tsunami threat very rapidly after the occurrence of a large earthquake, using as input the parameters of the seismic source, and an approach based on Green's summation. We show that the main weakness of the approach (the need to consider only linear shallow water propagation) is largely compensated by the advantages in terms of computing performance and independence with respect to pre-computed scenarios. To test the approach and to illustrate its implementation in a real environment, we focus on the Sea of Oman, a tsunamigenic area characterized by Makran subduction zone which detailed structure is partially unknown and where secondary tsunami sources must also be taken into account, both for hazard studies and warning purposes. The potential source area is partitioned into a grid of unity water sources. A shallow water (SW) numerical model is used to pre-compute the corresponding empirical Green's functions on several points of interest located on the coasts of Iran, Pakistan and Oman. The comparison between Green's summation and the direct SW computation using the full resolution of the bathymetric grid shows that the accuracy is good enough for practical applications.

Key words Numerical approximations and analysis • Early warning • Indian Ocean

SCIENTIFIC REPORTS

OPEN

Structural control on the Tohoku earthquake rupture process investigated by 3D FEM, tsunami and geodetic data

SUBJECT AREAS: GEOPHYSICS SEISMOLOGY
Received 5 February 2014
Accepted 20 June 2014
Published 9 July 2014

F. Romano[1], E. Trasatti[1], S. Lorito[1], C. Piromallo[1], A. Piatanesi[1], Y. Ito[2], D. Zhao[3], K. Hirata[4], P. Lanucara[5] & M. Cocco[1]

SCIENTIFIC REPORTS | 4 : 5631 | DOI: 10.1038/srep05631

ASTARTE @ EGU 2014

Geophysical Research Abstracts
Vol. 16, EGU2014-11400, 2014
EGU General Assembly 2014

Assessment of Tsunami Inundation map for Bulgarian coasts of in the Black Sea

Andrey Zaytsev (1,3,4), Irina Didenkulova (2,3,4), Boyko Ranguelov (5), Efim Pelinovsky (4,3), and Ahmet Yalciner (6)

Tsunami hazard in the Black Sea is considered low to moderate but not negligible. At present, New European Tsunami Catalogue counts 29 historical tsunami events in the Black Sea, 22 of which are considered as reliable. Four of them affected Bulgarian coast including a strong earthquakes event 544/545 of offshore Varna.
Here we discuss a forecast of possible tsunami wave heights at Bulgarian coasts of the Black Sea. In order to do that, prognostic numerical simulations of 55 tsunami events with use non-linear Boussinesq equation model in the Baltic Sea has been performed. All tsunami sources are uniformly distributed in the Black Sea basin. The results of prognostic numerical simulations are compared with the results of numerical modelling of two instrumentally measured historical events (1939 and 1966) and with the data of instrumental measurements. On this basis a preliminary forecast of tsunami inundation map along the Bulgarian coast of the Black Sea is given developed. Certainly a the tsunami the risk in the Black Sea is not too high but considering development of the European coastal infrastructure and utilization it becomes important. is An The gas terminal on at the Bulgarian coast of «South Stream» connecting to the Russian coast is an example of critical structures for which the tsunami assessment is also performed. necessary to consider it, here it is possible to refer construction of the gas terminal on the Bulgarian coast «South Stream» connecting to the Russian coast.

Acknowledgements: Support by EU 603839 ASTARTE Project, RFBR 14-05-00092, Russian Federation President Award 1935.2012.5

Geophysical Research Abstracts
Vol. 16, EGU2014-10035, 2014
EGU General Assembly 2014

The Hellenic National Tsunami Warning Centre (HL-NTWC): Recent updates and future developments

Nikolaos S. MELIS and Marinos CHARALAMPAKIS
NATIONAL OBSERVATORY OF ATHENS, INSTITUTE OF GEODYNAMICS, Athens, Greece

The Hellenic NTWC (HL-NTWC) was established officially by Greek Law in September 2010. HL-NTWC is hosted at the National Observatory of Athens, Institute of Geodynamics (NOA-IG), which also operates a 24/7 earthquake monitoring service in Greece and coordinates the newly established Hellenic Unified National Seismic Network. NOA-IG and HL-NTWC Operational Centre is linked to the Civil Protection Operational Centre and serves as the official alerting agency to the General Secretariat for Civil Protection in Greece, regarding earthquake events and tsunami watch.
Since August 2012, HL-NTWC acts as Candidate Tsunami Watch Provider (CTWP) under the UNESCO IOC – ICG NEAMTWS tsunami warning system (NEAM: North-Eastern Atlantic, the Mediterranean and connected seas) and offers its services to the NEAMTWS system. HL-NTWC has participated in all Communication Test Exercises (CTE) under NEAMTWS and also it has provided tsunami scenarios for extended system testing exercises such as NEAMWAVE12.
Some of the recent developments at HL-NTWC in Greece include: deployment of new tide gauge stations for tsunami watch purposes, computation of tsunami scenarios and extending the database in use, improving alerting response times, earthquake magnitude estimation and testing newly established software modules for tsunami and earthquake alerting (i.e. Early-Est, SeisComP3 etc.) in Greece and the Eastern Mediterranean.
Although funding today is limited, an advantage of the participation in important EC funded research projects, i.e. NERIES, NERA, TRANSFER, NEAMTIC and ASTARTE, demonstrates that collaboration of top class Research Institutions that care to produce important and useful results in the research front in Europe, can facilitate towards developing and operating top class Operational Centers, useful for Civil Protection purposes in regions in need. Last, it is demonstrated that HL-NTWC collaboration with important key role Research Centers in the Security and Safety issues (e.g. JRC-IPSC) at the Operational front, can further facilitate and secure everyday operation under a collaborative and experience exchanging manner.

This work is funded by project ASTARTE - Assessment, STrategy And Risk Reduction for Tsunamis in Europe. Grant 603839, 7th FP (ENV.2013.6.4-3 ENV.2013.6.4-3)

Geophysical Research Abstracts
Vol. 16, EGU2014-4305, 2014
EGU General Assembly 2014

Tsunami hazard assessment for the area of Siracusa and Augusta (eastern Sicily, Italy) by means of numerical techniques

Stefano Tinti, Alberto Armigliato, Gianluca Pagnoni, and Filippo Zaniboni
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The eastern coast of Sicily is one of the littorals most prone to tsunami hazard in the Mediterranean Sea. The potential tsunamigenic sources are many, all connected to the complex geological pattern of the area, and they span different scales. On the local scale one can find the Hyblaean-Malta Escarpment (HME), characterized by mass failures that have been hypothesized as possible causes of local tsunami generation (see e.g. the deep-sea slide off Augusta that was speculatively associated to the 1693 earthquake). On the medium range, the faults along the HME, the Ionian Sea, the Messina Straits, as a part of the wider Calabrian Arc system, provided several relevant earthquakes in the past, some of which producing large tsunamis, such as the 1693 and the 1908 events. In the far field, the western Hellenic Arc, characterized by the largest earthquakes in the whole Mediterranean Sea, has the potential of big trans-Mediterranean tsunamis capable of severe effects also on the coasts of Sicily.
In the framework of the EU-FP7 project ASTARTE, the area embracing the cities of Siracusa and Augusta, located in the southern part of the Ionian coast of Sicily, has been chosen as a test site for the evaluation of the tsunami hazard and risk by means of various techniques. In this work we adopt the worst-case credible scenario approach, which means that after taking into account the possible sources in different zones we select the largest events on the basis of historical and geo- and seismo-tectonical considerations and we compute the corresponding tsunami. The numerical calculations are carried out by means of in-house developed models: UBO-BLOCK to simulate the dynamics of the tsunamigenic slides, a code implementing the Okada equations to compute the co-seismic displacements of the sea floor, UBO-TSUFD to calculate the tsunami propagation over a domain covered by one or more regularly spaced grids with different resolution (the finer grids being nested within the coarser ones).
For each scenario, this procedure provides traditionally the fields of maximum values of relevant parameters such as the highest sea level, the maximum water particles speed, the maximum run-up and inundation distance, etc as well as synthetic tide gauges in specified locations. In addition, the aggregate fields can be built by picking up the extreme values of the worst-case scenarios in each point of the domain. One of such aggregate field is the field of the largest inundation depth at the coast, also providing the maximum flooding area which is a tool of great relevance for local authorities to implement mitigation actions such as evacuation programs and long-term development plans of the coastal zone.

Geophysical Research Abstracts
Vol. 16, EGU2014-11633, 2014
EGU General Assembly 2014

High Resolution Tsunami Modeling and Assessment of Harbor Resilience; Case Study in Istanbul

Ahmet Cevdet Yalciner (1), Betul Aytore (2), Hasan Gokhan Guler (2,6), Utku Kanoglu (3), Sebnem Duzgun (4), Andrey Zaytsev (5), Taro Arikawa (6), Takashi Tomita (6), Ceren Ozer Sozdinler (7), Ocal Necmioglu (7), and Nurcan Meral Ozel (7)
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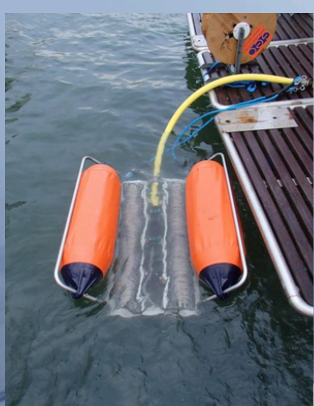
Ports and harbors are the major vulnerable coastal structures under tsunami attack. Resilient harbors against tsunami impacts are essential for proper, efficient and successful rescue operations and reduction of the loss of life and property by tsunami disasters. There are several critical coastal structures as such in the Marmara Sea. Haydarpasa and Yenikapı ports are located in the Marmara Sea coast of Istanbul. These two ports are selected as the sites of numerical experiments to test their resilience under tsunami impact. Cargo, container and ro-ro handlings, and short/long distance passenger transfers are the common services in both ports. Haydarpasa port has two breakwaters with the length of three kilometers in total. Yenikapi port has one kilometer long breakwater.
The accurate resilience analysis needs high resolution tsunami modeling and careful assessment of the site. Therefore, building data with accurate coordinates of their foot prints and elevations are obtained. The high resolution bathymetry and topography database with less than 5m grid size is developed for modeling. The metadata of the several types of structures and infrastructure of the ports and environs are processed. Different resistances for the structures/buildings/infrastructures are controlled by assigning different friction coefficients in a friction matrix. Two different tsunami conditions - high expected and moderate expected - are selected for numerical modeling. The hybrid tsunami simulation and visualization codes NAMI DANCE, STOC-CADMAS System are utilized to solve all necessary tsunami parameters and obtain the spatial and temporal distributions of flow depth, current velocity, inundation distance and maximum water level in the study domain. Finally, the computed critical values of tsunami parameters are evaluated and structural performance of the port components are discussed in regard to a better resilience.

ACKNOWLEDGEMENTS: Support by EU 603839 ASTARTE Project, UDAP-Ç-12-14 of AFAD, 108Y227 and 113M556 of TUBITAK, RAPSODI (CONCERT_Dis-021) of CONCERT-Japan Joint Call, Earthquake and Tsunami Disaster Mitigation in The Marmara Region and Disaster Education in Turkey Japan-Turkey Joint Research Project by SATREPS, 2011K140210 of DPT, Istanbul Metropolitan Municipality are acknowledged.

ASTARTE Marine cruises



ASTARTE smart phone app

International Workshop «Mega Earthquakes and Tsunamis in Subduction Zones–Forecasting Approaches and Implications for Hazard Assessment», Rhodes Isl., Greece, 6-8 October, 2014.

FINDING PEOPLE IN NATURAL DISASTERS

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When disasters (like earthquakes, hurricanes or tsunamis) hit populated areas, members of the affected communities often offer themselves to help in the field. While they may not have the necessary knowledge to provide first aid to victims in every situation, these volunteers know the geography and have a better sense of which people are missing. They can be valuable actors in emergency operations, providing immediate response and collecting information useful to other stakeholders, like civil defence efforts. They can report changes in the field, which people need help, etc. In areas that become isolated, local volunteers are sometimes the primary emergency responders for extended periods of time.

However, at those sites in the immediate aftermath of events, accurate information about the location and status of potential victims is often hard to collect, even for locals. Moreover, the communication infrastructure fails or is overloaded, hindering the dissemination of information, amongst volunteers, victims and volunteers and volunteers and professional rescuers. Technology, that could play a major role here, is crippled and tools that empower local volunteers are still uncommon.

We propose FIND (Finding Inaccessible people in Natural Disasters), a system that tackles the challenge of providing a source of actionable information to volunteer responders. It comprehends four main components. A smartphone application automatically gathers location and aliveness activity information from people's smartphones, which then tries to disseminate in a peer-to-peer, ad-hoc network. This network requires no infrastructure, relying solely in availability of neighbouring smartphones. Still, provided the adequate conditions, quite possible in the aforementioned scenarios, it provides the means to disseminate the information through very large areas. A second component, a tablet application, provides a visualization map where volunteers can directly track the data provided by the victims' smartphones. Besides the location, it shows aggregation and history of the victims' aliveness data thus informing the volunteers about the people's conditions in his/her vicinity. This component uses the same peer-to-peer, ad-hoc network, but it extends it by actively searching for any available infrastructured network. Upon success it uploads data to the third component, a server, which functions as a central repository, managing the data collected from all victims' smartphones and all volunteers' tablets. The last component is a web application, also providing a larger visualization map, which allows rescuers to access the server's data, thus allowing them to coordinate actions over the real information gathered in different locations.

Two studies have been conducted to preliminarily validate the solution. The first assesses the comprehension that users may have of the mapping tool. The second evaluates the efficiency of the tablet tool in rescuing operations, particularly considering the decisions people make when faced with the aliveness data.

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LOST-Map: A Victim-Sourced Rescue Map of Disaster Areas

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Abstract. In the aftermath of natural disasters, members of the affected communities are often the *de facto* first responders. Local volunteers can respond quickly, are strongly motivated, and have the necessary ground knowledge. However, their search and rescue efforts may be misdirected in the absence of information about the location and status of victims. We propose LOST, a system that gathers data from smartphones in affected areas, even when the regular communication infrastructure fails, and aggregates it in a web interface for visualization. For each individual, LOST-Map shows location traces and activity indicators. The information can be explored by selecting time-frames and/or applying filters over activity indicators. This paper briefly describes the design of LOST, introduces the visualization tool LOST-Map, and reports on a study (n=10) that suggests that it can be effectively used by untrained volunteers.

Keywords: Disaster management, Emergency response, Location services.

1 Introduction

When disasters (like earthquakes, hurricanes or tsunamis) hit populated areas, members of the affected communities often offer themselves to help in the field. While they may not have the necessary knowledge to provide first aid to victims in every situation, these volunteers know the geography and have a better sense of which people are missing. They can be valuable actors in emergency operations, providing immediate response and collecting information useful to other stake-holders, like civil defence efforts. They can report changes in the field, which people need help, etc. In areas that become isolated, local volunteers are sometimes the primary emergency responders for extended periods of time. However, when information flows are chaotic, it is difficult, even for locals, to have an accurate account of the location and status of potential victims. Often the communication infrastructure fails or is overloaded, hindering the dissemination of information.

Technology plays a crucial role in emergency response. Yet, tools that empower local volunteers aren't still common. LOST is a system that tackles the challenge of providing a source of actionable information to volunteer responders. With LOST,

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UP COMING EVENTS

After a year of ASTARTE activities, it's time for all involved to meet and discuss what was done and what is to be done ahead.

The General Assembly meeting will take place 16th and 17th October 2014 in Siracusa, Italy, one of ASTARTE's test sites, followed by a field trip.

Location: Siracusa, Sicily, Italy

Organized by University of Bologna and Local Civil Protection

THANKS !

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